County of San Diego
Parks and Recreation

ENERGY SAVING ADVENTURES

ESA

REC Club Unplugged

Program Manual

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PARKS AND RECREATION
COUNTY OF SAN DIEGO
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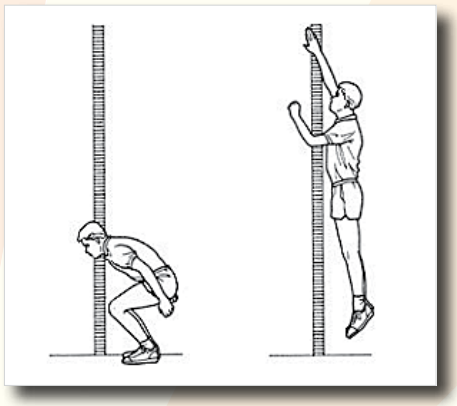

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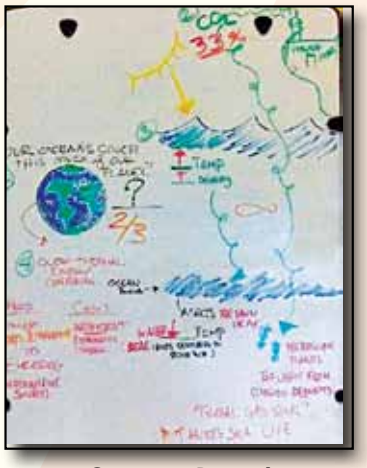

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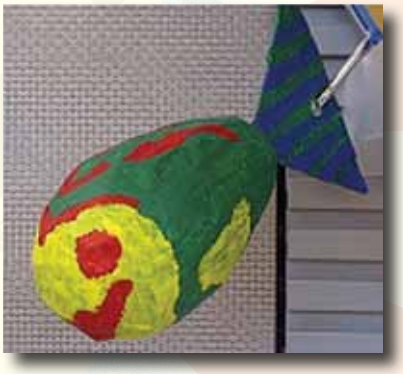

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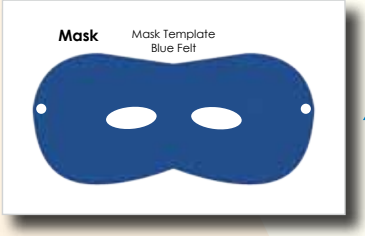

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THE ENERGY SAVING ADVENTURES PROGRAM

ESA Overview

Through a local partnership between the County of San Diego Parks and Recreation Department and San Diego Gas and Electric, the Energy Saving Adventures Program (ESA) provides innovative curriculum integrated into existing recreational activities. Information on energy efficiency, conservation, demand response and renewable is provided through programs including but not limited to "flagship" events at park sites, outdoor adventure and education programs, community and teen center programs, sports facilities, health fairs, theme based events and sponsorships.

Facilities

Since the launch of the DPR and SDG&E partnership, ESA has been implemented at both the Lakeside and Spring Valley REC Clubs. While both centers have their own individualized demographics, both ESA programs share the same vision of teaching participants about energy efficiency through recreational activities.

LAKESIDE REC CLUB
9911 Vine Street
Lakeside, CA 92040
(619) 443-4169

SPRING VALLEY REC CLUB
838 Kempton Street
Spring Valley, CA 91977
(619) 667-6835

Program Mission

ESA provides an outlet that empowers participants ages 10-17 to modify their behavior in order to support a more sustainable society. Daily programming educates teens through hands on activities that also fulfill DPR's health and wellness initiatives. Participants learn to budget energy use and minimize losses in all aspects, including physical activity and daily energy consumption.

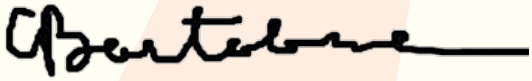
Promise to the Community

I am committed to enriching lives through lifelong learning experiences. The driving force to my commitment is my passion for working with youth and being able to create opportunities for change. I was once a teen in need of a constructive outlet, and then someone gave me the chance to challenge myself and opened my eyes to both recreation and the natural beauty of the great outdoors.

Through my time with the County of San Diego, I have been able to acquire a unique set of skills that allow me to develop and implement a large variety of activities as an educator and interpreter. Combined with my degree in Exercise Science, my goal is to make a difference in our communities by building connections between health and wellness, energy efficiency and conservation.

The County of San Diego Department of Parks and Recreation has created something larger than life, a hybrid curriculum of recreation and conservation. Change shouldn't be revolutionary, but evolutionary. The goal of our program is to make minor modifications in our daily lives in order to reap the benefits on a larger scale in the future. The Energy Saving Adventures program has created a creative after school outlet for youth to achieve goals in the areas of conservation, health and education. As the ESA program continues to expand and gain national recognition, my goal is to maintain the integrity of our program as an innovator and leader in both the recreation and conservation fields.

Fully committed,



Caroline Bartolome
Energy Saving Adventures
Program and Education Coordinator

Lesson Plan Template

Facility Upgrade Treasure Hunt

Program Description

Critical Thinking, Scavenger Hunt

Goals & Objectives

Participants will learn more about the energy efficient upgrades installed at the center, including why they were installed in each location and how they operate.

Program Impact

Participants perform an energy audit in the center by having an EE scavenger hunt. This hunt will take them around to all of the EE upgrades we have made in the Spring Valley REC club.

Curriculum

Basic Instructions

Create a list of energy efficient upgrades in your center. (For example, smart strip locations, Energy Star appliances, watt meters, lights that have timers etc)

Create clues that will lead participants to each upgrade.

Divide participants into teams and have staff distribute clues

As each team solves clues and finds each upgrade.

The first team to find each upgrade and return to home base is the winner.

After the activity, facilitate discussion about each upgrade with participants.

Discussion Topics

Energy Efficiency upgrades –be prepared to discuss each upgrade/ location to participants following the activity.

Required Supplies List & Budget

List of clues

Program Follow up & Suggestions

Distribute clues to teams in different orders so that they are not in the same place at one time. This prevents teams from simply following one another to each location.

How To Use This Manual

In accordance to the scope of work agreed upon through the Local Government Partnership between the County of San Diego Parks and Recreation Department and San Diego Gas & Electric, the following manual has been set up using the following key:

Lesson Emphasis Key

Blue

Energy Efficiency and Preservation (80%)

Green

Conservation, Demand Response & Renewables (20%)

In addition, curriculum has been split into two different categories:

DAILY PROGRAMMING

Individual activities that fall under the 80/20% split of the Local Government Partnership Scope of Work.

ONGOING PROGRAMS

Activities and programs that fall under multiple categories within the outlined scope of work.

Notes

Activities with multiple Goals & Objectives coincide with the numbered Program Impact listed below**

Items listed under "Required Supplies" and associated costs are subject to approval as many items were readily available at existing facilities

Education Standards

The lesson plans included in this manual correspond with the following California Department of Education K-12 standards:

References

Science Content Standards for California Public Schools Kindergarten Through Grade Twelve. California Department of Education, 14 Feb., 2013. Web.

Health Education Content Standards for California Public Schools Kindergarten Through Grade Twelve. California Department of Education , 14 Feb., 2013. Web.

Science Standards

Grade One

2. Plants and animals meet their needs in different ways. As a basis for understanding this concept:
    a. Students know different plants and animals inhabit different kinds of environments and have external features that help them thrive in different kinds of places.
    b. Students know both plants and animals need water, animals need food, and plants need light.
3. Weather can be observed, measured, and described. As a basis for understanding this concept:
    a. Students know how to use simple tools (e.g., thermometer, wind vane) to measure weather conditions and record changes from day to day and across the seasons.
4. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:
    a. Make new observations when discrepancies exist between two descriptions of the same object or phenomenon.

Grade Two

1. The motion of objects can be observed and measured. As a basis for understanding this concept:
    c. Students know the way to change how something is moving is by giving it a push or a pull. The size of the change is related to the strength, or the amount of force, of the push or pull.

3. Earth is made of materials that have distinct properties and provide resources for human activities. As a basis for understanding this concept:
    e. Students know rock, water, plants, and soil provide many resources, including food, fuel, and building materials, that humans use.

Grade Three

1. Energy and matter have multiple forms and can be changed from one form to another. As a basis for understanding this concept:
    b. Students know sources of stored energy take many forms, such as food, fuel, and batteries.
    c. Students know machines and living things convert stored energy to motion and heat.
    d. Students know energy can be carried from one place to another by waves, such as water waves and sound waves, by electric current, and by moving objects.
3. Adaptations in physical structure or behavior may improve an organism's chance for survival. As a basis for understanding this concept:
    a. Students know plants and animals have structures that serve different functions in growth, survival, and reproduction.
    c. Students know living things cause changes in the environment in which they live: some of these changes are detrimental to the organism or other organisms, and some are beneficial.
    d. Students know when the environment changes, some plants and animals survive and reproduce; others die or move to new locations.
4. Objects in the sky move in regular and predictable patterns. As a basis for understanding this concept:
    e. Students know the position of the Sun in the sky changes during the course of the day and from season to season.

Grade Four

1. Electricity and magnetism are related effects that have many useful applications in everyday life. As a basis for understanding this concept:
    b. Students know how to build a simple compass and use it to detect magnetic effects, including Earth's magnetic field.
    c. Students know electric currents produce magnetic fields and know how to build a simple electromagnet.

2. All organisms need energy and matter to live and grow. As a basis for understanding this concept:
   a. Students know plants are the primary source of matter and energy entering most food chains.
3. Living organisms depend on one another and on their environment for survival. As a basis for understanding this concept:
   a. Students know ecosystems can be characterized by their living and nonliving components.
   b. Students know that in any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all.
5. Waves, wind, water, and ice shape and reshape Earth's land surface. As a basis for understanding this concept:
   a. Students know some changes in the earth are due to slow processes, such as erosion, and some changes are due to rapid processes, such as landslides, volcanic eruptions, and earthquakes.
   c. Students know moving water erodes landforms, reshaping the land by taking it away from some places and depositing it as pebbles, sand, silt, and mud in other places (weathering, transport, and deposition).

Grade Five

2. Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials. As a basis for understanding this concept:
   f. Students know plants use carbon dioxide (CO2) and energy from sunlight to build molecules of sugar and release oxygen.
   g. Students know plant and animal cells break down sugar to obtain energy, a process resulting in carbon dioxide (CO) and water (respiration).
3. Water on Earth moves between the oceans and land through the processes of evaporation and condensation. As a basis for understanding this concept:
   a. Students know most of Earth's water is present as salt water in the oceans, which cover most of Earth's surface.
   d. Students know that the amount of fresh water located in rivers, lakes, underground sources, and glaciers is limited and that its availability can be extended by recycling and decreasing the use of water.
   e. Students know the origin of the water used by their local communities.

4. Energy from the Sun heats Earth unevenly, causing air movements that result in changing weather patterns. As a basis for understanding this concept:
    b) Students know the influence that the ocean has on the weather and the role that the water cycle plays in weather patterns.

Grade Six

1. Plate tectonics accounts for important features of Earth's surface and major geologic events. As a basis for understanding this concept:
    e. Students know major geologic events, such as earthquakes, volcanic eruptions, and mountain building, result from plate motions.
2. Topography is reshaped by the weathering of rock and soil and by the transportation and deposition of sediment. As a basis for understanding this concept:
    a. Students know water running downhill is the dominant process in shaping the landscape, including California's landscape.
    b. Students know rivers and streams are dynamic systems that erode, transport sediment, change course, and flood their banks in natural and recurring patterns.
    c. Students know beaches are dynamic systems in which the sand is supplied by rivers and moved along the coast by the action of waves.
3. Heat moves in a predictable flow from warmer objects to cooler objects until all the objects are at the same temperature. As a basis for understanding this concept:
    a. Students know energy can be carried from one place to another by heat flow or by waves, including water, light and sound waves, or by moving objects.
    b. Students know that when fuel is consumed, most of the energy released becomes heat energy.
4. Many phenomena on Earth's surface are affected by the transfer of energy through radiation and convection currents. As a basis for understanding this concept:
    a. Students know the sun is the major source of energy for phenomena on Earth's surface; it powers winds, ocean currents, and the water cycle.
    b. Students know solar energy reaches Earth through radiation, mostly in the form of visible light.
    c. Students know heat from Earth's interior reaches the surface primarily through convection.

d. Students know convection currents distribute heat in the atmosphere and oceans.

e. Students know differences in pressure, heat, air movement, and humidity result in changes of weather.

5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. As a basis for understanding this concept:

a. Students know energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis and then from organism to organism through food webs.

b. Students know matter is transferred over time from one organism to others in the food web and between organisms and the physical environment.

e. Students know the number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as quantities of light and water, a range of temperatures, and soil composition.

6. Sources of energy and materials differ in amounts, distribution, usefulness, and the time required for their formation. As a basis for understanding this concept:

b. Students know different natural energy and material resources, including air, soil, rocks, minerals, petroleum, fresh water, wildlife, and forests, and know how to classify them as renewable or nonrenewable.

Grade Seven

3. Biological evolution accounts for the diversity of species developed through gradual processes over many generations. As a basis for understanding this concept:

a. Students know both genetic variation and environmental factors are causes of evolution and diversity of organisms.

e. Students know that extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient for its survival.

5. The anatomy and physiology of plants and animals illustrate the complementary nature of structure and function. As a basis for understanding this concept:

c. Students know how bones and muscles work together to provide a structural framework for movement.

6. Physical principles underlie biological structures and functions. As a basis for understanding this concept:

i. Students know how levers confer mechanical advantage and how the application of this principle applies to the musculoskeletal system.

Grade Eight

1. The velocity of an object is the rate of change of its position. As a basis for understanding this concept:
   a. Students know that average speed is the total distance traveled divided by the total time elapsed and that the speed of an object along the path traveled can vary.
   b. Students know how to solve problems involving distance, time, and average speed.

8. All objects experience a buoyant force when immersed in a fluid. As a basis for understanding this concept:
   c. Students know the buoyant force on an object in a fluid is an upward force equal to the weight of the fluid the object has displaced.
   d. Students know how to predict whether an object will float or sink.

Grades Nine through Twelve

Physics

1. Newton's laws predict the motion of most objects. As a basis for understanding this concept:
   b. Students know that when forces are balanced, no acceleration occurs; thus an object continues to move at a constant speed or stays at rest (Newton's first law).
   d. Students know that when one object exerts a force on a second object, the second object always exerts a force of equal magnitude and in the opposite direction (Newton's third law).

2. The laws of conservation of energy and momentum provide a way to predict and describe the movement of objects. As a basis for understanding this concept:
   a. Students know how to calculate kinetic energy by using the formula E=(1/2)mv2.
   b. Students know how to calculate changes in gravitational potential energy near Earth by using the formula (change in potential energy) =mgh (h is the change in the elevation).

3. Energy cannot be created or destroyed, although in many processes energy is transferred to the environment as heat. As a basis for understanding this concept:
   a. Students know heat flow and work are two forms of energy transfer between systems.

b. Students know how to solve problems involving heat flow, work, and efficiency in a heat engine and know that all real engines lose some heat to their surroundings.

4. Waves have characteristic properties that do not depend on the type of wave. As a basis for understanding this concept:

a. Students know waves carry energy from one place to another.

Chemistry

7. Energy is exchanged or transformed in all chemical reactions and physical changes of matter. As a basis for understanding this concept:

b. Students know energy is released when a material condenses or freezes and is absorbed when a material evaporates or melts.

Biology/ Life Sciences

6. Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:

a. Students know biodiversity is the sum total of different kinds of organisms and is affected by alterations of habitats.

b. Students know how to analyze changes in an ecosystem resulting from changes in climate, human activity, introduction of nonnative species, or changes in population size.

7. The frequency of an allele in a gene pool of a population depends on many factors and may be stable or unstable over time. As a basis for understanding this concept:

d. Students know variation within a species increases the likelihood that at least some members of a species will survive under changed environmental conditions.

10. Organisms have a variety of mechanisms to combat disease. As a basis for under-standing the human immune response:

a. Students know the role of the skin in providing nonspecific defenses against infection.

Earth Sciences

4. Energy enters the Earth system primarily as solar radiation and eventually escapes as heat. As a basis for understanding this concept:

c. Students know the different atmospheric gases that absorb the Earth's thermal radiation and the mechanism and significance of the greenhouse effect.

d. * Students know the differing greenhouse conditions on Earth, Mars, and Venus; the origins of those conditions; and the climatic consequences of each.

5. Heating of Earth's surface and atmosphere by the sun drives convection within the atmosphere and oceans, producing winds and ocean currents. As a basis for understanding this concept:

   d. Students know properties of ocean water, such as temperature and salinity, can be used to explain the layered structure of the oceans, the generation of horizontal and vertical ocean currents, and the geographic distribution of marine organisms.

California Geology

9. The geology of California underlies the state's wealth of natural resources as well as its natural hazards. As a basis for understanding this concept:

   a. Students know the resources of major economic importance in California and their relation to California's geology.

   b. Students know the principal natural hazards in different California regions and the geologic basis of those hazards.

   c. Students know the importance of water to society, the origins of California's fresh water, and the relationship between supply and need.

   d. Students know how to analyze published geologic hazard maps of California and know how to use the map's information to identify evidence of geologic events of the past and predict geologic changes in the future.

Health Standards

Grade Five

Nutrition and Physical Activity

Standard 1: Essential Concepts

1.1.N Describe the food groups, including recommended portions to eat from each food group.

- o Describe different types of energy including potential and kinetic.

1.3.N Explain the relationship between the intake of nutrients and metabolism.

- o *Glucose metabolism & energy; different types of coal and their carbon potential.
- o Typical Fixed Carbon Content in Coal.
- o Anthracite Coal : 80.5 - 85.7 weight %.
- o Bituminous Coal : 44.9-78.2 weight %.
- o Food groups Lignite Coal : 31.4 weight %.

1.4.N Explain why some food groups have a greater number of recommended portions than other food groups.

o Why do we continue to rely on coal if renewable are available?

1.5.N Describe safe food handling and preparation practices.

o Watts Cooking

1.6.N Differentiate between more-nutritious and less-nutritious beverages and snacks.

o Levels of glucose and usable physical energy // levels of efficiency of types of energy.

1.7.N Explain the concept of eating in moderation.

1.9.N Explain how good health is influenced by healthy eating and being physically active.

1.10.N Describe how physical activity, rest, and sleep are related.

1.11.N Identify physical, academic, mental, and social benefits of regular physical activity.

Standard 6: Goal Setting (learning to hold yourself accountable for your actions; stewardship)

6.1.N Monitor personal progress toward a nutritional goal.

6.2.N Monitor personal progress toward a physical activity goal.

Standard 7: Practicing Health-Enhancing Behaviors

7.2.N Demonstrate how to prepare a healthy meal or snack using sanitary food preparation and storage practices.

o Watts Cooking.

7.3.N Demonstrate the ability to balance food intake and physical activity.

Personal and Community Health

Standard 1: Essential Concepts

1.3.P Describe how environmental conditions affect personal health.

o How energy usage affects environmental conditions.

1.5.P Define life-threatening situations (e.g., heart attacks, asthma attacks, poisonings).

1.6.P Explain that all individuals have a responsibility to protect and preserve the environment.

o Learning to inspire and foster "environmental energy awareness" and stewardship.

Standard 4: Interpersonal Communication

4.1.P Practice effective communication skills to seek help for health-related problems or emergencies.

Standard 5: Decision Making

5.1.P Use a decision-making process to determine personal choices that promote personal, environmental, and community health.

5.2.P Use a decision-making process to determine when medical assistance is needed.

Standard 6: Goal Setting

6.1.P Monitor progress toward a goal to help protect the environment.

Standard 7: Practicing Health-Enhancing Behaviors

7.3.P Practice strategies to protect against the harmful effects of the sun.

Standard 8: Health Promotion

8.1.P Encourage others to minimize pollution in the environment.

- o Reducing energy consumption & reducing pollution.
- o Learning about sequestration rates (20%) and activity offsets.
- o Pros and cons of various types of energy.

Grade Six

Injury Prevention and Safety

Standard 1: Essential Concepts

1.8.S Describe hazards related to sun, water, and ice.

Standard 8: Health Promotion

8.1.S Support injury prevention at school, at home, and in the community.

- o Proper form and balance during physical activity // proper balance of energy consumption

8.3.S Encourage others to practice safe behaviors, including the proper use of safety belts when riding in cars, wearing helmets when riding bicycles, and wearing mouth guards when participating in athletic activities.

- o Using resources effectively, responsibly rather than using resources irresponsibly.

Mental, Emotional, and Social Health

Standard 1: Essential Concepts

1.4.M Describe the importance of being aware of one's emotions.

1.5.M Describe the importance of being empathetic to individual differences, including people with disabilities and chronic diseases.

Standard 4: Interpersonal Communication

4.3.M Demonstrate ways to communicate respect for diversity.

Standard 6: Goal Setting

6.3.M Make a personal commitment to avoid persons, places, or activities that encourage violence or delinquency.

Standard 7: Practicing Health-Enhancing Behaviors

7.1.M Carry out personal and social responsibilities appropriately.

7.2.M Practice strategies to manage stress.

7.3.M Practice appropriate ways to respect and include others who are different from oneself.

7.4.M Demonstrate how to use self-control when angry.

Grades Seven and Eight

Nutrition and Physical Activity

Standard 1: Essential Concepts

1.1.N Describe the short- and long-term impact of nutritional choices on health.

- o What are the short and long term impacts of using various energy sources?

1.4.N Describe how to keep food safe through proper food purchasing, preparation, and storage practices.

- o Watts Cooking.

1.6.N Analyze the caloric and nutritional value of foods and beverages.

- o Similar to 5th grade 1.3N.
- o *Glucose metabolism & energy; different types of coal and their carbon potential.
- o Typical Fixed Carbon Content in Coal.
  - ♦ Anthracite Coal : 80.5 - 85.7 weight %.
  - ♦ Bituminous Coal : 44.9-78.2 weight %.
  - ♦ Food groups Lignite Coal : 31.4 weight %.

1.15.N Explain that incorporating daily moderate or vigorous physical activity into one's life does not require a structured exercise plan or special equipment.

- o Teaching behavior modification towards both recreation and lifelong activity and energy efficiency and conservation.

Standard 3: Accessing Valid Information

3.4.N Identify places where youths and families can be physically active.

Standard 5: Decision Making

5.2.N Identify recreational activities that increase physical activity.

5.4.N Analyze the physical, mental, and social benefits of physical activity.

Standard 6: Goal Setting

6.1.N Make a personal plan for improving one's nutrition and incorporating physical activity into daily routines.

6.2.N Set a goal to increase daily physical activity.

Standard 7: Practicing Health-Enhancing Behaviors

7.1.N Make healthy food choices in a variety of settings.

- o Watts Cooking Adventures.

7.2.N Explain proper food handling safety when preparing meals and snacks.

- o Watts Cooking.

7.4.N Examine ways to be physically active throughout a lifetime.

- o Teaching behavior modification towards both recreation and lifelong activity and energy efficiency and conservation.

Injury Prevention and Safety

Standard 1: Essential Concepts

1.11.S Identify ways to prevent climate-related physical conditions such as exhaustion, sunburn, heat stroke, and hypothermia.

1.12.S Explain safety hazards associated with Internet usage.

1.13.S Explain ways to prevent fires and reduce the risk of fire-related injuries.

- o How is this related to energy use? What precautions should you take to avoid electrical fires?

1.14.S Explain ways to reduce the risk of injuries in and around water.

o Pros and cons of hydropower.

1.15.S Explain ways to reduce the risk of injuries (including oral injuries) that can occur during sports and recreational activities.

o Importance of instruction, proper form in order to use energy efficiently and prevent injury.

Standard 6: Goal Setting

6.1.S Make a personal commitment to avoid persons, places, or activities that encourage violence or delinquency.

Standard 8: Health Promotion

8.1.S Support changes to promote safety in the home, at school, and in the community.

8.2.S Design a campaign for preventing violence, aggression, bullying, and harassment.

8.3.S Demonstrate the ability to influence others' safety behaviors (e.g., wearing bicycle helmets and seat belts).

o Being good environmental stewards and setting an example not only in the REC but in your community.

Alcohol, Tobacco, and Other Drugs

Standard 6: Goal Setting

6.1.A Develop short- and long-term goals to remain drug-free.

Mental, Emotional, and Social Health

Standard 1: Essential Concepts

1.1.M Explain positive social behaviors (e.g., helping others, being respectful to others, cooperation, consideration).

1.3.M Identify qualities that contribute to a positive self-image.

Standard 6: Goal Setting

6.1.M Develop achievable goals for handling stressors in healthy ways.

Personal and Community Health

Standard 1: Essential Concepts

1.1.P Describe the importance of health-management strategies (e.g., those involving adequate sleep, ergonomics, sun safety, hearing protection, and self-examination).

o Importance and significance of energy management.

1.7.P Identify effective protection for teeth, eyes, head, and neck during sports and recreational activities.

o Body is your resource, protect it!

1.9.P Identify ways that environmental factors, including air quality, affect our health.

o How does energy consumption affect air quality? What can we do to reduce our contributions? (reduce energy, using cleaner alternatives etc).

1.10.P Identify human activities that contribute to environmental challenges (e.g., air, water, and noise pollution).

1.12.P Identify ways to reduce exposure to the sun.

Standard 2: Analyzing Influences

2.5.P Analyze the social influences that encourage or discourage sun-safety practices.

Standard 6: Goal Setting

6.2.P Design a plan to minimize environmental pollutants, including noise at home and in the community.

6.3.P Create a plan to incorporate adequate rest and sleep into daily routines.

Standard 8: Health Promotion

8.2.P Demonstrate the ability to be a positive peer role model in the school and community.

8.3.P Demonstrate ways to accept responsibility for conserving natural resources.

Grades Nine through Twelve (High School)

Nutrition and Physical Activity

Standard 1: Essential Concepts

1.3.N Explain the importance of variety and moderation in food selection and consumption.

1.6.N Explain how to keep food safe through proper food purchasing, preparation, and storage practices.

1.9.N Analyze the relationship between physical activity and overall health.

Standard 2: Analyzing Influences

2.3.N Distinguish between facts and myths regarding nutrition practices, products, and physical performance.

2.6.N Analyze internal and external influences that affect physical activity.

Standard 5: Decision Making

5.2.N Use a decision-making process to plan nutritionally adequate meals at home and away from home.

Standard 7: Practicing Health-Enhancing Behaviors

7.1.N Select healthy foods and beverages in a variety of settings.

7.3.N Identify strategies for eating more fruits and vegetables.

Injury Prevention and Safety

Standard 1: Essential Concepts

1.10.S Describe procedures for emergency care and lifesaving, including CPR, first aid, and control of bleeding.

1.11.S Identify ways to stay safe during natural disasters and emergency situations (e.g., landslides, floods, earthquakes, wildfires, electrical storms, winter storms, and terrorist attacks).

Standard 6: Goal Setting

6.1.S Develop a plan to prevent injuries during emergencies and natural disasters.

Standard 7: Practicing Health-Enhancing Behaviors

7.1.S Practice injury prevention during athletic, social, and motor vehicle-related activities.

7.3.S Demonstrate first aid and CPR procedures.

Standard 8: Health Promotion

8.1.S Identify and support changes in the home, at school, and in the community that promote safety.

8.2.S Encourage peers to use safety equipment during physical activity.

Mental, Emotional, and Social Health

Standard 1: Essential Concepts

1.1.M Describe the benefits of having positive relationships with trusted adults.

1.2.M Analyze the qualities of healthy peer and family relationships.

1.4.M Describe qualities that contribute to a positive self-image.

Standard 6: Goal Setting

6.2.M Set a goal to reduce life stressors in a health-enhancing way.

Standard 7: Practicing Health-Enhancing Behaviors

7.4.M Practice respect for individual differences and diverse backgrounds.

7.5.M Participate in clubs, organizations, and activities in the school and in the community that offer opportunities for student and family involvement.

Personal and Community Health

Standard 1: Essential Concepts

1.1.P Discuss the value of actively managing personal health behaviors (e.g., getting adequate sleep, practicing ergonomics, and performing self-examinations).

1.12.P Identify global environmental issues.

1.13.P Describe the impact of air and water pollution on health.

1.14.P Identify ways to reduce pollution and harmful health effects (e.g., by using alternative methods of transportation).

Standard 2: Analyzing Influences

2.3.P Analyze how environmental conditions affect personal and community health.

2.4.P Discuss ways to stay informed about environmental issues.

2.6.P Evaluate the benefits of informed health choices.

2.7.P Evaluate the need for rest, sleep, and exercise.

Standard 3: Accessing Valid Information

3.4.P Identify government and community agencies that promote health and protect the environment.

Standard 7: Practicing Health-Enhancing Behaviors

7.3.P Demonstrate the proper steps for protecting oneself against the harmful effects of the sun.

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RESOURCE ADVENTURES

Energy Efficiency and Preservation
Problem Solving and Critical Thinking

Park Treasure Hunt

Program Description

Critical Thinking, Scavenger Hunt

Goals & Objectives

ESA participants will learn what resources are readily available to them in their communities.

Program Impact

REC members investigate available resources at Lindo Lake Park. Participants are encouraged to use the resources they find to create individualized "wands" that empower them to make the park more efficient.

Curriculum

Basic Instructions

1. Research site specific resources and designate a path that leaders will take participants on.
2. Using research, have facts/tips readily available to make the treasure hunt interactive as well as educational.

Discussion Topics

(answers located on Local Resources Fact Sheet)

1. What resources are available in the park?
2. Your community?
3. Are resources readily available to community members?
4. Why or why not?

Required Supplies List & Budget

Local Resources Fact sheet (See Appendix)
EE Tips sheet (see appendix)
Water for participants ($5 for every 10 participants)

Program Follow up & Suggestions

Be aware of popular trends so that you can tailor the treasure hunt to your target audience.

Locations for scavenger hunts are subject to approval by SDG&E.

Facility Upgrade Treasure Hunt

Program Description

Critical Thinking, Scavenger Hunt

Goals & Objectives

Participants will learn more about the energy efficient upgrades installed at the center, including why they were installed in each location and how they operate.

Program Impact

Participants perform an energy audit in the center by having an EE scavenger hunt. This hunt will take them around to all of the EE upgrades we have made in the Spring Valley REC club.

Curriculum

Basic Instructions

1. Create a list of energy efficient upgrades in your center. (For example, smart strip locations, Energy Star appliances, watt meters, lights that have timers etc).
2. Create clues that will lead participants to each upgrade.
3. Divide participants into teams and have staff distribute clues as each team solves clues and finds each upgrade.
4. The first team to find each upgrade and return to home base is the winner.
5. After the activity, facilitate discussion about each upgrade with participants.

Discussion Topics

Energy Efficiency upgrades –be prepared to discuss each upgrade/ location to participants following the activity.

Required Supplies List & Budget

List of clues and facility upgrades.

Sample Clues

1. Digital picture frame: I can display your happiest moments and memories.
2. Rainfall meter: I detect the amount of rainfall we have to determine if the water sprinklers should be used that particular.

3. Watt meter: I show you the amount of energy that you use while using your utilities
4. Motion censored light switch: You can activate me with only your presence.
    a. Energy Star Appliances
    b. Large white watt meter in ESA room
    c. Power kill switch in REC Club
    d. Energy Saving Censored Lights
    e. Outdoor rain fall detector
    f. Energy Star Digital Picture Frame

Program Follow up & Suggestions

Distribute clues to teams in different orders so that they are not in the same place at one time. This prevents teams from simply following one another to each location.

Energy Insight Detectives

Program Description

Problem Solving, Energy Audit

Goals & Objectives

Increase participant awareness of current behaviors and energy consumption patterns, and inspire behavior modification to conserve energy after gaining insight to their current habits.

Program Impact

Participants audit appliances that are used daily at the center to gain insight on how much energy they use. (For example-entertainment center, music room equipment etc).

Afterwards, participants create an Energy Guide with 20 ways to save energy at home and in the center.

Curriculum

Basic Instructions

1. Attach the Belkin Conserve-Insight monitor to an appliance that is used often in the facility.
2. Have participants turn on the appliance and use it accordingly.
3. As participants take turns using the appliance/equipment, point out the changes in the numbers that appear on the Belkin monitor.

4. Facilitate a discussion about the significance of each of the values that appear.
5. Participants will then work together to brainstorm 20 ways to save energy and create an energy guide/tip sheet to use as a reference guide at both the center and at home.

Discussion Topics

Button	What do the numbers mean?
	The Globe button estimates how much CO2 per month/year is generated when you use the item you have plugged into the Insight monitor.
	The Dollar sign button estimates how much money it takes to operate the appliance per month/year.
	How do energy companies charge us?
	Per kiloWatt hour -$0.05788
	Some cities even add on an extra tax for using energy during peak hours!
	The Watt button shows you how much energy you are using in real time.

Required Supplies List & Budget

Belkin-Conserve Insight Energy Use Monitor — $30

Program Follow up & Suggestions

1. Be familiar with how to navigate through the various settings on the Energy Use monitor.
2. Relate the content to situations that participants can relate to.

   For example, if the energy use monitor is hooked up to music equipment, have them think critically about how much of their allowance per month they would spend on energy if they listen to their stereo for an hour/day for an entire month. Or, how much of their allowance is spent on supplying energy for their video game habits.

Find the Vampire

Program Description

Critical Thinking/Problem Solving

Goals & Objectives

To correctly identify which appliance is the "Energy Vampire" based on the following factors: Annual load, Annual energy, Monthly energy, Annual energy cost, Monthly energy cost, Total Annual watts and Total Annual cost.

Program Impact

Participants will learn how to identify which household appliance consumes the most energy on a monthly and annual basis. Participants will also learn ways they can decrease energy consumption based on their findings.

Curriculum

Basic Instructions

1. Using the spreadsheet below, research common household appliances and fill in the appropriate information:

ENTERTAINMENT CENTER					
RUNNING			OFF		
LOADING RESULTS			LOADING RESULTS		
Total Load	645		Total Load	38	
Annual Energy	619		Annual Energy	276	
Monthly Energy	51.6		Monthly Energy	23.05	
Annual Energy Cost	$68.61		Annual Energy Cost	$30.34	
Monthly Energy Cost	$5.68		Monthly Energy Cost	$2.45	

Total Annual Watts	Total Annual Cost
895	$98.95

2. Flip through each appliance and have participants take mental notes of each appliance's energy and associated costs.

3. Facilitate a discussion with participants about what makes an appliance a "vampire" when evaluating energy costs when appliances are turned on compared to when they are turned off.

Discussion Topics

Energy vampires, loading

Required Supplies List & Budget

Household appliance spreadsheet

Pens or pencils

Program Follow up & Suggestions

Make sure to use appliances that the kids can identify with. Implementing lessons that create emotional connections help youth participants retain information.

Recycler Monkey

Program Description

Problem Solving, Critical Thinking

Goals & Objectives

1. Identify which items are recyclable, compostable and waste.
2. Be able to sort the above items correctly and place them in the proper disposal bins.

Program Impact

Participants learn that because trash incinerators are inefficient at generating electricity, recycling can save 3-5 times the amount of energy spent from burning waste.

Curriculum

Basic Instructions

(based on the Recycle Round up game:
http://kids.nationalgeographic.com/kids/games/actiongames/recycle-roundup/)

1. Collect a variety of recyclable, compostable and waste products in a bin.

2. Set up 3 sorting bins (a blue recycle bin, a clear compost bin and a trash can) an equal distance apart from one another.

3. Make sure each participant has a pair of disposable gloves or a trash picker so that they do not have to touch the items directly.

4. Each player starts at the collection bin. Once the stopwatch begins timing, players can begin sorting the items into the appropriate bins.

5. When the final piece is placed in the appropriate bin, stop timing.

Have staff go through the bin to make sure items were placed in the correct bin. For every item placed in the incorrect bin, add 5 seconds to their overall time. Make sure to sort the items discretely as not to reveal the correct answers to participants who have not had their turn. This prevents any of the players from having an unfair advantage. Note any items that resulted in penalties to the player.

The player with the fastest time is the ultimate Recycler Monkey!

Debrief with the group and identify items and their corresponding bins. Make sure to discuss with participants any penalties that may have occurred.

Discussion Topics

Recycling, Composting, Waste, energy efficiency

Required Supplies List & Budget

Recyclable items (bottles, paper, cardboard etc)

Compostable items (leaves, paper etc)

Waste

Vinyl gloves or trash pickers

Sorting bins

Stopwatch

Large open space

Program Follow up & Suggestions

Prior to playing this real world version of the game, test participants by having them play the online game first. Then after teens participate in both versions, compare results. Discuss with participants reasons why results varied between the online game and real world application.

Insulator Calculator

Program Description

Problem Solving and Critical Thinking

Goals & Objectives

1. Calculate how much insulation is needed for the REC club.
2. Examine the relationship between proper insulation and energy consumption.

Program Impact

Participants calculate individual energy needs using available online tools. Youth are encouraged to utilize knowledge of estimated need to make energy efficient choices in their households.

Curriculum

Basic Instructions

1. Assist participants with measuring the main room of the REC club.
2. Input data online and hit "calculate."
3. Based on the data, the calculator will total the amount of insulation the REC club needs.
4. Conclude the activity with a facilitated discussion about the importance of energy and the relationship between insulation and energy use.

Discussion Topics

Insulation, energy preservation

Required Supplies List & Budget

http://www.homedepot.com/webapp/wcs/stores/servlet/THDCalcInsulationView?metric=true&storeId=10051&langId=-1&catalogId
(worksheet located in appendix)

Measuring tape

Pen or pencil to record data

Program Follow up & Suggestions

In order to save energy and reduce the amount of time participants spend on the computer, have the teens write data down and then input measurements into calculator.

Board Games Unplugged

Program Description

Board Game, PEAK activity

Goals & Objectives

Test knowledge and to learn new energy concepts

Program Impact

Participants unhook from television, gaming systems, and electronic devices in favor of card, board, and PEAK's power mix board games. Students learn where energy resources come from and how natural resources are extracted.

Curriculum

Basic Instructions

Print game and Instructions at:
http://www.peakstudents.org/teachers/login/teacher_resource_guidebook/unit_1.asp

Discussion Topics

Peak hour usage, blackouts, energy production

Required Supplies List & Budget

- **Printer**
- **Paper**

Program Follow up & Suggestions

1. Before and after the activity, refer to PEAK unit 1 student and teacher information PDF's for additional support, topics, and interesting activities.
2. Consider printing the board game on a large scale (poster size) to encourage group interaction and socializing between participants. Paint plastic paint trays to use as tokens on the larger game board.

Energy in Action Photo Contest

Program Description

Resource Adventure

Goals & Objectives

1. Observe local energy resources.
2. Document energy efficiency in the community.
3. Evaluate available resources and community need.

Program Impact

Participants explore their communities to document energy efficiency in action. Participants evaluate resources and community needs as a result of their discoveries.

Curriculum

Basic Instructions

1. Using the REC club cameras, supervise participants on a local hike and/or walk around the park and facilities.
2. As the group circles around, facilitate an interactive discussion with them about what energy efficiency looks like. Based on their responses, point out various landmarks such as:
   a. The solar panels on the Lakeside community center roof and the real time energy use monitor located in the hallway.
   b. The motion activated LED lights throughout Lindo Lake Park.
   c. The various smart strips and kill switches located throughout the REC club.
   d. The solar compactor and recycle bin in front of the community center.
   e. Citizens or other REC members exhibiting acts of environmental energy stewardship.
   f. Local businesses incorporating upgrades to save energy.

Discussion Topics

Energy efficiency, stewardship

Required Supplies List & Budget

Digital Camera(s)

Program Follow up & Suggestions

1. Use the available REC club cameras (both the SLR and the regular digital camera).
2. Split participants into groups and assign 1 staff member to accompany each group as they go around the park.

ESA presents…

Program Description

Resource Adventures, Critical thinking and Problem Solving

Goals & Objectives

1. Decrease energy consumption during peak hours by using a single entertainment system.
2. Learn how to install smart strips around the REC in order to save energy by reducing wasted energy while appliances are not on.
3. Learn about the benefits of using Energy Star appliances.

Curriculum

Basic Instructions

1. Have participants vote on which film they would like to watch.
2. Show the feature film on the Energy Star qualified TV/projector system, making sure to point out the upgrades the REC has made in order to become more energy efficient.
3. After the presentation of the film concludes, facilitate a discussion about the importance of energy efficiency and conservation themes as implied within each film or each movie session.

Discussion Topics

Planet Earth

Examines the effects of consumption of resources and how we can amend our lifestyles by maximizing efficiency.

Fern Gully

Looks at the importance of preserving resources through the creation of a magical fairy world.

Bill Nye the Science Guy, Energy episode

Types of energy and the importance of conservation are addressed.

Monsters Inc.

Depicts an animated world at risk of losing their energy supply as their resources become scarce.

Arctic Tale

Discusses the effects of energy consumption and global warming on the Arctic; can be shown in conjunction with Polar Bear Carbon Footprint activities.

Bill Nye the Science Guy, Bowling Ball Energy clip
Examines conversion and transference of Potential Energy and Kinetic Energy.

No Impact Man
Examines one man's extreme behavior modifications to leave no impact. Participants are taught that behavior modification can be as simple as flipping a light switch when they leave a room.

Cloudy with A Chance of Meatballs
Examines the implied and associated risks of demanding resources that are not available.

Myth Busters
Explore the myths about the science of energy.

1. Discuss ways movie producers preserve story lines when translating novels into feature films, and how sustainable technologies affect local ecology.
2. Energy Star Appliances require a fraction of the watt usage of regular appliances.
3. The Magic School Bus Gets Charged episode:

   a. How does Ms. Frizzle fix her hair?
   By using static electricity (balloon friction).

   b. What are SPECS?
   Special electrical Charge Sputters.

   c. What do the SPECS make visible?
   Electrical charges. Charges always want to stay together, rubbing pulls them apart, when charges join back together, sparks fly. Opposites attract, electricity is made up of charges trying to move back together.

   d. How does the light bulb work?
   The battery completes the electrical circuit, as the charges move they heat up the filament in the light bulb, creating light.

Required Supplies List & Budget

Energy Star Projector and Screen

Energy Star Television

DVDs

Program Follow up & Suggestions

Rotate educational films and science clips/episodes with regular DVD movies when programming in order to continue to offer a wide variety to participants.

REC CLUB Audits and Upgrades Series

Program Description

Problem Solving and Critical Thinking

Goals & Objectives

1. Adjust the REC club thermostat to reduce energy expenditure as the seasons change.
2. Install various upgrades (smart strips, monitors, kill switches etc) around the REC Club in order to save energy.
3. Use a thermal imager to identify heat sources, leaks and drafts in the REC Club. Once identified, upgrades can be made to help eliminate wasting energy.

Program Impact

1. Participants put their energy efficiency knowledge to work as The REC Club prepares for the new season by adjusting the center's thermostats.
2. Participants install new energy use monitors through-out the REC Club. These monitors reveal energy wasters, show energy use in dollar amounts and carbon output. Participants learn to save energy by bundling major appliances onto a single smart strip to help moderate usage.
3. Participants use a thermal imager in order to identify heat sources, leaks, and drafts, which account for up to 20% of energy loss in homes.

Curriculum

Basic Instructions

Goal 1

1. Identify how many thermostats are located in the facility.
2. Supervise participants and adjust thermostats accordingly.
3. Facilitate a discussion about the importance of adjusting the temperatures inside as the temperature outside changes. Make sure to also discuss the importance of turning off air conditioning and heating units when not in use.

Goal 2

1. Lead a discussion about which areas in the REC use a lot of energy.
2. Have participants label energy vampires, and award energy saving appliances (see appendix). Energy vampires get violation tickets, while energy efficient appliances are awarded energy star labels.
3. Discuss the differences between energy vampires and energy stars and why it is important to identify which appliance is which. Conclude with a brainstorming session of how the REC can eliminate vampires and increase the overall energy efficiency of the center.
4. Assist participants in installing various upgrades, such as smart strips and monitors around the center, and using a kilowatt meter, take note of how many kilowatt hours are used before and after upgrades are installed.

Goal 3

1. Check out a thermal imager from the California Center for Sustainable Energy. It is free to borrow materials and tools from the Resource Library. For more info visit **http://energycenter.org/index.php/outreach-a-education/san-diego-energy-resource-center.**
2. Investigate the REC club and use the thermal imager to detect any leaks that may be present in the teen center.
3. Discuss the significance of leaks and the importance of proper preventative measures in order to save energy.

Discussion Topics

Vampire energy, peak hours, energy efficiency, thermal energy

Required Supplies List & Budget

Smart Strips

Belkin Insight Conserve Monitor ($30)

Powercost Monitor ($99.99)

Thermal Imager (available for checkout from California Center for Sustainable Energy).

Program Follow up & Suggestions

Belkin and Powercost Monitors can be used for multiple activities. New monitors do not have to be purchased for every activity.

Bubble Mania

Program Description

Problem Solving, Critical Thinking

Goals & Objectives

1. Compare and contrast renewable energy with traditional energy.
2. Examine the pros and cons of both energy sources.
3. Place emphasis on the importance of energy efficiency in order to decrease society's reliance on alternative sources.

Program Impact

Participants discover the science behind the concept of "bubble energy" versus an energy grid. Youth are inspired to reduce energy consumption based on projected flaws of "bubble energy" innovation.

Curriculum

Basic Instructions

1. Instruct participants to use the pipe cleaners to create individual bubble blowers/frames.
2. After various attempts at creating a bubble, gather participants and begin discussing the differences in the frames, emphasizing which designs were most successful in creating a bubble ("bubble energy").

Discussion Topics

1. Traditional energy resources vs. alternative energy resources (pros and cons).
2. The more intricate the design, the less energy can be harnessed to create a concrete foundation for a bubbly. Much like energy, alternative resources require complex structures to both capture and convert resources into usable energy. A more traditional design (simple shape), or a power plant and energy grid, is simple enough to utilize a simple solution and create a bubble. Similarly, the bubble is delicate like an energy grid, whereas any sudden movement (sudden spike in use) will pop the bubble (blackout).

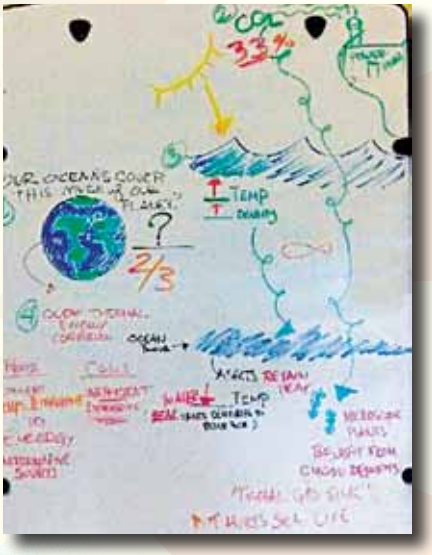
Required Supplies List & Budget

- Pipe Cleaners
- Dish soap
- Water
- Bowls
- Mixing Utensils

Program Follow up & Suggestions

This activity tends to get messy, especially when working with younger participants. Prepare an open area outside for participants to play with the bubbles and/or lay down protective covering on the floors inside in order to expedite the cleaning process.

Oceans Board



Program Description

Resource Adventure

Goals & Objectives

1. Learn how carbon emissions affect our sea life.
2. Identify the pros and cons of Ocean Thermal Energy Conversion (OTEC) technology.

Program Impact

Participants learn about the pros and cons of alternative energy; emphasis is placed on modifying current behaviors to save energy.

Curriculum

Basic Instructions

Questions

1. **Our oceans cover this much of our planet?**
   Answer: 2/3.
2. **What percentage of CO2 is released from power plants?**
   33%, Carbon deposits fall onto the ocean floor and only benefit microscopic plants. This is known as the "global gas sink", which is harmful to sea life.

3. **How are temperature and density of ocean water related?**

Increasing temperature, increases density; near the ocean floor the water is colder, because heat is retained (embodied energy) and heat takes centuries to resurface.

4. **What are the pros and cons of Ocean Thermal Energy conversion (OTEC) technology?**

Pros: converts the temperature difference between surface and ocean floor to energy (alternative energy source).

Cons: Inefficient and expensive energy source.

Discussion Topics

Greenhouse gas emissions, energy efficiency, alternative energy.

Required Supplies List & Budget

White board

Expo Markers

Program Follow up & Suggestions

Make sure to leave spaces on the board to make the board interactive. Youth participants are naturally drawn to whiteboards and by letting them make guesses prior to discussion helps to rally large participation.

Spoons

Program Description

Problem Solving and critical thinking

Goals & Objectives

Discover how energy shortages affect resources and customers during peak demand time.

Program Impact

Participants engage in a card game which illustrates the principle of peak demand time through the use of retrievable objects and a rush to secure an energy source or be "blacked out" and out of the game.

Curriculum

Basic Instructions

Goal

To be the first player to collect four cards of the same number, allowing you to grab a spoon. Once any player grabs a spoon, other players must notice and do the same. The goal of the game is to advance through each round by grabbing a spoon. Players who do not collect a spoon are "blacked out" and do not advance to the next round.

Setup

1. Players gather around a small table, all players should be able to reach the middle without stretching.
2. Spoons are placed in the middle with 1 less spoon than players. For example, if there are 6 players, only 5 spoons will be placed in the middle.
3. For each player in the game, you need four cards of the same rank from the deck. For example, with 5 players you could use the Aces, 2s, 3s, 4s and 5s.

Game Play

1. Players simultaneously choose one card from their hands, sliding that card to the opponent on their left, and pick up the card they've received from the opponent on their right.
2. Each player is limited to four cards in his/her hand. A player cannot pick up a card without passing one first.
3. When a player reaches 4 of a kind, he/she must subtly take a spoon from the pile and can continue passing cards until other players notice and scramble for a spoon of their own.
4. The player without a spoon is eliminated from the game and a set of cards removed from play. The final two players face off with 3 sets of cards in play.

Discussion Topics

1. Peak demand time, limited and non-renewable resources, causes of blackouts(see below).
2. Blackout causes include faults at power stations, damage to electric transmission lines from weather or wildlife, damage to substations, short circuit, or the overloading of electricity mains and overuse of a limited resource.

Required Supplies List & Budget

- Playing cards
- Spoons
- Pennies
- Retrievable objects

Program Follow up & Suggestions

1. Play should continue at a fast pace. Designate a player to maintain the tempo of the game.
2. If spoons aren't available, you can use other miscellaneous items such as pens, pencils etc. Once you use disposable spoons, store them for future use.

Measure Our Impact

Program Description

Problem Solving and Critical Thinking

Goals & Objectives

1. Learn how to calculate our plastic footprints using a simple survey.
2. Learn how to calculate our water footprints using an interactive spreadsheet.
3. Learn how to calculate our impact using an online calculator.
4. Calculate the energy we use daily through the use of an interactive spreadsheet.
5. Learn how to calculate our carbon footprint (PEAK unit 3).

Program Impact

1. Participants were made aware of daily plastic consumption in order to inspire them to reduce product use and encourage proper disposal to limit the amount of energy used to dispose of waste.
2. Using PEAK approved curriculum, participants discover the science behind kilowatt-hours in water heating systems. Teens are encouraged to acknowledge daily habits and learn ways to modify behaviors in order to save energy.
3. Participants discover individual energy needs based on available survey and learn additional ways to save energy.
4. Watt consumption easily adds up, especially when we don't think about appliances that stay plugged in like the refrigerator.

Participants examine the energy they use daily and brainstorm ways to save energy.

5. Participants calculate their greenhouse gas emissions and paint footprints sized accordingly. These carbon footprint indicators are then displayed in the resource room.

Curriculum

Basic Instructions

Plastic Footprint Survey

Have participants calculate their plastic footprint by tallying how many plastic items they use throughout a routine day.

Water Footprint

Using the attached spreadsheet (see appendix), have participants input their information and calculate their water footprint.

Measure Our Impact

Use the following website link:
http://www.nature.org/greenliving/carboncalculator/index.htm

The Energy We Use

Use the attached spreadsheet (see appendix) to calculate how much energy is used on daily basis.

Carbon Footprint

Using the attached PEAK survey, calculate your carbon footprint. (See appendix for a copy of Unit 3). Once each participant has calculated their carbon footprint (small, medium or large), use the attached templates to trace a footprint on contact paper. Paint each footprint and allow paintings to dry. Once dried, footprints can be applied to the wall as stickers.

Discussion Topics

Plastic consumption and waste, water consumption and energy use, energy efficiency, vampire energy, peak hours, greenhouse gas emissions.

Required Supplies List & Budget

Paper

Pens or pencils

Water footprint calculator (see appendix)

The Energy We Use spreadsheet (see appendix)

PEAK unit 3 worksheets

Program Follow up & Suggestions

Plastic Footprint

The easiest way for younger participants to complete the survey is to walk them through their day and identify which items that they used were plastic.

Carbon Footprint

In order to prevent the contact paper from rolling up while painting, tape down the corners to hold the paper in place.

Energy Eggs

Program Description

Problem Solving and Critical Thinking

Goals & Objectives

Learn how energy is transferred and managed.

Program Impact

Participants create rigs that can efficiently manage energy during a crash test, without breaking an egg or wasting construction resources. The similarities between the activity and grid stability during peak time impacts are discussed.

Curriculum

Basic Instructions

1. Using spare, recycled, and "junk" materials, participants create an "egg holder."
2. Once constructed and decorated, place an uncooked egg is secured in each egg holder.
3. Drop the egg contraptions from various heights, ranging from 10-30 feet.
4. The surviving eggs are then dropped from higher altitudes until none remain.
5. Judges award a winner based on creativity, least amount of material used, and most efficient at managing energy.

Discussion Topics

1. **Peak demand time, blackouts, and energy management.**

2. **Energy Management:** Monitoring, conserving, and controlling energy usage, especially in business, residential, and natural environments. Measures planned and carried out using the minimum possible energy while maintain health and comfort and at minimal expense.

3. **How do power plants protect themselves from "crashing?"**
   Power plants protect themselves by allowing a buffer of available energy during peak demand time (unfortunately costing more for consumers year around), encouraging consumers to save energy during peak hours, and by supplying additional power sources tied in to major grid layouts. To prevent a full on "crash" of a system, these plants shut down when overused, instead of burning out.

Required Supplies List & Budget

- **Cups (50 pack, 3.99)**
- **Plates (100 pack, 5.99)**
- **Balloons (25 pack, 2.99)**
- **Popsicle sticks (150 pack, 6.99)**
- **Pipe cleaners (100 count, 5.00)**
- **Paper**
- **Scissors**
- **Tape**
- **Glue**
- **Eggs**

Program Follow up & Suggestions

1. Make sure participants assist with cleaning up the work area after the activity.
2. Depending on how many participants and the amount of materials collected, have participants work in teams to conserve resources as well as expedite the testing process.
3. Items list is a suggestion. Use Recycled materials whenever possible.

Liar's Dice

Program Description

Problem Solving and Critical thinking

Goals & Objectives

Learn popular energy myths and answer energy related trivia.

Program Impact

Participants use probability, luck, and common sense in a game that separates myth from fact, especially prevalent in the energy world and the "green" movement.

Curriculum

Basic Instructions

Setup

1. Each player around a table starts the first round of the game with 5 dice (can be altered depending on supplies and participants), which they will all roll simultaneously, while keeping them covered with a cup or hand.
2. Players are only allowed to look at their own dice.

Bidding

1. A player (chosen randomly to start) then "bids" by announcing a certain number of dice that are showing a specific number that he/she thinks were rolled at the table.

   Example : "3 fours" means the player believes that, among all of the players at the table, there are at least three dice with a four face up on the die.

2. Continuing in a circle, other players bid by either increasing the number of dots face up between all players (3 fives or 3 sixes) or increasing the number of dice bid and any number 1-6. (5 ones, two, threes, etc). If a player does not wish to bid, they may challenge the previous bid.

Challenging

1. If a player feels that the player before them is incorrect, they can "challenge." When a challenge is made, each player shows his dice, the number of dice with the face value of the bid are then counted. If there are at least as many dice with the face value that was bid, the challenger loses the round. If there are fewer dice with the face value that was bid, the bidder loses the round.
2. The loser must then give up a die. Play continues until only 1 player has dice left and they are announced as winner.

Alternate Version 2

The loser must successfully answer an EE trivia question or lose a die. The game continues until only 1 player has dice left and they are announced as winner.

Discussion Topics

Energy myths, energy saving methods, household upgrades.

Required Supplies List & Budget

A table or playing area that everyone can see

Dice

Program Follow up & Suggestions

While reviewing instructions, playing 1 or 2 practice rounds will help participants understand the activity.

Discuss the myths prior to the game and emphasize how what people say and accept as fact is not always the truth. Just like in liar's dice, participants must be smart about who they listen to and who they challenge.

Some Myths About Energy Consumption

1. **Leaving a ceiling fan on will help cool the room.**

   Fans cool people, not rooms. If a ceiling fan runs in an empty room, it helps no one. A fan works by circulating the air in the space; when the breeze moves across the skin, we feel cooler even though the temperature in the room is still the same. So when you leave the room, save energy by turning off the ceiling fan.

2. **Cranking the thermostat up or down will make your home get warmer or cooler faster.**

   Turning the heater excessively high is like repeatedly pressing the button to make an elevator come faster; it feels like it's helping, but it's not. Thermostats ramp up heat at the same pace no matter if they are set to 60 or 90 degrees.

3. **Leaving a computer on is more energy-efficient than turning it on and off.**

   a. *Half of all corporate PCs in the U.S. are not regularly switched off at night, which needlessly pumps 14.4 million tons of carbon dioxide into the atmosphere and costs U.S. businesses $1.72 billion dollars.*

   b. *Today's computers are tougher, and switching them off is a good habit to get into, especially on nights and weekends; anytime you can turn the machine off, it will save energy. Newer computers have energy-saving "sleep" or "hibernate" features that save energy when the computer is not being used.*

4. **Washing dishes by hand uses less energy than running an electric dishwasher.**

   a. *This is one instance where the modern machine beats the old-fashioned method: hand washing generally uses more hot water per load than using a dishwasher.*

   b. *Use a dishwasher efficiently, fill it! Most modern dishwashers don't require pre-rinsing of dishes, a practice which wastes up to 20 gallons of water per load without getting dishes any cleaner.*

c. Opening the door after the rinse cycle and letting the dishes air dry is another way to save energy.

5. **"Green" buildings cost more than conventionally constructed buildings.**

   Even though some sustainable materials initially cost more, overall using green building materials lowers maintenance and utility costs which provide bigger savings. It's easy to find green materials to incorporate into homes and businesses.

Energy Efficient Holiday Series

Program Description

1. Problem Solving and Critical Thinking.
2. Arts and Crafts.
3. Fitness Activities and Physical Challenges.
4. Science of Energy Experiments.

Goals & Objectives

Programs 1-6

Learn the importance of using available resources efficiently in order to reduce waste and associated costs.

Programs 7 & 8

Learn to work together to move resources as well as protect resources.

Programs 9 & 10

Learn the difference between series and parallel circuits.

Program Impact

Programs 1-6

Participants learn to use available resources to create a festive environment in order to reduce holiday costs and purchases.

Programs 7 & 8.

Participants must work together to move resources from one end of the field to another while protecting their own energy stores.

Programs 9 & 10

Participants explore how electricity moves using series and parallel circuits. Participants make use of a watt meter to compare older, less efficient holiday lights with new, energy friendly strands in order to calculate energy saved.

Curriculum

Basic Instructions

Problem Solving and Critical Thinking

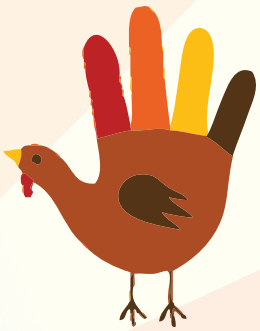
1. Redecorating

a. Collect decorations from storage.

b. Have participants assist staff in decorating the REC for the upcoming holiday.

Arts and Crafts

2. Hand Turkeys



a. Have each participant trace his or her hand onto a piece of construction paper.

b. Transform each handprint into a turkey by using the thumb as the head and the fingers as feathers.

3. Countdown to the Holidays

a. Each participant needs 25 strips of construction paper. Number the strips 1 – 25.

b. Loop together the strips of construction paper to create a countdown chain. Optional: Encourage participants to decorate each ring prior to creating the chain.

c. Each loop represents a day and as each day ends, participants remove a loop as they countdown to the Christmas holiday.

4. Energy Saints Crafts

a. Collect available materials such as construction paper, glue, tape etc.

b. Using the collected materials, encourage participants to be resourceful and create handmade holiday cards.

5. Electricitree & Leaf Decorating (2 part activity)

a. Using the Energy Star projector located in the ESA resource room, trace the ESA logo (tree) onto a large piece of cardboard.

b. Cut out the tree and cut a slit in the center. Using an extra piece of cardboard, create a stand by creating a "+" on the bottom so that the tree can stand on its own.

c. Part 2- Have each participant stamp a leaf in the color of their choice on a piece of construction paper.

d. Each participant should write out the following on their leaf to be displayed on the "Electricitree": What they are thankful for, an energy efficient holiday tip, and their name (on the back).

e. Have a staff member award the participant with the most creative leaf/EE tip with an ESA participant t-shirt.

6. Fall Costumes

a. Gather materials that can be used to create simple costumes (felt pieces, old blankets, t-shirts etc).

b. Using the attached templates (see appendix), trace and cut out super hero capes and masks.

c. Decorate and personalize costumes using available resources.

Fitness Activities and Physical Challenges

7. Candy Cane Pass

a. Player holds 4 candy canes between fingers and passes them down the line, teammate to teammate, without dropping.

8. Gaelic Football

adapted from **www.phoenixgaels.com/Rules.htm**

Rules of the game:

1. Players can carry the ball and take a maximum of 4 steps. After every 4 steps, the ball must be bounced, or "solo-ed" (drop kicked back into the player's hand).
2. Players may not bounce the ball twice in a row, but there is no limit to how many times a player may "solo" the ball.

Passing

Hand pass- holding the ball in one hand and striking it with the other in order to pass the ball to another player.

Tackling/Blocking the Kick/Jostling

Tackling/blocking the kick/jostling of any sort is not allowed to ensure the safety of all participants.

Knocking the Ball

If playing Gaelic Football with older participants, staff may choose to use the "knocking the ball rule" which allows players to play the ball and safely knock the ball out of an opponent's hand in order to gain possession of the ball.

Scoring

A player may score by 1- kicking the ball in like a soccer goal, or 2- if the ball is in the air, and in nobody's possession, a player may punch it directly into the goal, similar to a spike in volleyball.

Science of Energy Experiments

9. Make your holiday lights grow
(Refer to Peak Handbook Unit 7).

10. Compare Holiday Watts

a. Using a kilowatt meter, have participants compare and contrast which light strand saves the most energy.

b. After evaluating light strands, use energy efficient alternatives to decorate the REC club.

Discussion Topics

Waste, energy efficiency, kilowatt hours, conservation, series circuits, parallel circuits.

1. Discuss with the group the importance of reducing waste (Waste = energy needed to dispose of it properly). Brainstorm ways to modify behaviors in order to limit purchases, and energy use during the holidays.
2. Encourage each participant to be creative as well as write down a pledge of how they will use energy efficiently/ save energy during the holidays.
3. Discuss waste and the importance of reducing consumption, especially during the holidays when people tend to purchase and consume more.
4. Discuss the relationship between their efforts and the amount of energy they save manufacturers when they mass produce items. Highlight their resourceful efforts and emphasize the link between waste reduction and how reducing waste reduces the amount of energy used to dispose of excess materials.
5. Discuss holiday energy efficiency tips.
6. Conclude the activity by holding a "super hero" debrief and discuss the importance of using resources efficiently, especially when resources are in high demand, but resources are limited.
7. Discuss efficient techniques for transporting and protecting resources.
8. Discuss strategies that were used to move the ball (the "resource") down the playing field. Discuss what challenges they faced based on the rules of the game (for example, the limited amount of steps they could take or the amount of coordination required to "solo" the ball or score.

Required Supplies List & Budget

Program 2

- **Construction paper**
- **Holiday decorations**
  (if any are readily available such as lights, decals etc.)

Programs 2-6

- **Construction paper**
- **Markers**
- **Paint**
- **Paintbrushes**
- **Cardboard**
- **Cloth**
- **Sewing Kit complete with thread and needles**
- **Tape**
- **Stapler and Staples**
- **Glue**
- **Leaf stamp**

Program 7

- **Candy Canes**

Program 8

- **Timer**
- **Cones**
- **Small soccer ball**

Program 9

- **PEAK unit 7**

Program 10

- **Watt meter**
- **Traditional holiday light strands**
- **LED holiday light stands**

Program Follow up & Suggestions

For the Candy Cane pass activity, consider making "candy canes" out of red and white pipe cleaners. This eliminates waste if candy canes break and can no longer be used for the relay race.

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FITNESS

Energy Efficiency and Preservation
Problem Solving and Critical Thinking

Rollout Tennis

Program Description

Fitness Activity, Physical Challenge
Location: Lakeside REC Club

Goals & Objectives

Decrease peak hour usage, teach energy efficient techniques.

Program Impact

Participants work to keep the electrical turbines (tennis balls) in motion and maintain power on their side of the court. Emphasis is placed on using efficient techniques in order to generate energy and minimize losses.

Curriculum

Basic Instructions

1. Separate the teens into two groups.
2. Have a group on either side of the tennis court.
3. The point of the game is to not let the ball stop bouncing.
4. Once the ball rolls out the point will go to the other team.

Discussion Topics

Peak hour usage, blackouts

Required Supplies List & Budget

Tennis Balls ($3/can)

Tennis Racquets (varies from $20/each -$30/each for recreational/ performance value racquets)

Program Follow up & Suggestions

Review proper form and techniques with participants prior to starting the game.

Have multiple tennis balls ready in case participants lose them.

Gatorball/Speedball

Program Description

Fitness Activity, Physical Challenge

Goals & Objectives

1. To encourage participants to use energy efficient strategies both on the field and at home.
2. To learn the various components of an energy system by comparing it to tools and production methods utilized during the activity. (Peak Unit 2– Where does energy come from?).

Program Impact

1. Participants are encouraged to save energy by using energy efficient appliances. Participants must also use efficient strategies to successfully complete the activity.
2. Through the use of several balls, scoring styles, and players, participants learn how multiple tools, means, and production methods create a well-rounded energy system comparable to the power plant/voltage transmitter/substation/transformer grids we use today.

Curriculum

Gatorball

Basic Instructions

Using available equipment, gather supplies listed below.

The Rules of the Game

Scoring

3 points: Player reception in goal
2 points: Soccer kick into goal
1 point: Player rolls game ball into goal

Game Play

Players can pick up the ball to throw it, but cannot run with it.

Players can dribble the ball on the ground, similar to a soccer game to move the ball around the court.

If a player is holding the ball and is tagged by a member of the opposing team, the resulting action is an automatic turnover.

Speedball (Advanced Play)

The Rules of the Game

Scoring

3 points: Dropkick (ball is dropped and kicked into the goal from outside the penalty area).

2 points: Field goal (between goal posts or above top of soccer goal and within the goal width).

1 point: Touchdown (player reception behind the goal line).

1 point: Penalty kick (player awarded the try kicks the ball into the goal).

Game Length

4 quarters like a basketball game at 12 minutes each quarter.

Game play

1. A kick off occurs to begin game play. The kickoff must travel the length of the ball, and cannot be touched by the kicker until another player has touched it.
2. Players move the ball down the field similar to a soccer / basketball game.
3. Dribbling– dribbling the ball similar to soccer.
4. Passing– In order to pass the ball like in basketball, a ground ball must be kicked up and then kicked, headed or played by any other part of the body except the hands or arms.
5. If the ball becomes airborne and is caught by a player, that player can take 2 steps forward, and then proceed to use either any variety of basketball passes, such as an overhead pass or single handed baseball pass. Players are allowed to pivot on a single foot similar to basketball to maneuver around opponents and pass the ball.
6. Penalty kicks are awarded as the result of a foul. The defensive players may be behind the goal or on the field so long as no one is within 5 feet of the kicker.

The free kick is awarded in the following cases

1. For an individual or personal foul committed on the field outside the penalty area.
2. For a personal foul behind the goal line committed by the attacking team.

Any part of the body, except the hand and arms, may be used to stop or slow the ball.

Gatorball/Speedball Discussion Topics

Energy efficient strategies during game play to avoid fatigue, energy efficient strategies/upgrades (such as smart strips, LED light bulbs etc) that can be used at participants' homes.

Where does Electricity come from? (PEAK Unit 2)

Coal

Similar to the sugars from the food we eat that powers our bodies, coal is turned into electricity once it is processed.

Catalyst

In our bodies, we process energy both with and without oxygen (aerobic exercise = cardio; anaerobic = quick burst activities such as sprints) while coal needs a catalyst in order to be converted into electricity.

Boiler/turbine/generator

Our bodies have 3 different pathways that result in making energy for our muscles to use, similarly, coal must go through all 3 components before it can successfully generate usable electricity.

Cooling Towers

You know that cramped feeling you get after sprinting? That's just the byproducts of your muscles breaking down sugars/carbs. These can also be used as a "middle man" to processing carbs, just like cooling towers are the last component energy must pass through before being transmitted.

Transmission Wires

While electrical plants must set up wires to transmit signals to buildings for energy to be used as electricity, muscles have fibers that communicate to one another through electrical signals.

Required Supplies List & Budget

Gatorball–Kickball

($5-$10) or Soccer ball ($11-$40 based on indoor/outdoor use and size).

Open Playing Area.

Soccer Goals/All purpose goal ($50/each) or cones to mark of Goals (varies- $5/each to $20-$30/set of 6).

Speedball

Soccer Ball ($11-$40 based on indoor/outdoor use and size).

Open Playing Area.

Soccer Goals/All purpose goal ($50/each).

Gatorball/Speedball Program Follow up & Suggestions

While both activities encourage strategic game play, Speedball is for more advanced players because of the skills required to follow the rules.

Using the discussion topics listed above, ask participants to think about the following: Compare and contrast which components of the game are the most important? Which components of electrical plant are the most important? Facilitate discussion and then lead into efficient strategies that can be used in both processes.

Balance Board Battle

Program Description

Fitness Activity, Physical Challenge

Goals & Objectives

Work to keep balanced on an indo board while using the body's energy.

Program Impact

Participants use stored energy in their bodies to stand on a balance board. They discover that, similar to generators turning mechanical energy into electrical, energy is lost during large, excessive movements, and unplanned surges; emphasis is placed on energy efficient techniques.

Curriculum

Basic Instructions

1. Place balance boards in a safe area.
2. Using a stop watch and a referee, Participants attempt to balance on the board for as long as possible.
3. Once the board touches the ground or the rider steps off, the turn is over and times are noted.
4. The longest time recorded is the winner. A discussion about large body movements, energy used, etc, is facilitated.

Discussion Topics

Peak energy usage, energy stores and demand response, the importance of a steady and predictable resource supply and power grid.

Required Supplies List & Budget

Indo Boards Stop watch

Program Follow up & Suggestions

Review proper form and techniques with participants prior to starting the activity; knees should be bent, arms out, and participants always ready to step off the board to avoid falling. To help participants gain confidence and comfort, spotters and objects can be used. While a flat concrete surface is ideal for balance, for those new to the activity, grass and soft padded areas should be used.

Disc Golf

Program Description

Fitness Activity, Physical Challenge

Goals & Objectives

Illustrate the path of energy from production to consumption.

Program Impact

Participants compete in an effort to transmit their electricity (disc) to the customers (goals) in the most efficient manner possible. Each player assesses the environment and attempts to reach the goal in the least number of throws.

Curriculum

Basic Instructions

1. Each player starts off with both a disc and a score card to keep track of the number of "strokes" it takes to reach the goal.
2. A round starts at a designated point (a landmark, a tree, a building, etc) with players, one at a time, throwing from this spot to hit a goal far off in the distance (a basket, disc golf goals, a tree, rock, etc). Players wait off to the side until all discs have been thrown.
3. The second round continues once all players have thrown once. The player who is furthest away from the goal is the first to throw. Play continues in this manner with each player noting the number of throws it takes until they hit the goal.
4. At the end of the round(s), the player with the least amount of throws is dubbed the most efficient energy provider and disc golf champion.

Discussion Topics

Energy efficient transfer, supply and demand.

Required Supplies List & Budget

Discs or Frisbees (3 disc beginner set – $19.99)

Program Follow up & Suggestions

1. Choose a Frisbee you are comfortable with, feel for a good size and weight.
2. Stance: If you are right-handed, point your right foot at the target, keeping your right leg in front of you. If you are left-handed, you do the opposite.
3. Throwing: Take the rim of the Frisbee between your fingers and thumb. Curl your wrist back towards your body and release with a flicking motion, extending your whole arm towards your target.
4. Practice.

Play several rounds, with each round getting progressively harder as targets get further away.

If space is limited, have players work around large, natural objects like trees and buildings.

Dizzy Kickball

Program Description

Fitness activities and Physical challenges

Goals & Objective

Learn to manage daily energy use while at home.

Program Impact

Participants use bases to save their "resources" from running out during a game of kickball; they compare and contrast the importance of strategizing ways to save energy during a game and at home to ways to win the game.

Curriculum

Basic Instructions

1. Set up three bases equivalent to a standard baseball field. Every base represents a different type of energy plant:
    a. 1st base: geothermal energy
    b. 2nd base: renewable energy
    c. 3rd base: electric energy

2. All traditional kickball rules apply.
   (see Program Follow up and Suggestions for more information).
3. When runners are **"safe"**
   they successfully save the plant and its resources.
4. When runners are **"out"**
   resources are depleted. When participants waste energy a total of 3 outs, teams switch roles.

Discussion Topics

1. Energy should be a daily routine.
2. Turning off your light every day before you leave home.
3. Using power strips that help save energy throughout the day.
4. Strategizing as a team can often be a challenge, but gathering everyone's ideas and working together during a game of kickball is more efficient than one person doing all of the work. Similarly, we must all do our part in saving energy. Together we can make a difference.

Required Supplies List & Budget

Soccer ball

$5-$10 (varies based on size and quality).

Baseball mats

$10-50$ (varies based on quantity).

Program Follow Up & Suggestion

http://www.livestrong.com/article/201012-kick-ball-instructions/

Consider using sidewalk chalk to draw bases if mats are unavailable and you are playing on a blacktop.

Soccer Ball Sockets

Program Description

Fitness Activity, Physical Challenge

Goals & Objectives

Learn how everyday activities can be used as alternate forms of energy.

Program Impact

Participants learn that every hour spent kicking a soccer ball produces enough kinetic energy to power a small energy efficient LED lamp for approximately 6 hours.

Curriculum

Basic Instructions

Version 1

1. Players start the discussion in a circle, passing a soccer ball from person to person.
2. Players then separate into two teams, picked by either team captains or random number.
3. Participants play a game of Soccer for two 20 minute halves.
4. All traditional soccer rules apply.

Version 2:

1. Players participate in a "shoot-out" competition.
2. Each team chooses a goalie and a kick off-point about 10 yards away.
3. All players get 1 attempt to kick a goal.

The team with the most points at the end of the line wins.

Discussion Topics

Soccket Soccer balls
Alternative energy forms

Required Supplies List & Budget

Goals
Soccer balls

Program Follow up & Suggestions

1. To see soccer balls producing electrical energy in real life scenarios, check out the Soccket Soccerball website.

http://us.soccket.org/

2. For more in depth information on soccer rules refer to:

http://www.ehow.com/list_6711430_soccer-rules-regulations-kids.html

Take-A-Hike

Program Description

Fitness Activity, Physical Challenge

Goals & Objectives:

Learn to incorporate adaptations to common activities in order to make them more energy efficient.

Program Impact

Participants alter a game of musical chairs to use less electricity and more brainpower. Finding a chair is based on asking and answering questions in favor of using an energy intensive sound system.

Curriculum

Basic Instructions

1. Using chairs or spot markers, create a circle with 1 less position than there are players (for example, there are 8 players and only 7 spots).
2. Choose one player to be in the middle while the others take their mark.
3. The middle player exclaims "Take a hike if…" followed by a fact about themselves.

   Examples: Take a hike if you know how to surf
   Take a hike if you've been to another state
   Take a hike if you're wearing flip flops.
4. If the statement applies, players must run to another open spot. Hikers cannot move into spots directly next to them.
5. The Hiker left without a spot is now the caller in the middle and the activity continues.

Discussion Topics

Adapting games to use no electricity, watt usage and common devices, nature appreciation leading to conservation.

Required Supplies List & Budget

Spot markers or chairs

Program Follow up & Suggestions

Incorporate energy saving ideas into the game: "Take a hike if you turn off the water when you brush your teeth/ if you turn off lights in unused rooms/use smart strips/etc."

If using chairs, be aware that they can easily tip over.

Basketball "Bolts & Bricks" Series

Program Description

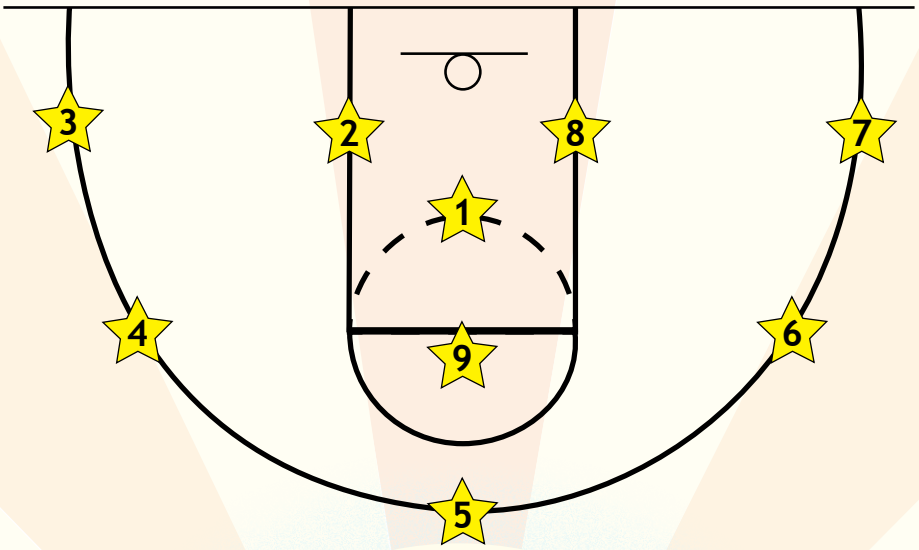
Fitness Activity and Physical Challenge

Goals & Objectives

1. Examine the parallels of physiology in activity and the science of energy.
2. Examine the importance of maintaining fundamental skills to achieve optimum performance.
3. Learn both the "B.E.E.F." principle in basketball and the 4 PEAK energy actions.

Program Impact

1. Goals and Objectives 1 and 3: Participants experience the parallels of physiology of activity and the science of energy at various stations.
2. Learn that their bodies produce by-products just like any other organic materials used in bio mass energy. While their bodies are efficient in processing products to avoid cramps, biomass energy plants are not as efficient even though they are renewable sources.
3. Participants must maintain individual skills (passing, dribbling, shooting) in order to achieve optimum performance. Maintaining appliances helps to also achieve optimum performance as well as increase energy efficiency.



Curriculum

Basic Instructions

Around The World

1. Starting in the middle of the key (the star located on the dotted semi circle) number 9 different spots on the half court.
2. Players take turns going one at a time, so there is only 1 traveler on the world circuit.
3. Starting from spot #1, a player begins traveling "around the world". After every successful basket, the player advances to the next numbered spot.
4. If a player fails their first attempt, they may "chance" it and take a second shot.
5. If they miss on a "chance" they must return to the end of the line and begin at spot #1 on their next turn.
6. If the "chance" is successful, the player may continue advancing until they miss.
7. Players are only allowed one "chance" per round.
8. Players who miss on their first attempt can also choose not to chance it, and remain in their spot until their next turn.
9. Players remain in their current position until they successfully complete the basket and can advance to the next designated spot on the court.

Knockout

1. You will need 2 basketballs for this activity.
2. Line up participants in a single file line.
3. Game play begins when the first player takes his/her shot. The player immediately behind them can take their first shot as soon as the first player releases their shot.
4. If the first player misses, they must scramble to make a basket before the player behind them makes one.
5. If the second player makes a basket before the first, the first player is out.
6. Once a player makes their basket, or gets out, the ball is passed to the players next in line to continue game play.
7. The game ends when there is only 1 player remaining.

Basketball Camp (stations)

1. Set up the following stations to allow participants focus on developing fundamentals – shooting, passing and dribbling.
2. Staff use motor development to reinforce fundamentals of sport and various lessons (see discussion topics below).

Discussion Topics

1. Closed Kinetic Chain Exercises- stabilization of ankle affects knee joint; emphasis on energy conservation and proper form to reduce injury; Symbolic of the power grid used to power facilities. Electricity must travel in a closed circuit, because excess energy returns to the grid, but if imbalances are present, disturbances (blackouts) occur. If imbalance occurs in form, injury occurs.
2. If an appliance is well maintained, the output of energy is just as efficient as an Energy Star rated appliance.
3. "B.E.E.F." principle of basketball (how to shoot).

   B: Bend your knees – Modify your habits and flex your energy use by consuming energy during off peak hours.

   E: Eyes forward – look towards the future and minimize waste to preserve resources.

   E: Elbow in – Explore renewable energy, knowledge is power!

   F: Follow through – Follow technology trends to help use energy efficiently and conserve resources.

Required Supplies List & Budget

Basketball

Basketball hoop
(Open courtyard or gymnasium with basketball court).

Sidewalk chalk
(To number stations if playing Around the World outside).

Cones
(To set up stations if playing Around the World in a gymnasium).

Program Follow up & Suggestions

1. The following activities are a fun way to get participants to "learn without learning". All activities build motor skills while teaching EE principles.
2. While playing Knockout, make sure all participants are aware of where the ball is at ALL times. Young players tend to get over anxious/excited and injury can easily occur if players are not paying attention.
3. Make reference cards that can be displayed during the basketball camp session to further reinforce associated lessons and discussion topics.

Musical Water Balloon Toss

Program Description

Fitness Activity and Physical Challenge

Goals & Objectives

Explore alternative ways to save energy during peak hours during the summer.

Program Impact

Participants experience saving energy through cooling off with a fun water game rather than using an air conditioning unit.

Curriculum

Basic Instructions

1. Fill the large bucket halfway with water.
2. Using the included water balloon nozzle, attach it to the sink and fill up the water balloons.
3. Place the water balloons in the bucket and transport to activity area.
4. Pair up participants and have pairs line up back to back in a single file line.
5. With each successful toss, participants must take one step back.
6. Participants toss water balloons back and forth until one player drops and breaks the balloon. If the balloon drops and does not break, participants are still eliminated from the competition.

Discussion Topics

1. How many watts does the average air conditioner use? 4500 watts/hr.
2. Using the following equation: 4500 watts/hr. x (# of hours) = total watts used per day; how many watts did the REC club save?

Required Supplies List & Budget

Water balloons/ water balloon nozzle

Access to a sink to fill up balloons

Large bucket

Large grass area or courtyard

Program Follow up & Suggestions

Make sure to "Leave No Trace" and pick up all the balloon scraps after the activity. Water will evaporate, rubber just turns into litter.

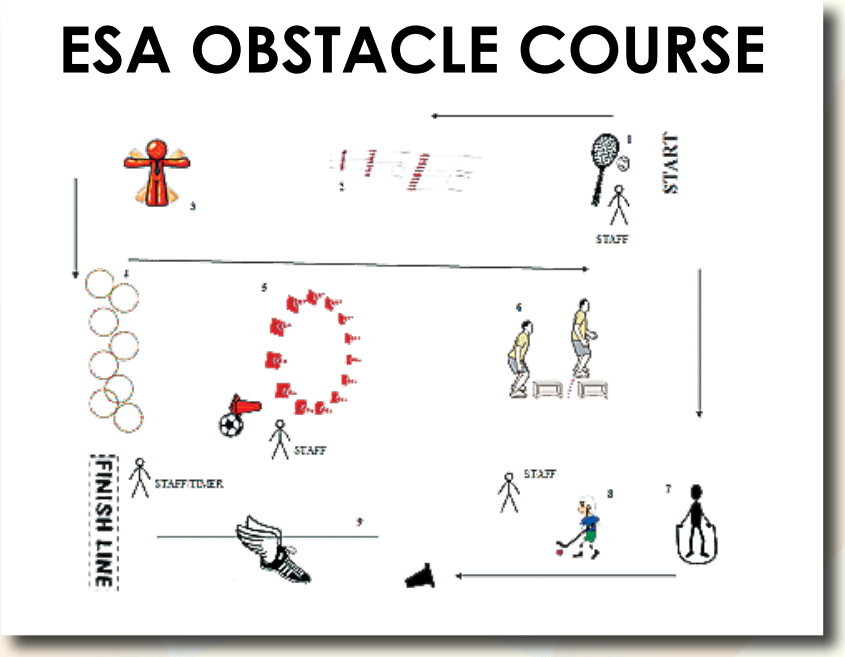
ESA Obstacle Course

Program Description

Fitness Activity and Physical Challenge

Goals & Objectives

1. Explore the following concepts in both the human body and energy processes:



2. Energy conversion, energy conservation, alternative energy (hydroelectricity and biomass), circuits, kinetic and potential energy

Program Impact

Participants experience the parallels of physiology of activity and the science of energy at various stations.

Curriculum

Basic Instructions

1. Using the following diagram, set up the following obstacle course:
2. Create signs and post them on cones beside each station in order to help participants identify the correct discussion topics with each station.

Discussion Topics

Tennis Ball Juggle

Similar to how the body uses the oxidation process to create energy for tennis activities, energy plants convert coal into usable forms of energy. Conservation is important in both cases to avoid depleting resources.

Hurdles (myelinated nerves in the human body; Nodes of Ranvier)

Our bodies use electrical signals to communicate messages from the brain to various body parts. In order to conserve energy and make our bodies function efficiently, electrical signals in our nervous system "jump" from Nodes of Ranvier on nerve cell endings because electrical signals travel slower through myelinated portions than unmyelinated parts.

Jumping Jacks

Basic exercise that allows variation with the same health results = variations of energy sources with the same results.

Hula Hoop Chain

Closed Kinetic Chain Exercise-Jumping from hoop to hoop; stabilization of ankle affects knee joint; emphasis on energy conservation and proper form to reduce injury; Symbolic of the power grid used to power facilities. Electricity must travel in a closed circuit, because excess energy returns to the grid, but if imbalances are present, disturbances (blackouts) occur. If imbalance occurs in form, injury occurs.

Soccer Dribbling

New research shows that Kinetic energy from physical activity can be stored as potential energy to be used later to power everyday electronics.

http://www.greenr.ca/2010/02/09/harness-energy-with-the-soccket-soccer-ball/

Bunny Hop (Jenga pieces)

Plyometric exercises emphasize development of muscle strength by improving muscle innervations with the nervous system (improve communication of electrical signals from brain to muscle). Similarly, maintenance of appliances improves electrical transmission and uses energy more efficiently.

Jump Rope Station

New tech developments include energy efficient flashlights that use kinetic energy from jump roping as an energy source.

http://www.yankodesign.com/2010/01/12/skip-to-make-some-light/

Hockey

Represents flow of water into turbines to create hydropower; conservation is important to prevent relying on secondary energy sources such as hydropower because of the following:

"California law also severely limits the types of hydroelectric power due to growing concerns about effects on fish, other wildlife and the environment. These facilities must be smaller than 30 MW and typically consist of hydro generators placed in water aqueducts."

http://www.sdge.com/environment/renewableenergy/geothermalHydro.shtml

Dash

During anaerobic metabolism used in activities such as sprinting, our bodies produce bio-gas byproducts such as lactic acid, which causes fatigue, but as the body recycles it, more energy is produced to continue performing an activity. Similarly, Biomass/Biogas energy recycles organic matter to produce usable energy and is a renewable energy source.

Required Supplies List & Budget

Tennis balls	Tennis racquets	Soccer Ball	Hula Hoops
Cones	Hurdles	giant Jenga pieces	
Hockey ball	hockey stick	Jump ropes	

Program Follow up & Suggestions

Recruit older participants at the REC club to help facilitate and supervise each station as well as mentor younger REC members. Hold pre-activity briefings to prepare the volunteers so that they can successfully run a station and explain the principles behind them.

Ultimate Frisbee

Program Description

Fitness Activities & Physical Challenges

Goals & Objectives

1. Protect and move resources down the playing field.
2. Identify strengths and individual energy contributions of teammates and use them efficiently.

Program Impact

Participants were taught the importance of saving energy in order to maximize performance in short durations, similar to sprinting.

Curriculum

Basic Instructions

Rules of the Game

1. Participants must work together to move resources (Frisbees) down the length of the playing field.

2. Players are not allowed to run with the Frisbee. Players can use a single pivot foot, similar to basketball to maneuver around defensive players. Players must pass the Frisbee prior to advancing down the field.
3. Scoring- The Frisbee must be passed to a player that is across the goal line in order for a team to score.

Discussion Topics

Energy efficiency, conservation, resource preservation

Pivoting

Provides limited movement of a player despite the resource having to cover a large area; just like power plants must be placed strategically in order to provide adequate resources to a large service area.

Teamwork

Every player has a different amount of energy to contribute to the game, teams must learn to work together to identify individual strengths and advance the Frisbee using the least amount of moves and expending the least amount of energy (use energy efficiently).

Required Supplies List & Budget

Cones

Frisbee

Program Follow up & Suggestions

In order to avoid player injury or arguments, assign staff to act as referees to make sure all game play is fair.

Spring Jump

Program Description

Fitness Activities & Physical Challenges

Goals & Objectives

Examine the importance of proper form in both circuits and athletic performance and its relationship to performance efficiency.

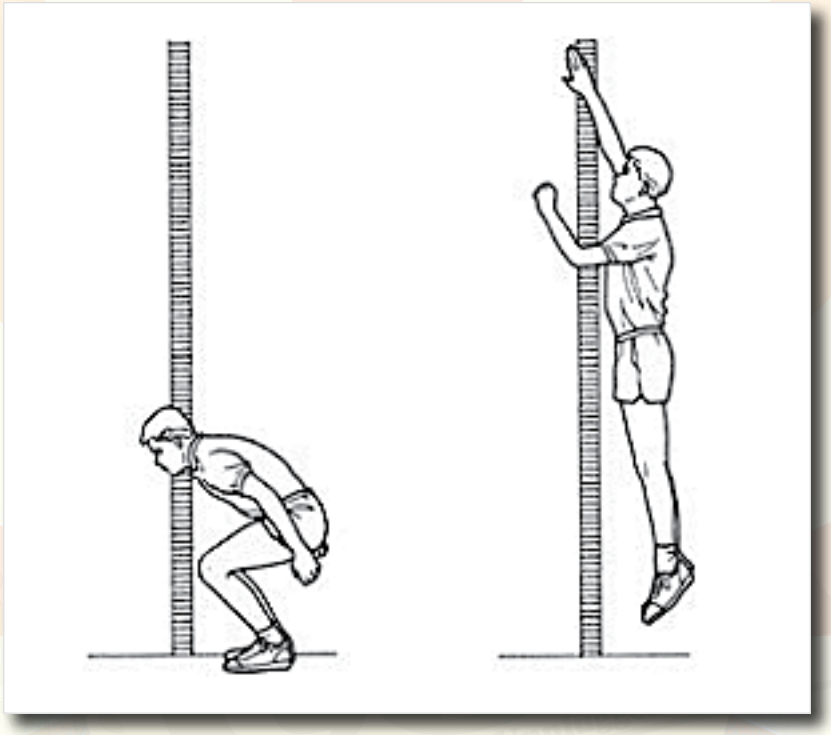
Program Impact

Emphasis on saving energy and proper form; electricity must travel in circuits and if imbalances are present, blackouts occur (injury in sport).

Curriculum

Basic Instructions

1. Tape the poster paper on the wall.



2. Have each participant stand by the wall and have them hold their dominant arm (right or left) up against the wall. Mark a line at the tip of their middle finger, this is the starting measurement. Measure how high in inches the starting mark is from the floor and record it in the data table.
3. Put pool chalk on the participant's middle finger and have them jump up as high as they can from a standing start. Participants must "slap" the paper and leave a finger print in order to get their ending measurement.

Participant	Starting Measurement (inches)	Ending Measurement (inches)	Jump Height (Start-End: Inches)

4. Measure the distance of the end measurement and calculate the difference. The difference is their jump height. Refer to the table listed below to get individual performance ratings.

Rating	Males (inches)	Males (cm)	Females (inches)	Females (cm)
Excellent	> 28	> 70	> 24	> 60
Very Good	24-28	61-70	20-24	51-60
Above Average	20-24	51-60	16-20	41-50
Average	16-20	41-50	12-16	31-40
Below Average	12-16	31-40	8-12	21-30
Poor	8-12	21-30	4-8	11-20
Very Poor	< 8	< 21	< 4	< 11

5. Facilitate a discussion based upon the results.

Chart from: **http://www.topendsports.com/testing/tests/vertjump.htm**

Discussion Topics

1. Techniques and challenges- place emphasis on balance- maintaining balance prior to jumping leads to a successful jump because it results in even power distribution and individuals can generate the maximum amount of potential energy to complete the jump.
2. On the other hand, maintaining balance of the energy grid ensures efficient electrical transmission of energy. Large surges of demand (peak hours) can cause blackouts (or injury in sport due to improper form).

Required Supplies List & Budget

Open space with access to a wall

Poster paper the length of the wall

Tape

Pool chalk

Measuring tape

Program Follow up & Suggestions

Make sure to initial end marks as each participant jumps. The more participants you have the more marks you will have on you wall and you want to ensure you are measuring the correct heights for each individual.

Slip N Slide

Program Description

Physical Challenge, Fitness Activity

Goals & Objectives

1. Compare and contrast liquid viscosity in relation to slide efficiency.
2. Discuss the differences between efficient/inefficient strategies in relation to collecting "resources."
3. Relate game strategies to strategic energy management tasks that can be implemented at home.

Program Impact

Participants compare the difference of using only water to slip n slide versus adding dish soap to the water. Participants compare times to reach the end of the slide in order to find which liquid is more efficient for sliding, allowing them to collect more resources.

Curriculum

Basic Instructions

Set up the slip n slide in a large open space. Make sure to set up the slide in a large enough area where participants can line up nearby without interfering with students as they take their turns on the slide.

Discussion Topics

Energy Efficiency, energy management

Required Supplies List & Budget

- **Slip and Slide**
- **Water Source (hose/spigot)**
- **Dish Soap**

Program Follow up & Suggestions

Post program reminders around the REC leading up to the day of the Slip and Slide activity. Remind participants to bring swimsuits/swim trunks!

Wolves and Vampires

Program Description

Fitness Activities & Physical Challenges

Goals & Objectives

1. Protect and move resources down the playing field.
2. Identify strengths and individual energy contributions of teammates and use them efficiently.

Program Impact

Participants observe the importance of saving energy, as consumption quickly adds up without notice.

Curriculum

Basic Instructions

Rules of the Game

1. Depending on how many participants you have, designate 1-2 "wolves". The remaining players are "vampires."
2. The object of the game is for the wolves to eliminate all of the vampires that are stealing their energy. The only way to do that is to work together and tag each vampire with an energy strip (tag them with the ball).
3. Wolves are not allowed to run with the ball, they can only use a single pivot foot to maneuver around and try and tag a vampire.
4. Once a vampire is tagged, they become wolves.
5. Game play ends when there are no longer any vampires.

Discussion Topics

1. Energy Efficiency, energy vampires.
2. What observations did you make as the "wolves" captured additional "vampires?"
3. As wolves gained resources (players), it was easier to capture the remaining vampires. Once upgrades are installed, it is easier to monitor and manage energy use.
4. Wolves – What strategies did you use? Were they successful? Why or why not?

5. The most efficient strategy is for wolves to come together and corner vampires. Wolves who position themselves around a vampire within a smaller range have a higher success rate of tagging and converting vampires to wolves.

Required Supplies List & Budget

Cones

Medium sized ball

Program Follow up & Suggestions

Similar to other activities, feel free to rename the activity in order to appeal to your youth participants (for example changing Wolves and Bunnies to Wolves and Vampires).

Cone Soccer

Program Description

Fitness Activities & Physical Challenges

Goals & Objectives

Recognize the importance of energy conservation in order to avoid blackouts, especially during the summertime.

Program Impact

Participants are taught that cones are easily knocked down and lost, just like energy grids can easily be maxed out and blackouts can occur. As a result, participants are inspired to save energy.

Curriculum

Basic Instructions

Rules of the Game

1. Set up 5 cones on each side of the playing area.
2. All traditional soccer rules apply; no hands. The only exception to this rule is when a cone is knocked down and a player is transporting the energy tower (cone) to their side of the field.
3. Divide participants into 2 equal teams. Teams will compete to knock over and steal the opposing team's resource towers. Note- Players are not allowed to kick over towers. Players must use the soccer ball to knock over the cones.

4. Once a cone is knocked over, the player who knocks it over or is closest to the cone can pick it up and run it back and add it to their line of resources.
5. Game play ends when one team loses all their resources or time expires (game play periods vary based on the age group participating).

Discussion Topics

1. Energy efficiency, conservation, peak hours, demand response
2. In a game of soccer we must anticipate the opposing team's moves and plan accordingly. Players must learn to strategize both offensively (using energy) and defensively (preserving energy). It is also important to anticipate an increased demand during summer (San Diego gets extremely hot!) so we must prepare so that we are using energy efficiently and blackouts do not occur, especially when we want to be able to cool down inside the REC.

Required Supplies List & Budget

Soccer Ball

Large playing area/grassy field

Cones

Program Follow up & Suggestions

Provide a staff referee to ensure fair game play.

Boat Building and Boat Races

Program Description

Arts and Crafts; Fitness Activities & Physical Challenges

Goals & Objectives

1. Inspire participants to do their part in energy efficient design and preservation of resources.
2. Successfully complete practical application of a science behind energy experiment on both a model and full size scale.
3. Identify the 3 types of boating efficiency and the importance of balance in order to maximize performance.

Program Impact

1A. Participants are taught that waterways are better suited for boats than channeling water into narrow ducts to try and create hydropower. Participants are inspired to save energy in order to prevent relying on alternative sources.

1B. Race boats with and without obstacles; observe any associated challenges with the narrowing of the channel just as channels for hydropower must narrow. To inspire saving energy in order to prevent relying on alternative sources.

Based on previous success of boat races at each REC center, expanding the project through the County's partnership with San Diego State University will expose participants to energy efficiency in action and preservation at a grander scale.

Curriculum

Basic Instructions

Part 1

Using recycled materials such as plastic bottles and card board, provide time for participants to experiment with various boat designs. Use the rain gutter to test each boat.

Part 2

Build the most efficient boat that will successfully transport your team using only the provided materials. Identical materials will be provided to both centers courtesy of San Diego State's Aztec Adventures.

Awards will be given out at judge's discretion: Best Design, Best looking, the Underdog and if necessary the Titanic Award.

Discussion Topics

Focus on 3 types of efficiency, boat, paddle and body.

Week 1: Boat efficiency

Design allows individuals to paddle fast with less effort.

Week 2: Paddle efficiency

Stroke pattern enables individual to paddle fast and still navigate safely.

Week 3: Body Efficiency

Positioning allows individuals to paddle efficiently without injury.

Of the 3, body efficiency is safer and more sustainable and comes at the expense of boat and paddle efficiency. Participants will learn to balance the 3 while designing their vessels, just like we must learn to balance energy consumption and not rely on a single source because taxing any one resource can result in power outages (boat tipping over).

Required Supplies List & Budget

Rain gutter

Water

Plastic bottles

Card board

Duct tape

Miscellaneous craft supplies

Wood dowels, craft sticks etc.
Kits including cardboard and PVC piping etc.
(provided by Aztec Adventure).

Kings & Queens

Program Description

Fitness Activities & Physical Challenges

Goals & Objectives

Identify the importance of shutting down appliances in the teen center when not in use.

Program Impact

To play a simple ball game where participants must use closed fists to transport the ball just as participants must "close" or turn off lights before going outside to play in order to save energy.

Curriculum

Basic Instructions

1. Designate one player to be "it."
2. The objective of the game is for the player who is "it" to convert the remaining players to their team by hitting them with the ball.
3. A player is converted to the opposite team when they are hit with the ball after "it" bats the ball at another player.
4. The "it" player is not allowed to tag the player with the ball in their hand.
5. It must hit the player after being hit with their fist.
6. The "it" player is also allowed to transport the ball between their closed fists in order to position themselves around the playing area.
7. Players can bat away the ball and defend themselves using a closed fist.

Discussion Topics

Energy efficiency, vampire energy, performance efficiency, stewardship.

Required Supplies List & Budget

Playground ball (i.e. a kickball or dodgeball).

Program Follow up & Suggestions

Provide a staff referee to ensure fair game play.

S.P.U.D.

Program Description

Fitness Activities & Physical Challenges

Goals & Objectives

Identify the importance of resource and energy preservation.

Program Impact

Participants dodge the "energy sucker" in order to preserve their resources. Once an individual's resources were depleted they became energy vampires.

Curriculum

Basic Instructions

1. Designate a single player to be the "energy sucker."
2. Because "energy suckers" hog all the resources, only they can throw the dodgeballs.
3. When a player is hit by a ball/balloon, they gain a letter, "S," then "P" and so on until they become a "SPUD". Once a player has been hit 4 times, they are converted into energy suckers and can now assist in trying to get the remaining players onto "their side of the energy grid."

Discussion Topics

1. Conservation, preservation, vampire energy
2. Once a household has a single "energy sucker," additional energy suckers quickly add up.

Required Supplies List & Budget

Dodgeballs

Water balloons (optional)

Program Follow up & Suggestions

You can opt to play this game water balloons on a hot summer day in order to provide a fun way to cool off and teach participants. Make sure to clean up the pieces from the balloons afterwards.

500

Program Description

Fitness Activities & Physical Challenges

Goals & Objectives

Observe how quickly watt usage can add up and strategically learn to save approximately 500 watts during the day.

Program Impact

Participants are challenged to "save 500 watts" through the use of a classic game of catch. When minimum savings are reached, participants switch roles.

Curriculum

Basic Instructions

1. Designate a player or staff to act as the energy czar. The energy czar is responsible for facilitating game play. The energy czar is responsible for calling out watt amounts and then throwing the ball.
2. After the energy czar calls out a watt amount and throws the ball into the air, participants "save" watts by catching the ball before it touches the ground.
3. If the ball hits the ground, the energy czar consumes and wastes the watts and adds it to his or her total score.
4. Game play ends when a player saves a total of 500 watts or the current energy czar exceeds the combined total of all players (for example if there are 5 players, 5 x 500(watt goal) = 1500 watts.

Discussion Topics

We rely on energy heavily during the day, but it is our job to manage our daily consumption. The energy czar represents when we are wasteful and leave appliances plugged in (vampire energy) or use the lights during the daytime and leave them on.

Required Supplies List & Budget

- Football
- Large open space

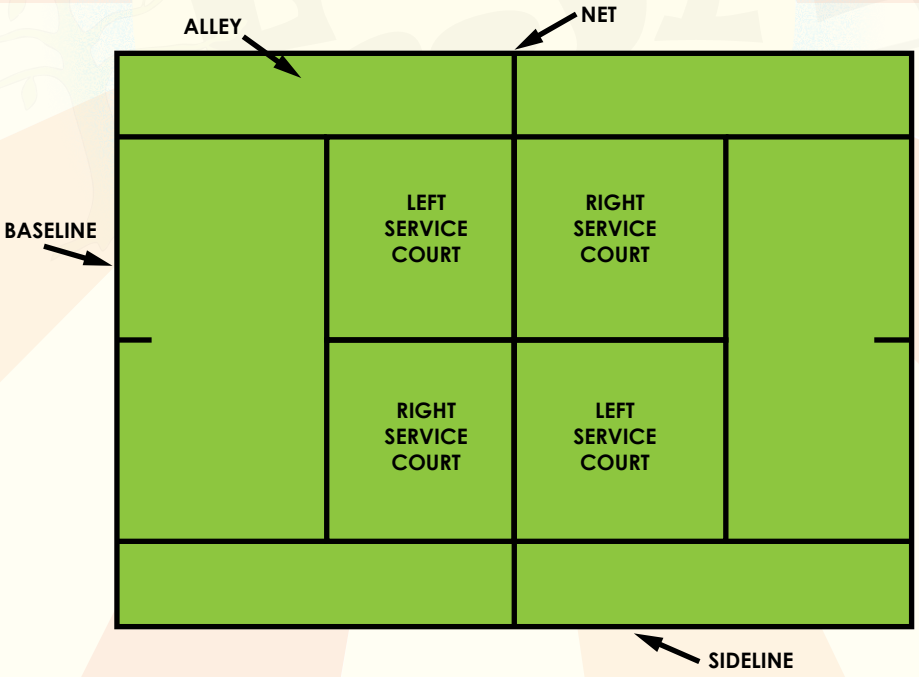
Program Follow up & Suggestions

This game can be played in any open space that is available. If you are playing in a parking lot (Spring Valley REC), make sure you anticipate and allow enough room to avoid parked or incoming cars.

Tennis Skills Relay

Program Description

Fitness Activity, Physical Challenge



Goals & Objectives

Examine the relationship between maintenance, optimum performance and energy efficiency.

Program Impact

Participants learn that tennis racquets require the proper tension for optimum performance, just like energy grids require the proper balance to supply energy demands without any blackouts.

Curriculum

Basic Instructions

Rules

1. Tennis skills- forehand and backhand juggling.
2. Establish the length of the relay race based on the age of the participants. Typically, races are held from the baseline to the base of the service court lines. Races that run from the baseline to the net should only be used for older participants.
3. Split participants into 2 teams and have each team line up on the baseline.
4. Players will take turns juggling the ball from the baseline to the service line and back.
5. When they return to the baseline, they must transfer their resources (the tennis ball) to the next user (player).
6. Resources are wasted if they touch the ground. Players must work together to prevent waste.
7. The team that successfully juggles their resources through multiple uses (players) is declared the winner.

Advanced Juggling Variations

1. **Dribbling:** Players bounce the tennis ball between the racquet and the court floor and dribble between the baseline and service line.
2. **Forehand/Backhand Juggling**: Players alternate the racquet from forehand and backhand positions between juggles.
3. **Non-Dominant Hand Juggling**: Challenge players to use their non-dominant hand to juggle.

Discussion Topics

Similar to how the body uses the oxidation process to create energy for tennis activities, energy plants convert coal into usable forms of energy. Conservation is important in both cases to avoid depleting resources.

Required Supplies List & Budget

Tennis racquets and balls

Cones (optional)

Program Follow up & Suggestions

Depending on the age and the abilities of the group you are working with, you can incorporate different variations of tennis juggling (see above).

Bocce Golf

Program Description

Fitness Activity, Physical Challenge

Goals & Objectives

Use available resources to create alternative forms of entertainment during peak hours.

Program Impact

Players are encouraged to combine outdoor games and activities to create an alternative to heavily energy reliant video games and electronic entertainment.

Curriculum

Basic Instructions

Rules

1. To begin play, have participants pair up into teams of 2.
2. Each pair designates a "player 1/player 2."
3. At the beginning of the first round, Player 1 throws his/her game ball onto the playing area. Each team should have their first ball in play before the 2nd player of each pair takes their turn.
4. Player 2 then takes his/her turn and tries to throw their game ball near/hit their partner's game ball. The amount of throws needed to accomplish this task is recorded as the team's score for the round.
5. Players can only take 1 throw/ "stroke" at a time (Player 2 of Team 1 goes, then Player 2 of Team 2 and so on). Once the team has successfully reached their goal the team fills out their scorecard and sets up for the next round.

6. For each additional round, players take turns setting the goal (i.e. round 2-Player 2 plays their ball first and player 1 tries to hit their partner's game ball etc.).
7. The team with the lowest score at the end of the game wins!

Discussion Topics

1. Peak hours, vampire energy
2. Emphasis is placed on strategies used to accomplish a goal with a minimum amount of effort, similar to completing everyday tasks using energy efficiently, especially during peak hours.

Required Supplies List & Budget

Bocce ball set

Large open space

Program Follow up & Suggestions

Prior to heading outdoors, make sure to go through the center with participants and shut down all electronics (computers, video games, lights, etc).

Sample Scorecard

Note X mark indicates player threw the initial game ball into play.

Round	Player 1	Player 2	Total No. of Throws
1	X	3	3
2	3	X	6
3			
4			
5			
6			
7			

Bark Ball

Program Description

Fitness Activity, Physical Challenge

Goals & Objectives

1. Successfully complete a checklist of items in order to shut down the teen center.
2. Learn to work together to save energy while participating in physical activity.

Program Impact

Participants expend their physical energy on outdoor activities while saving on electrical energy consumption within the center.

Curriculum

Basic Instructions

Rules

(adapted from **http://www.teachingideas.co.uk/pe/barkball.htm**)

1. Split participants into two teams.
2. Bark ball is similar to baseball, one team bats, while the other plays the field.
3. The object of the game is to return as many resources (players) to home base as possible during each team's turn at bat.
4. In order to focus on proper form and motor development, teams pitch to their own players.
5. Once a player at bat hits the ball, they run to the opposite side of the court while the fielders scramble to retrieve the ball and tag the player. IF they feel it is safe to return, they may run back to home base immediately. If players do not feel it is safe to return, they may stay at the baseline while the next player bats.
6. Only a maximum of 5 runners can stand on the baseline. Once 5 runners are on the baseline, ALL 5 must run back regardless of if they feel it is safe or not.
7. Outs: Players are out if a fly ball is caught, or they are tagged by a fielder who has retrieved the ball. Fielders are allowed to pass the ball to try and tag a player.
8. When a team has 3 outs, teams switch roles.

Discussion Topics

1. What factors determined whether you thought it was safe to run back or not? *Awareness of surroundings and actions of others influences behavior*.
2. What strategies, if any did you use to create your batting order? *Distribute skilled players between novice players. This prevents novice players from getting stranded on the base line. Stronger players who can hit the ball farther can open up a bigger window of time to run back to home base, and if strategically placed in the batting order, they can help bring back novice players. Strategizing the placement of batters helps to consolidate energy efforts of all team members. EE-see also preferred loading order (appendix).*
3. What strategies, if any did you use in the outfield? *Depending on the size of the playing area, teams will want to spread out to maximize the amount of the court/field that has coverage. Condensing all their resources into a single area is not as efficient as if they were spread out. This same concept can be applied to energy use- large spikes of energy use are more damaging to the energy grid than the same amount of demand is over a longer period of time. (Demand response).*

Required Supplies List & Budget

Large open space

Tennis ball

Racquet

Cones

Program Follow up & Suggestions

Depending on weather and availability of time, designate the amount of innings that will be played and/or a goal that needs to be reached before the game ends. (For example, on a hot day, you will play 5 innings but will play 7 on a cooler day; first team to save 10 resources wins etc.).

Treasure Challenge/Blind Opera

Program Description

Physical Challenge; Resource Adventure

Goals & Objectives

1. Identify the key components to efficient communication
2. Retrieve an energy source in the least amount of moves

Program Impact

Participants work together to navigate their partners to energy resources without wasting energy (least amount of moves).

Curriculum

Basic Instructions

Rules

1. This game is all about communication and trust, both of which are essential to successful team building.
2. Each team must successfully complete an action/task (pick up a ball etc).
3. Designate 1 person to be the "blind" participant and blindfold them. This individual can only receive auditory commands and must follow their teammate's directions.
4. Designate a second person to be the communicator. This person will have their back towards the blind participant and will use visual cues from the rest of the group to direct the blindfolded participant.
5. The rest of the group will be facing the communicator as well as the blind participant, but cannot speak.
6. Team members can only act out/gesture instructions to the communicator so they can guide the blindfolded participant.

Discussion Topics

Efficient communication between team members leads to efficient energy expenditure by the blindfolded participant. Similarly, when appliances are properly maintained, electrical transmissions can be conducted with minimal energy loss and appliances can perform on a daily basis.

Required Supplies List & Budget

Blindfolds

Small object such as a tennis ball and/or small toy

Program Follow up & Suggestions

Ensure participant safety throughout the activity, emphasizing that participants must trust one another and not mislead participants that are blindfolded.

Steal the Globe

Program Description

Fitness Activity, Physical Challenge

Goals & Objectives

1. Learn the definition of peak hours.
2. Observe the challenges associated with multiple sources competing for energy sources.

Program Impact

Participants learn the importance of using appliances during off peak hours as they experience multiple sources competing for the use of a single energy source.

Curriculum

Basic Instructions

Rules

1. Split participants into teams.
2. Assign each player a letter, number or object. Each team should have a player represent each object (for example, each team should have an "A" or a "1").
3. Have each team line up on opposite sides of the court and place the dodgeball in the middle of the court.
4. Game play begins when players are lined up.
5. A neutral player (staff) yells out one of the objects/letters.
6. The players whose letter or object that was called out race to the middle and try to retrieve the dodgeball first.

7. The player to retrieve the ball first and return to their team scores a point for their team.

Discussion Topics

Peak hours, demand response

Required Supplies List & Budget

- Small ball, such as a dodgeball
- Large open space

Program Follow up & Suggestions

If you are working with a larger group of participants, you can divide them into more than 2 teams. Make sure that each team has the same amount of players. (for example if you have 15 players, consider having 3 teams of 5 rather than 2 uneven teams of 7 and 8)

4 Square Blackout

Program Description

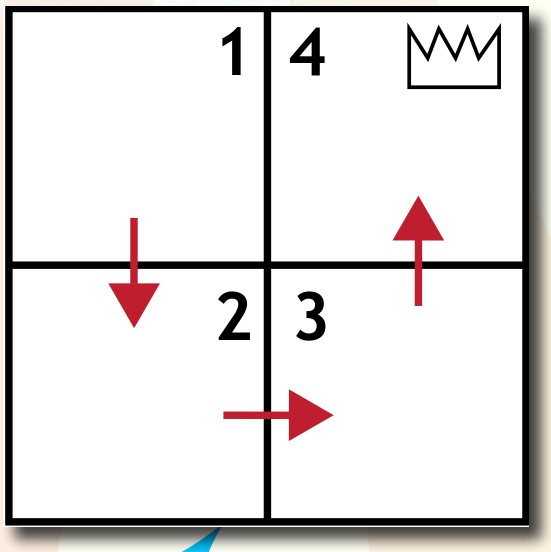
Fitness Activities & Physical Challenges

Goals & Objectives

Learn how to manage a section of the energy grid.

Program Impact

Participants must creatively manage their own grid in order to save energy efficiently and successfully perform tasks.



Curriculum

Basic Instructions

(rules adapted from **www.squarefour.org**)

Game play/Energy Grid Set-up

(If a ball hits an outside line, the ball is still in play.
If the ball hits an inside line, the player who last hit the ball is out.)

Rules

1. Prior to game play, make sure all participants agree on the set of playground rules they will be following.
2. The goal of the game is to stay in the #1 spot for as many rounds as possible. The player who remains in the #1 spot at the end of the activity is declared the EE King/Queen for successfully managing the energy grid.
3. Players are eliminated for:
   a. Failing to hit the ball into another square.
   b. Allowing the ball to bounce more than once in their own square.
   c. Hitting the ball out of bounds or onto an inside line.
   d. Hitting the ball incorrectly, such as holding, catching or carrying.
   e. Hitting the ball with a part of the body other than the hands.
   f. Hitting the ball out of turn (poaching).
   g. Violating any number of local rules that are made up on the playground.
   h. No double taps (hitting the ball twice in a row) and no cherry bombs! (Slamming the ball into an opponent's square).

Discussion Topics

1. Demand response, peak energy demand.
2. Players must maintain balance and be agile enough to manage their grid. When players lose balance, their ability to efficiently use their energy is compromised. When energy and techniques are comprised, attempts to keep the ball in play are also unsuccessful.
3. What techniques are considered "risky" and why?
   Off balance shots place a player at risk because these shots are taken from an awkward position. Players learn to maintain control and balance in order to avoid making costly mistakes during the

game. Participants learn to apply this principal to managing their energy usage at home because everyone benefits from steady and efficient use of energy throughout the day rather than taxing the energy grid (especially during peak hours) at any point in time. Large spikes in energy use are less efficient than using the same amount of energy throughout the day.

4. Which techniques require the most energy to execute?

Required Supplies List & Budget

Large open space (such as a courtyard or blacktop)

Kickball

Program Follow up & Suggestions

Rather than drawing a 4 square on the pavement, utilize naturally occurring lines to create your court.

Can-portation

Program Description

Fitness Activity, Physical Challenge

Goals & Objectives

Illustrate how too many users and limited resources can bog down power station and cause brown and/or black outs.

Program Impact

Participants work to transport energy resources, represented by a small can, to various locations. Each location requires more users to "plug in" via finger touch until movement is impossible and a "black out" occurs.

Curriculum

Basic Instructions

Version 1

1. Participants work as a team to move an object to a series of goals using only 1 finger per person.
2. Each player must be touching the object with only 1 finger in order for it to move.

3. No "disconnecting" allowed. If a player is not touching the object, the portion of the route where the team disconnects from the object must be restarted.
4. At each goal point, more players must be added (varies depending on the amount of players, usually 2 new players per goal point).
5. For example, in a game with 10 players total and three goal points, 6 players would plug in to the object at the start, then add 2 more players upon the next goal, then 2 more on the last goal, ultimately reaching 10.
6. Travel continues until all players are "plugged in" or the object can no longer move.

Version 2

The same rules stated above apply, but the participants must all "plug in" with a different finger or body part.

Version 3

The same rules as above apply, but the players are split into two teams and a race through an obstacle course occurs.

Discussion Topics

Peak hour usage, how overtaxing a resource can lead to blackouts and brownouts.

Required Supplies List & Budget

Can, ball or any transportable object readily available

Obstacles (cones, stairs, blindfolds, etc)(optional)

Program Follow up & Suggestions

Depending on how many participants are involved in the activity, the object should be smaller or larger. Picking a large object will make moving easy but make illustrating the principle that too many electrical devices can overtax a resource more difficult, picking a smaller object will make play more difficult while making it easier for participants to see how too many energy suckers can be bad for a limited resource. If you notice that play is going quickly, change the object to something with a smaller/ unique surface area, or choose an object with more weight.

Hockey/Hockey Tag

Program Description

Fitness Activities & Physical Challenges

Goals & Objectives

Illustrate limited availability of energy in a high demand/peak time market.

Program Impact

1. Participants play outdoor hockey instead of in an ice hockey arena which can use up to 2.4 kWh, a total of 1.5 million kWh a year.
2. Participants protect their energy cache (puck) from others while simultaneously attempting to drain other power plants (players) of their resources.

Curriculum

Basic Instructions

Hockey

1. To make teams- Players pair up and play a game of rock, paper, scissors. Players who win the game of rock, paper, scissors will create the first team, and the remaining players will create the second team.
2. Game play begins with a face off in the middle of playing area. Make sure players take turns with each face off. A face off also occurs after every goal to restart the game.
3. No "high sticking"! – Players cannot raise their sticks higher than their knees to strike the puck. Players who break this rule are subject to being removed from the game for the safety of the other players.
4. Game play ends at the conclusion of two 20 minute periods.

Curriculum

Basic Instructions

Hockey Tag

1. Note-There are no teams in this hockey mini-game. It is every player for themselves.
2. Each player has their own resources (ball/puck) to protect. Players are free to move around the designated playing area while simultaneously trying to protect their resources and steal other player's resources.
3. Once a player loses their resources, the player no longer has enough power to keep up with energy demands and is eliminated from the game.
4. At the end of the game, the player who protects their resources and remains in the game the longest is declared the winner.

Discussion Topics

Peak demand time, energy efficiency, energy preservation.

Required Supplies List & Budget

Portable soccer goals,
Cones

Hockey puck/ball,
Hockey sticks

Program Follow up & Suggestions

Make sure players who face off in the middle are closely matched in skill level to ensure game play is fair.

Conservation, Demand Response and Renewables

Renewable Dodgeball

Program Description

Fitness Activity, Physical Challenge

Goals & Objectives

Participants must protect each of their resources (players) while trying to steal the resources of the other teams.

Program Impact

Participants protect their power plant from the other team while energy stores (players) get depleted. Teams learn the value of energy reserves in protecting vulnerable power infrastructures.

Participants observe the importance of renewable sources and are inspired to save non-renewable sources. Once the renewable source is gone, the remaining team resources are in danger.

Curriculum

Basic Instructions

Version 1

1. Have participants pair up and play a quick game of Rock, paper, scissors to pick teams.
2. Once a player is out, they must go to the energy store behind the opposite team.
3. Players can block balls with another ball if they maintain possession of it throughout the block. If the ball used to block is knocked loose, the player is out.
4. If a ball is caught, the thrower is out and a player is returned to the team that caught the dodgeball.
5. Head shots result in the thrower automatically being out.
6. Players in storage are not allowed to play until the round ends.

Version 2

All rules apply except players in storage are allowed to aid teammates by playing from behind the opposing team.

Version 3

All rules apply except each team has an energy technician (designated player). When players get out they kneel in place and the technician can come around and restore resources (players) by tagging them.

Renewable Dodgeball Discussion Topics

Renewable energy sources and how they work

Solar

Photovoltaic cells turn sunlight into usable energy and average < 25% efficiency.

Wind

Wind turbines turn as the wind blows and generate energy and average between 35-40% efficiency.

Geothermal

This uses the Earth's heat to generate energy, averages 10-23% efficiency and only accounts for about 0.3% of the U.S.'s energy supply because geothermal plants require drilling and geothermal heat is not easily harnessed.

Hydro

Hydro uses water to generate energy, but can cause large scale habitat disruption.

Biomass

Biomass uses biological matter from living or once living organisms to generate power and averages between 20-27% efficiency.

Availability of energy stores and demand response

Required Supplies List & Budget

An open space
Dodgeballs
($60/set of 6)
Water for participants
($5 for every 10 participants)

Program Follow up & Suggestions

Depending on the age range of participants you will be working with, pick an appropriate version of the activity. When facilitating discussion topics make sure to match the grade school science level of your participants.

Punt, Pass, Kick

Program Description

Fitness Activity, Physical Challenge

Goals & Objectives

To successfully compare and contrast traditional energy sources with alternative energy sources and teach the importance of energy conservation to avoid relying on alternative sources.

Program Impact

Version 1

Participants learn that throwing techniques can be compared to the efficiencies of energy and alternative energy. Inspires behavior modification to save energy and avoid relying on alternatives.

Version 2

Participants learn about the 4 PEAK student actions through the use of various activity stations.

1. Shift Energy Use off Peak Demand Time
2. Shrink Energy Use through Cutting Waste
3. Explore Renewable Energy
4. Plug in to new technology

Curriculum

Basic Instructions

Version 1

Set up stations that pairs an activity with an energy source (for example, "passing is a traditional energy plant, punting is a solar energy plant, and kicking is a hydroelectric plant."

At each station– have participants compete to see who can throw, kick and punt the farthest.

After each activity, facilitate a discussion about the pros and cons about techniques for both the activity and energy plants.

Version 2

Set up stations and pair an activity with one of the PEAK student actions:

1. Shift energy Use off Peak Demand Time (Passing)
2. Shrink Energy Use through Cutting Waste (Kicking)
3. Explore Renewable Energy (punting)
4. Plug in to new technology

Discussion Topics

1. Passing is the key to any football game, just like energy helps society to function on a daily basis. The Passing station represents participants shifting their energy use during peak hours to using daylight instead of electricity.
2. The Punting station will represent the specialized fields of renewable energy including, solar, hydroelectric, geothermal, biomass and wind. Punting plays a big part in a football game because it sets up the following series of plays and has the potential to make or break the outcome of the game. Solar energy has the potential to power society, but is a very specialized field, with limited availability and increased operating costs.
3. Kicking, like punting, is also a specialized field, just like hydroelectric energy. Techniques for both activities can account for only a small margin of error in order to successfully operate which limits their performance efficiency. Participants will also learn to "kick" their consumption by modifying behaviors and shrinking energy use through cutting waste generation.
4. Plug in to new technology- Research and discuss your local stadiums energy efficiency and conservation plans. By associating items that participants already identify and connect with, information is more likely to be retained. For example, many stadiums are investing in energy efficient lighting and innovative irrigation systems to help save energy.

Required Supplies List & Budget

Athletic Field Cloth measuring tape
(cost varies based on length $6/50 ft. - $30/400 ft.)

Various size footballs for participant age groups
($20/each Youth size; $30/each for official size)

Cones (varies- $5/each to $20-$30/set of 6)

Program Follow up & Suggestions

1. Be thrifty and creative to supplement available supplies rather than purchasing items. This teaches participants that with a little creativity, available resources can go a long way.
2. For example– create your own cloth measuring tape by using yarn and a ruler. Use duct tape to create markers on the yarn that indicate specified distances.
3. If you are leading the activity on pavement rather than grass, mark footballs with chalk so that when it hits the pavement it will leave a mark and distances can be measured accordingly.

Potato Sacks and Sack Races

Program Description

Arts & Crafts; Fitness Activity and Physical Challenge

Goals & Objectives

To use available resources constructively to create a game.

Program Impact

Participants use available resources to create sacks in order to host a tournament. Participants reduce the amount of energy used for entertainment at the teen center.

Curriculum

Basic Instructions

1. Prepare materials by cutting leftover burlap material into large squares and sew each square into a bag using a large sewing needle and yarn.
2. Have participants sign up in teams of 4.
3. After handing out a potato sack to each team of 4, have each group work together to come up with a team name and decorate their bag.
4. Host a relay race and post race facilitate a discussion that covers efficient techniques as well as the importance of being thrifty with available resources.

Discussion Topics

Energy transference and efficiency, resource preservation

Required Supplies List & Budget

Burlap material
Yarn
Large sewing needle
Fabric markers or paint and paintbrushes

Program Follow up & Suggestions

Encourage participants to mix up the teams and turn the relay race into a chance to build new friendships. The relay race is a fun way to get participants out of their comfort zones as well as get some exercise!

Clean Up the Shore

Program Description

Fitness Activity, Physical Challenge

Goals & Objectives

Learn about the importance of keeping beaches clean and the relationship between clean shores and the rate of energy efficiency of hydropower.

Program Impact

1. Energy is conserved while outside activity promotes keeping a clean shore in order to efficiently harness wave power and prevent excess energy expenditure from secondary energy sources.
2. Participants work as a team to clear their rooms of "energy vampires" by transferring them to the opposing side and saving their team energy.

Curriculum

Basic Instructions

1. Divide the playing area (grass field, courtyard, basketball court etc) into two sides.
2. Have participants pair up and play a quick game of roshambo to divide them into teams.
3. Spread out the sponges on both sides.
4. When game play begins, participants can pick up sponges and throw them onto the opposing team's side in order to "clean" up their part of the shore.
5. Call time, and participants can no longer throw sponges and must leave all sponges in their place, or drop any sponges they may be holding.
6. Tally up how many sponges are remaining on both sides.
7. The team with the least amount of sponges on their side is declared the winner for their cleaning efforts.
8. After hosting a couple of rounds, debrief with participants about the significance of a clean shore and ways we can all do our part to keep our beaches clean.

Discussion Topics

Hydropower (pros and cons), vampire energy, energy transference

Required Supplies List & Budget

- Cones
- Sponges

Program Follow up & Suggestions

If sponges are not readily available, the use of small stuffed animals or a collection of miscellaneous items that are soft work just as well for this activity.

EXPERIMENTS

Energy Efficiency and Preservation
Problem Solving and Critical Thinking

Energy Hangman

Program Description

Problem Solving, Board Game

Goals & Objectives

Review and learn EE terminology and vocabulary

Program Impact

Participants are introduced to new EE terminology and vocabulary through a game of hangman.

Curriculum

Basic Instructions

1. Research and create a list of EE terminology, their definitions and proper application.
2. Participants take turns guessing letters.
3. A participant's turn continues until an incorrect guess is given and a body part is added to the drawing board.
4. The game ends when one of the following occurs:
   a. A participant correctly solves the vocabulary puzzle
   b. The "hang man" has all of his body parts.

Discussion Topics

Energy efficiency, conservation, demand response, renewables

Required Supplies List & Budget

1. Paper (poster size) and markers
2. List of EE vocabulary terms

Fossil	boiler	climate	Turbine	
capacity	internal	carbon	industry	
scale	coal	efficiency	electromagnetic	
natural	liquefied	sustainable	magnetic	
fuel	transmit	windmill	radiate	biodiesel

EE Definitions

Biodiesel: an alternative fuel formulated exclusive for diesel engines; made from vegetable oil or animal fats.

Boiler: closed vessel or arrangement of vessels and tubes, together with a furnace or other heat source.

Capacity: the ability to receive or contain.

Climate: Meteorological conditions, including temperature, precipitation, and wind that prevail in a region.

Coal: A natural, dark-brown to black, solid substance formed from fossilized plants under conditions of great pressure, high humidity, and lack of air.

Efficiency: Acting or producing effectively with a minimum of waste or unnecessary effort.

Fossil: the preserved remains of an animal or plant.

Electromagnetic: pertaining to electromagnetism or electromagnetic fields.

Industry: the commercial production and scale of goods and services.

Internal: Of, or located within the limits or surface of something inner, interior.

Liquefied: the change from solid to liquid state.

Natural: of existing in, or formed by nature.

Radiate: To send out rays or waves.

Scale: An instrumental or machine used for weighing.

Sustainable: Capable of being supported or upheld, as by having its weight borne from below.

Windmill: any of various machines for grinding or pumping; driven by the force of wind.

Program Follow up & Suggestions

If available, use a dry erase whiteboard instead of poster paper.

Make sure staff is prepared to answer any questions participants may have regarding definitions and practical applications of the terms.

Jeopardy

Program Description

Critical Thinking, PEAK testing

Goals & Objectives

Successfully measure participant progress using PEAK standards.

Program Impact

Using pre-approved PEAK curriculum, participants test their knowledge of energy efficiency facts and trivia through an interactive game of Jeopardy.

Curriculum

Basic Instructions

1. Use either PEAK test questions and/or PEAK Power Mix Game cards to create Jeopardy questions.
2. Split participants into teams.
3. Using available materials develop a system to determine how participants will answer (for example, raising their hands, raising colored flash cards, or ringing a bell).

Use one of the following point systems

Version 1

a. Correct answers = + 10 points.

b. Incorrect answers = -5 points.

c. Bonus questions = 20 points.

d. Incorrect bonus questions = -20 points.

Staff act as game narrators and ask participants questions until a team reaches a score of 100 or until time runs out.

Version 2

a. Create a jeopardy board with various categories.

b. Each category includes questions worth 100 – 500 points, 100 level questions are the easiest while 500 level questions are the most difficult.

c. Create an answer sheet with questions and answers with the appropriate levels of difficulty.

d. Staff act as game show hosts and open with a question to determine which player gets "control of the board."

e. The participant who raises their hand/card first and answers correctly has control of the board and can pick any category, any level of question.

f. Players remain in control as long as they continue to answer correctly.

g. An incorrect answer results in loss of control and points.

h. Control goes to the first participant to answer correctly and game play continues from there.

i. Game play ends when all the questions have been asked, and the participant with the most points wins.

j. If time allows, staff can choose to implement a Final Jeopardy question that allows participants to wager their points to try and win the game.

Discussion Topics

Energy efficiency, energy preservation, conservation, demand response, renewables.

Required Supplies List & Budget

1. PEAK test
2. PEAK Power Mix game
3. Jeopardy Game Board
4. Bells ($5/each) or answer flash cards

Program Follow up & Suggestions

1. **Note:** During game play staff track answers to PEAK test questions and submit responses online. Staff is also in charge of keeping accurate PEAK student and teacher logs in order to monitor participant progress accurately.
2. When using Version 2, adding in fun pop culture (Disney, skate, music etc) trivia into the question boards helps make the game more interactive and fun for participants of all ages.
3. When deciding which version to use, keep in mind the age range of participants that you are working with and adapt game play accordingly.

Cranberry Lemon Snow

Program Description

Science of Energy Experiment

Goals & Objectives

To observe endothermic changes in energy to create a frozen treat rather than rely on a high voltage freezer.

Program Impact

Participants use energy efficient methods to create frozen treats, while minimizing dependency on modern appliances.

Curriculum

Basic Instructions

1. Pour the fruit and lemon juice into the jar and shake.
2. Place the open jar/small bowl in the middle of the large mixing bowl
3. Carefully pour crushed ice around the jar up to the top.
4. Sprinkle rock salt in and around ice.
5. Fold the dish towels lengthwise and wrap them around the mixing bowl. Facilitate a participant discussion while waiting for the experiment to turn into an icy treat.

Discussion Topics

Endothermic reactions, energy loss, energy transference, energy efficiency

Required Supplies List & Budget (~$30)

Small Clean Jar (or a smaller bowl)
Medium size bowl or container ($15/set of 3 mixing bowls-various sizes)
2 small dish towels (varies in price)
1/2 cup cranberry juice ($3/bottle)
1 tablespoon lemon juice ($3/bottle)
1/2 cup rock salt ($7/bag)
6 cups of crushed ice ($5/medium sized bag of ice)

Program Follow up & Suggestions

1. Be prepared to facilitate discussion about the energy processes while participants wait for the experiment to be completed.
2. Have additional activities, like team building games, handy to keep participants engaged while waiting.

DJ Contest

Program Description

Critical thinking, Problem Solving

Goals & Objectives

1. Record energy use through the use of Powercost and Kill A Watt meters.
2. Learn to set up an energy efficient DJ booth.
3. Compare energy savings between various DJ setups.

Program Impact

1. Participants will use the Powercost monitors and observe just how much energy they use when using the facilities gaming and entertainment systems.
2. Participants use the Kill A Watt meters to compare how much energy is used by the REC's DJ equipment and video game systems. Participants re-structure systems to become more efficient.
3. Participants save energy by focusing usage on one entertainment point around the center while competing in a DJ Hero battle. The energy is then compared to a real DJ turntable set up and savings are compared.

Curriculum

Basic Instructions

Version 1

1. Hook up either the Powercost monitor or the Kill A Watt meter to the DJ booth in the REC club music room. Record the energy reading prior to turning the DJ booth on.
2. Power on the DJ booth and record the new energy reading. Note any changes in the new reading and the initial recording.
3. Discuss with participants the significance of the energy readings and brainstorm what steps can be done to reduce energy use.

Version 2

1. Hook up the Powercost monitor to the main game and entertainment system in the REC club. Record the energy reading prior to powering on the system.
2. Power on the DJ Hero game and entertainment center. Note any changes in the new reading and the initial recording.

Discussion Topics
Energy efficiency, vampire energy, energy management.

Required Supplies List & Budget

Powercost monitor

Kill A Watt Meter

DJ booth
(computer, 2 turntables, speakers, mixer, soundboard and lights).

DJ Hero
(TV, ps3, turntables, DJ Hero game).

Program Follow up & Suggestions

1. Program follow up should include a comparison of the REC DJ booth to the DJ hero energy readings.
2. If time allows and equipment is easily accessible, work with participants and install smart strips in both rooms in order to better manage energy consumption around the REC club.

Energy Inspectors

Program Description
Problem Solving, Critical Thinking

Goals & Objectives
Identify EE trends among ESA participants.

Program Impact
Participants learn about their EE habits and the importance of EE behavior on a daily basis.

Curriculum

Basic Instructions

1. Print out copies of the Energy Inspectors grid and hand them out to participants. (see below)
2. Instruct participants to find other REC club members who take the EE actions listed in the grid and have them initial in the square.
3. The first participant to complete the grid and turn it in wins!

4. Conclude the activity by having participants identify which EE actions were easier to complete and which tasks were harder to ask their peers about. This helps participants identify behaviors they have in common with others!

Discussion Topics

Energy efficiency, energy management.

Required Supplies List & Budget

Energy Inspectors Grid (above)

Pens/Pencils

Program Follow up & Suggestions

Make sure to set a time limit for participants to complete their investigations of their peers. Without a specified time limit, participants will get distracted and will not complete the activity.

Energy Inspectors		
Turn off lights/computer when not in use	Uses CFL lightblubs	Washes laundry in cold water
Takes baths	Takes short showers	Uses a dishwasher when it's only half full
Hangs up clothes to dry	Dries dishes by hand	Closes blinds to keep out summer sun/winter cold
Uses window/door guardians to block drafts	Unplugs rarely used appliances	Limits use of AC/heater

Make an Ice Box

Program Description

Science of Energy Experiment

Goals & Objectives

Examine the relationship between proper insulation and energy.

Program Impact

Participants discover the science behind energy and insulation within an icebox. Teens are instructed to build an energy efficient icebox using recycled materials in order to save sources.

Curriculum

Basic Instructions

1. Collect supplies listed below.
2. Spread materials onto activity table and open activity with the discussion question listed below.
3. Have participants brainstorm and create an ice box by using available materials to insulate only 1 of the 2 boxes.
4. Once you finish insulating the box, place an ice cube in the box and seal it.
5. Place a 2nd ice cube in the box without insulation and seal.
6. Place both boxes near a heater or outside if it is warm.
7. After 15-20 minutes, compare the size of the ice cubes.

Discussion Topics

1. Open the activity by asking this series of questions: What do all of these items have in common? Are these items all edible? Can you find these items in your own home? Make sure to ask participants "Yes" and "No" questions only. Youth have a tendency to retain all of the incorrect answers when asked open ended questions in a group setting.
2. Before electricity, people harvested ice in the winter from frozen lakes and then stored it in icehouses for use in refrigeration during the rest of the year. A proper insulation is dense enough to prevent much air from reaching the ice cube.
3. Before letting the participants build their icebox, ask the following: Is one material the best insulator? Or will a combination of materials create more efficient insulation?

4. Depending on the materials gathered, a combination of materials creates a more efficient insulation because it ensures that insulation is dense enough to keep the ice from melting.
5. When warm air comes in contact with slower-moving ice molecules, energy is transferred from the air to the ice. When the water molecules move faster, the ice melts.

Required Supplies List & Budget

2 Milk cartons or small boxes

Ice cubes

Various materials to be used as insulation

denim dried beans cotton hay grass

Program Follow up & Suggestions

Make sure to plan ahead to allow yourself enough time to gather enough materials that you can use as insulation.

Elephant Toothpaste

Program Description

Science of Energy Experiment

Goals & Objectives

Explore energy conversion and catalysts in relationship to energy efficiency.

Program Impact

Participants discover the science behind energy and learn the importance of saving energy during energy conversion.

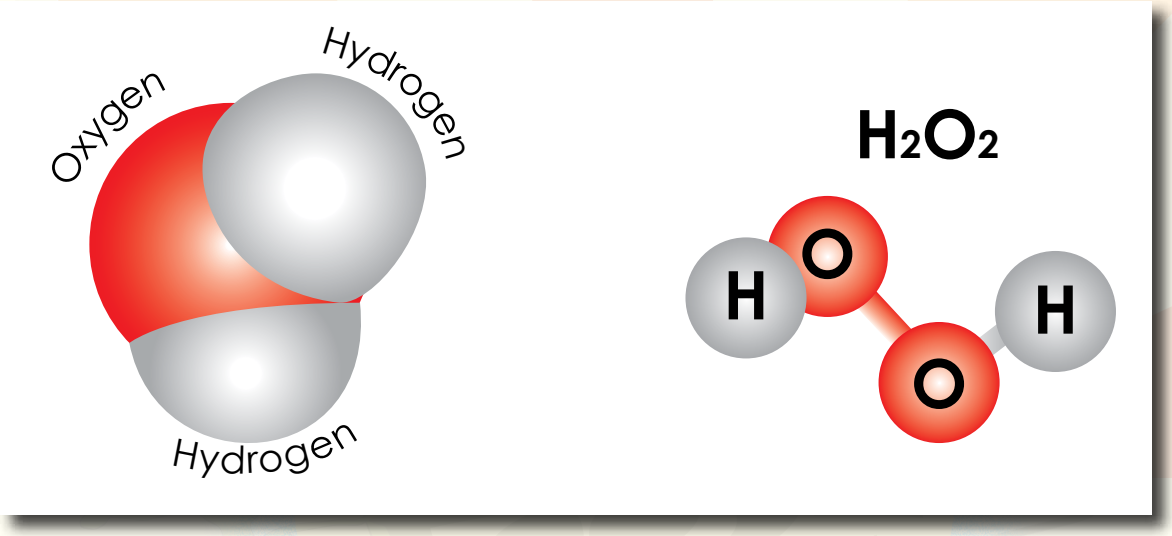
Curriculum

Basic Instructions

1. Place the cake pan on the table and then place the plastic bottle in the cake pan.
2. Place the funnel in the opening of the bottle.
3. Add a couple of drops of food coloring and add the peroxide.
4. Add the dish detergent.
5. Pour the yeast mixture into the bottle and quickly remove the funnel and watch the energy reaction take place. Participants can touch the bottle to feel for any changes that take place.

Discussion Topics

The yeast acts as a catalyst, which causes the peroxide to release the extra Oxygen faster, which creates the "toothpaste". The bottle feels warm because as the Oxygen is released, energy is released. Catalysts are sometimes used to increase the efficiency of coal to energy conversion. The use of catalysts improves heat transfer and reduces carbon emissions as well as helps conserve coal maximizing effects of coal combustion.



Water **Peroxide**

Required Supplies List & Budget

- 16 oz. empty plastic soda bottle
- 1/2 cup 20-volume hydrogen peroxide (20-volume is 6% solution, purchased from a beauty supply store)
- Squirt of Dawn dish detergent
- 3-4 drops of food coloring
- 1 teaspoon yeast dissolved in about 2 tablespoons very warm water
- Funnel
- Foil cake pan with 2-inch sides

Program Follow up & Suggestions

Lay down a trash bag underneath the pan in case the paste spills over. This will help expedite the clean up process afterwards.

Make Your Own Play Dough

Program Description

Science of energy experiment

Goals & Objectives

Modify behaviors to consume resources more efficiently to achieve a single goal.

Program Impact

Participants learn to re-use materials to create their own play dough. To change traditional thoughts of efficiency by emphasizing discipline in consumption.

Curriculum

Basic Instructions

1. Create a work space by first clearing off a table and lining it with newspaper or plastic table covers.
2. Measure out 1 cup of flour, and pour it into the bowl.
3. Measure out 1/2 cup of salt, and add that to the bowl, too.
4. Fill the measuring cup with 1/2 cup of water and pour it into the mixing bowl.
5. Mix everything together and then add a few drops of the food coloring. Using your hands, you can begin to knead the dough together to the desired consistency. You can always add a few drops of food coloring to enhance the color of the play dough.

Discussion Topics

1. Consumption, waste, recycling
2. Prior to beginning the activity, have participants guess how much play dough they can make with the provided materials. After all the materials are gone, discuss with participants whether or not their results were the same as their predictions.
3. Why or why not?

4. In most cases, recipes need to be adjusted to get the consistency just right, which ultimately results in using additional resources. Similarly, we must learn to do our best to modify our behaviors so that we use energy efficiently. Using energy efficiently on a daily basis helps avoid large influxes of demand and allows the energy grid to maintain consistency when providing energy to consumers. Large influxes of energy consumption (peak demand) can often lead to blackouts if energy use is mismanaged.

Required Supplies List & Budget

- 1/2 cup salt
- 1/2 cup water
- 1 cup flour
- Food dye (any color, be creative!)
- Bowl
- Spoon

Program Follow up & Suggestions

Allow the food dye to set for a couple minutes before picking the dough up. Picking up the dough early will dye your hands!

Crystal Hearts

Program Description

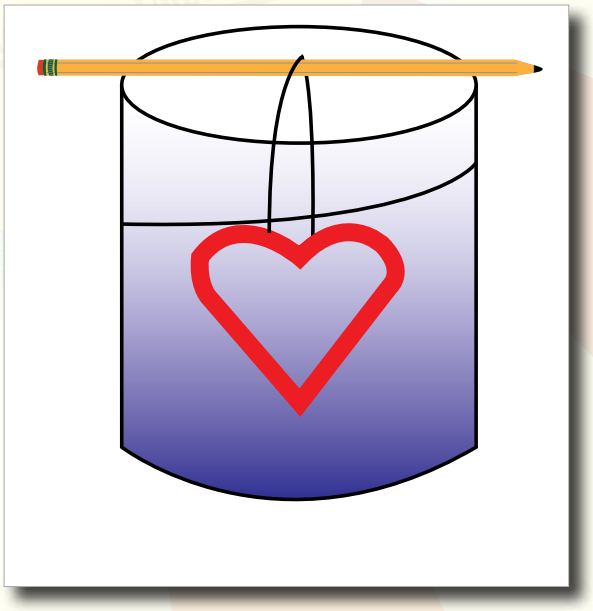
Science of Energy Experiment

Goals & Objectives

Explore the relationship between energy efficiency and energy conversion.

Program Impact

Participants discover the science behind energy and the importance of energy efficiency during energy conversion.



Curriculum

Basic Instructions

1. Bend the pipe cleaners into a heart shape.
2. For every cup of hot water, stir in 3 tablespoons of borax.
3. Tie the heart to a pencil and hang it so that the pipe cleaner sits in the water and borax solution.
4. Let the solution sit overnight and by morning you will have your crystal heart!

Discussion Topics

Hot water holds more borax crystals than cold water because the water molecules are moving rapidly. When the solution cools overnight, the water molecules slow down and can no longer hold the borax. Crystals begin to form around the pipe cleaner as the water lets go of the borax and evaporates.

Required Supplies List & Budget

String

Wide mouth cups

Pipe cleaners

Boiling water (with adult help)

Borax
(Available at grocery stores in the laundry soap section, as 20 Mule Team Borax Laundry Booster - NOT Boraxo soap).

Pencil

Program Follow up & Suggestions

Encourage participants to get creative with the pipe cleaners and see how many variations of crystals they can come up with.

Solar Ovens

Program Description

Science of Energy Experiment

Goals & Objectives

To compare and contrast 2 models of solar ovens.

Program Impact

Participants explore the pros and cons of solar energy. Participants witness how efficient alternative energy sources can potentially be while being inspired to modify behaviors to save energy.

Curriculum

Basic Instructions

Note: This lesson should be implemented in stages, not on a single day because of the amount of time required to construct solar ovens.

Discussion Topics

Solar energy, efficiency, pros and cons of renewable energy.

Pizza Box Pros	Pizza Box Cons	Wood Paneled Solar Oven Pros	Wood Paneled Solar Oven Cons

Required Supplies List & Budget

1. **Pizza Box Solar Oven**
   - **a. Recycled pizza box**
   - **b Black construction paper**
   - **c. Aluminum foil**
   - **d. Clear plastic (heavy plastic laminate works best)**
   - **e. Non-toxic glue, tape, scissors, ruler, magic marker**
   - **f. Wooden dowel or straw**
2. **Wooden Paneled Solar Oven**
   - **a. Wood pieces (Boards from a pallet work well)**
   - **b. Nails**
   - **c. Hammer**
   - **d. Wood glue**
   - **e. Car windshield shade**
   - **f. Scissors**

Program Follow up & Suggestions

Solar ovens should only be used to reheat food items. Homemade solar ovens do not have the ability to cook pre made cookie dough from scratch.

Pull a Car with Hydropower

Program Description

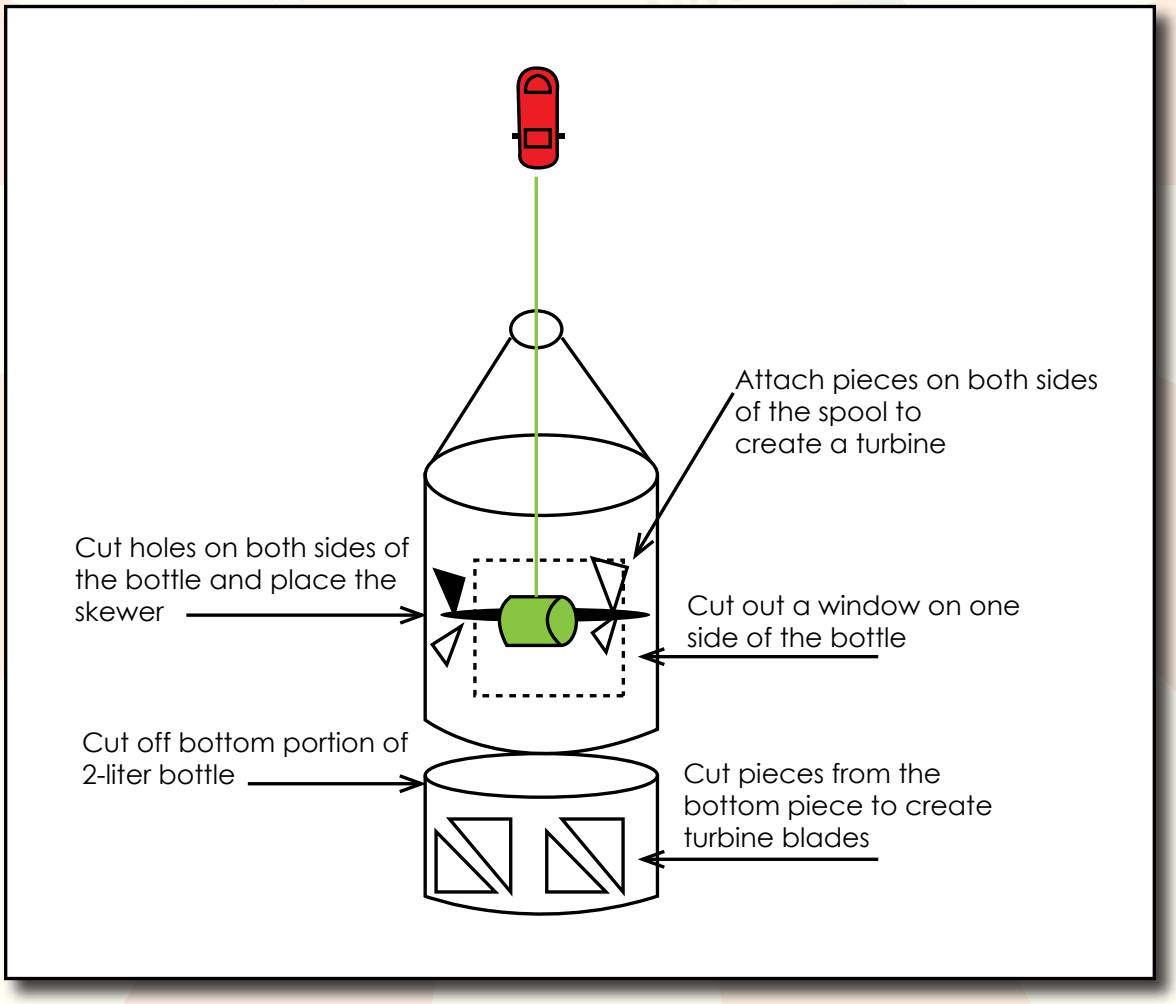
Science of Energy Experiment, Problem Solving and Critical Thinking

Goals & Objectives

1. Observe and evaluate the efficiency of hydropower.
2. Observe the importance of design and its relationship to performance efficiency.

Program Impact

Participants learn the science behind hydropower. Lesson emphasizes the importance of conserving energy because of the complexity of alternative energy sources.



Curriculum

Basic Instructions

1. Collect and rinse out a 2-liter bottle.
2. Place a spool of thread on a skewer.
3. Cut out pieces from the bottom of the bottle.
4. Attach bottle pieces to skewer on both sides of the spool to create the turbine.
5. Cut holes on the sides of the 2-liter bottle to put the skewer through and hold it in place.
6. Cut 1 side of the 2-liter bottle off so you have a window that allows you place the skewer into the newly cut holes.
7. Attach a toy car to the end of the spool of thread.
8. Pour water into the bottle on the opposite end of the bottle.
9. As water hits the turbine blades, the spool of thread should pull the toy car through the bottle.

Discussion Topics

Hydropower efficiency, design and performance efficiency.

Required Supplies List & Budget

- **2-Liter bottle**
- **Scissors**
- **Spool of thread**
- **Toy car**
- **Skewer**
- **Push pins**

Program Follow up & Suggestions

Be resourceful! If a skewer is not readily available, rather than purchasing a bag of skewers for the experiment, unsharpened #2 pencils or craft sticks (dowels) work just as well. If you decide to use craft sticks, make sure they are thick enough to put push pins through.

ARTS AND CRAFTS

Energy Efficiency and Preservation
Problem Solving and Critical Thinking

Time In A Bottle

Program Description

Arts & Crafts

Goals & Objectives

To teach participants the importance of water conservation and its relationship to energy use

Program Impact

Participants make a timer out of available resources. Participants learn to save energy by limiting the amount of shower time used daily; emphasis is placed on the use of energy to warm and pump water during each use.

Curriculum

Basic Instructions

1. Collect recycled bottles prior to leading this activity.
2. Encourage participants to assist staff in both collecting and rinsing recyclables.
3. Each participant should have 2 bottles.
4. Using craft sand and a funnel, pour cups of sand into 1 of the bottles (1 cup = ~ 1 minute).
5. Use the bottle neck to trace a circle onto the card stock so it is the exact circumference of the opening.
6. Cut it out and use a standard hole punch to punch a hole in the middle of the card stock circle.
7. Tape the circle over the opening of one of the bottles using scotch tape, but don't cover the hole you punched in the card stock.
8. Place the bottles one on top of the other neck to neck with the card stock piece in between and use the plastic tape to firmly attach them.

Discussion Topics

Relationship between water use and energy consumption.

Importance of water and energy conservation.

Required Supplies List & Budget

Recyclables (bottles)

Card stock

Scissors

Packing tape/Duct tape

Program Follow up & Suggestions

Begin collecting materials as soon as you know you will be leading this activity unless a recycle bin is readily available at your site.

Encourage participants to assist with gathering and prepping materials. The more interactive they are with the overall process, the more empowered they will feel which will make the activity even more successful.

Inventions/Flex Power Machine

Program Description

Arts & Crafts

Goals & Objectives

To encourage participants to be creative about the ways they do their part in working towards an energy efficient and sustainable future; emphasize that everyone can do their part.

To encourage participants to collaborate and develop and diagram new and creative ways to use energy more efficiently on a daily basis.

Program Impact

The growing field of energy efficiency is dependent upon marketing to communities to take action. Participants evaluate community needs and design inventions/services tailored to the East County area.

Participants kick off "What If" week by competing to create an energy efficient tool/gadget that could be used in residents as well as businesses to encourage saving energy.

Curriculum

Basic Instructions

Gather participants and discuss what the energy needs are in the community.

Highlight what resources are readily available, and what resources should be made available to community members.

Split participants into groups. Make sure each group has pens/pencils and paper.

Version 1

Instruct each group to design their own "Flex Power Machine", an invention that helps consumers save energy.

Version 2

Instruct each group to design an invention or a business service that can be used in their area to encourage community members to save energy.

Discussion Topics

Community needs, available resources/services.

What local businesses use sustainable business practices?

Ways to save energy (home, business).

Required Supplies List & Budget

Pens/Pencils/Markers/Colored Pencils (Class packs of 20 sets = $50).

Paper ($5-$10/pack of printer multipurpose paper).

Optional: Digital camera with video capability.

Program Follow up & Suggestions

If time and resources are available, have participants create a commercial advertising their products/services. Debut each commercial at the conclusion of the activity and discussion.

Use available materials to encourage thriftiness and creativity with readily available resources. There's no such thing as waste in nature, there is only innovative and energy efficient inventions waiting to be created!

Tower Targets & Catapults

Program Description

Arts & Crafts

Goals & Objectives

Teach participants the importance of conserving resources and using available resources efficiently.

Program Impact

Part 1: Participants explore the science of energy and construct towers to protect their section of the energy grid to avoid exploiting resources which can lead to blackouts.

Part 2: Using the towers from the previous day, participants try to infiltrate resources while still managing to protect their own.

Curriculum

Basic Instructions

1. Create a list of participant rules and guidelines.
2. Prior to the day of the activity, gather excess materials from around your facility into a box. This box will become your resource box.
3. Present your participants with this challenge: resources are limited, and it is your duty to conserve them and use them efficiently. Design a tower complete with targets to protect your resources and a catapult to help defend them and steal others resources. Store towers and catapults for use the following day.
4. Host a tournament where participants compete to protect their resources and steal others in an energy grid battle.
5. Facilitate discussion about the importance of conserving resources and ways participants can do their part to decrease their energy consumption on a daily basis.

Discussion Topics

Energy vampires, Peak energy hours, demand response (competition for limited resources), energy conservation.

Required Supplies List & Budget

Miscellaneous art supplies and items from facility
Duct tape/Scotch taper/Glue

Program Follow up & Suggestions

1. Old CD cases create sturdy tower bases.
2. Craft sticks create sturdy yet functional catapults.
3. Using ping pong balls under staff supervision is a safe and fun way for participants to compete for "resources" on the energy grid.

Calendar Contest

Program Description

Arts & Crafts

Goals & Objectives

To creatively display EE and conservation tips.

Program Impact

Participants will work together to design a calendar that includes EE and conservation tips that can be used at home.

Curriculum

Basic Instructions

Rules

1. Each participant can enter multiple designs, but only one design will be chosen for the final calendar.
2. Designs must include tips that address one of the following:
   a. How to use energy efficiently.
   b. How to save energy.
   c. How to conserve our resources.
   d. A type of renewable energy and how it can help.
3. BE CREATIVE and HAVE FUN! :)

Discussion Topics

Air leaks, insulation, heating, cooling, roofing, landscaping, water heating, windows, lighting, appliances and electronics, renewable energy, transportation.

Required Supplies List & Budget

- Construction paper
- Printer paper
- Internet access to access EE tips
- Scissors
- Glue
- Tape

Program Follow up & Suggestions

Resources for EE tips and discussion topic information:
http://www.energysavers.gov/tips/

Pinball Machine

Program Description

Arts & Crafts

Goals & Objectives

1. Learn about energy use relative to traditional arcade games.
2. Identify and create alternative and energy efficient versions of the same games.

Program Impact

Participants learn that while traditional arcade pinball machines use hundreds of volts per use, they can create their own energy efficient pinball machine.

Curriculum

Basic Instructions

(adapted from:
http://spoonful.com/crafts/design-your-own-pinball-machine)

1. Gather materials, using items that are readily available at the center.
2. Depending on what materials are available, using the above hyperlink, work with participants to create their own version of a pinball machine, including various obstacles.
3. Once construction is complete, have the participants experiment with the efficiency of their design and newly created pinball machine!

Discussion Topics
"Upcycling", energy efficiency

Required Supplies List & Budget

- Leftover arts & crafts supplies (cardboard pieces, construction paper etc)
- Rubber bands
- Marble
- Clothespin
- Hot glue/hot glue gun
- Paint (optional)
- Plastic bottle pieces

ESA Beads

Program Description
Arts and Crafts

Goals & Objectives
Obtain as many accomplishment beads in order to make an individualized ESA bracelet.

Program Impact
Participants set EE goals in order to earn accomplishment beads to create a custom ESA bracelet.

Curriculum

Basic Instructions

ESA Bead Goals

1. **Fancy bead:** Represents self, because goals are specific to the individual and only you are capable of controlling your actions towards achieving your goals.
2. **Silver or Clear colored bead:** Represents an EE goal you want to reach at school.
3. **Red:** represents the inspiration to do EE actions.
4. **Green:** represents an EE goal you want to reach at the center.
5. **Turquoise:** represents shorter showers and to not pollute our water streams.

6. **Purple:** represents buying products locally grown.
7. **White:** represents an EE goal you want to reach at home.

Have participants create a personalized poster with their names and their goals to display in the ESA Resource room. Posters will serve as reminders to participants as well as a means to hold them accountable for their goals. Posters also help empower them to keep working towards their individual goals.

Discussion Topics

Energy efficiency, stewardship.

Required Supplies List & Budget

- Assorted Beads
- Assorted craft string
- Paper
- Pens/pencils/markers/colored pencils

Program Follow up & Suggestions

At the beginning of each week, check up on your participant's progress after the weekend. By following up with participant's the importance of behavior modification at home is reinforced.

Pirate Silhouettes

Program Description

Arts & Crafts

Goals & Objectives

1. Discuss the significance of energy pirates/vampires in the REC club.
2. Design an energy management plan that can be implemented at both the REC club and at home.

Program Impact

Participants create their own versions of energy pirates/vampires using available resources and pledge different ways to defeat them.

Curriculum

Basic Instructions

1. Begin the activity session by having participants play the Energy Pirates game online (link).

2. Discuss with participants the significance of pirate energy. Make sure to emphasize how everyone can do their part in reducing pirate energy by unplugging appliances (especially cell phone chargers) when not in use!
3. Use the white construction paper as the background, and cut out a silhouette of a pirate symbol (ships, skull and crossbones etc). Encourage each participant to pick a different symbol in order to customize their pledges towards EE.

Discussion Topics

Pirate energy, energy efficiency.

Required Supplies List & Budget

Link **Black and White construction paper**
Scissors **Glue** **Pencils** **White Chalk**

Program Follow up & Suggestions

1. If time allows, you can run an Energy pirate tournament as a secondary and complementary activity. Simply record participants high scores from the Energy pirate game. This activity can also serve as a quick and simple activity if time is limited. (See "Inspired By Others" Section, Energy Pirates Adventure).
2. For another variation of this pledge craft, use white chalk to draw silhouettes on black construction paper!

PEAK Pals

Program Description

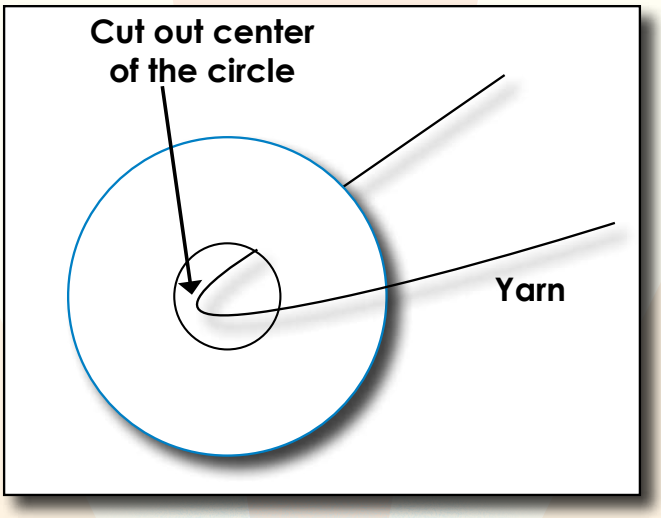
Arts and Crafts

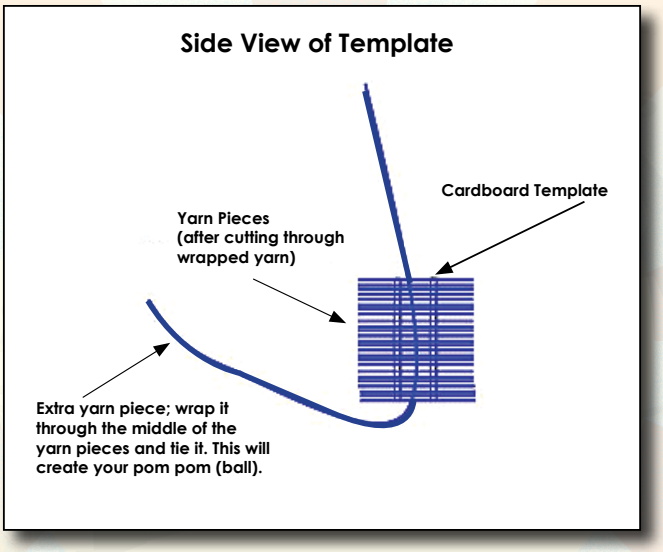
Goals & Objectives

Use readily available materials to create a furry friend.

Program Impact

Individuals create personalized PEAK pals to represent each of the 4 PEAK energy actions.





Curriculum

Basic Instructions

1. Cut out 2 circles out of cardboard. Cut out 2 smaller circles in the center of the larger circles. This is the template you will use to create your "pal."
2. Wrap the yarn completely around the circle. The more layers you wrap around the template, the thicker your pal will be. You do not need to tie the yarn in place when starting a new string. Simply wrap the remaining yarn around the end to hold it in place.
3. Once you have wrapped the desired amount of yarn around the template, take a pair of scissors and cut between the 2 circles. Make sure that your yarn doesn't come undone in the process.
4. Take another piece of yarn and tie it through the middle of the newly created yarn pieces.

5. As you pull the extra piece of yarn, the yarn pieces will bunch together creating a pom pom (ball) shape.

Discussion Topics
PEAK energy actions (refer to PEAK manual).

Required Supplies List & Budget
- Cardboard
- Yarn
- Googly eyes
- Scissors
- Glue

ESA Globe

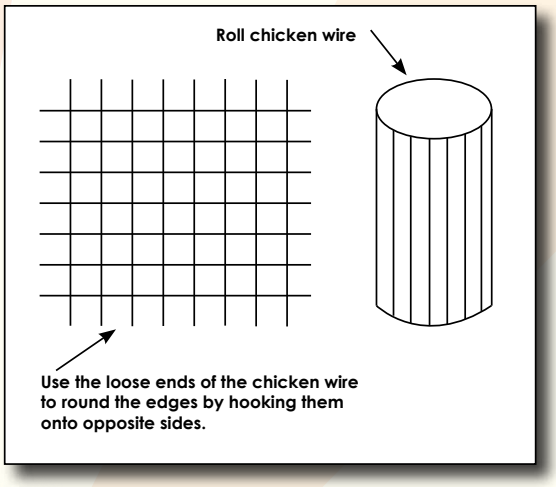
Program Description
Arts and Crafts

Goals & Objectives
Program Impact
1. Participants reflect on the impact of the ESA program has had on their lives, and how they have been inspired to change their behavior and live more energy efficient lives.
2. Participants prepare to share what they have learned from engaging in various ESA programs. Individuals collect materials for globe display and reflect upon the impact they have had by modifying behaviors to save energy.
3. Based on their ideas, participants create a globe display to share the ESA program with the community in hopes of empowering change towards a more efficient society.

Curriculum

Basic Instructions
1. Use paper recycling bins to collect enough scratch paper to use for the globe. (a month's worth of discarded scratch paper makes a globe with a four-foot globe with a two-foot circumference).

2. Use the chicken wire as the frame of the globe. You will need to round the edges in order to make a sphere shape. (Hint: you can close one side without adding an extra piece, but you will need to add an extra piece to the opposite side to round it out.



3. Once the frame is built, make your paper maché solution (1 part glue for every 1 part water, or if the glue you are using is not as thick, ¾ glue to ¼ water).
4. Dip scratch paper into the paper maché solution and apply it to the chicken wire frame.
5. You can create letters by fusing plastic bags together! (see Fused Energy and Fused Energy Bags curriculum).
6. Once you have applied a nice thick layer of paper maché, let the globe dry. It may take a couple of days depending on the size and the amount of layers used.
7. Paint the globe and add program pictures that you want to show off!
8. The globe makes an interesting centerpiece/ marketing tool, so show off all your hard work proudly at an outreach event!

Discussion Topics

Recycling, energy efficiency.

Required Supplies List & Budget

- Chicken Wire
- Paint
- Glue
- Water
- Paint Brushes
- Scratch Paper
- Wire cutters/Pliers

Corn Cup Flowers

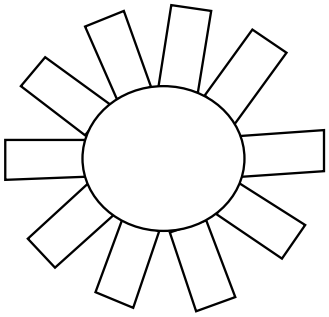
Program Description

Arts and Crafts

Goals & Objectives

1. Reduce waste around the REC club.
2. Identify the amount of energy used by trash incinerators and the importance of reducing waste in relationship to saving energy.

Cut 3-4 strips all around the cup, these will become your petals, while the bottom will be the face of the flower.



Fold back each strip to create the petals and paint the cup to transform it into a flower!

Program Impact

Participants learn to save energy by reducing waste. Participants also learn that trash incinerators are inefficient and waste enough energy to run 15 power plants.

Curriculum

Basic Instructions

1. After you have finished using your water cup, rinse it out one last time and dry it thoroughly.
2. Cut ¾ strips all around the cup (approximately from the lip of the cup to the green bar).
3. Fold each of the strips back to form your flower.
4. Paint the cup to turn it into a flower that doesn't require any water!

Discussion Topics

Energy efficiency, recycling, waste.

Required Supplies List & Budget

- Corn cups
- Scissors
- Paint
- Paintbrushes

Cape Insulators & Draft Stoppers

Program Description

Arts and Crafts

Program Impact

Participants learn that, through re-purposing fabrics and materials, the same principles used to efficiently insulate the human body can be applied to homes, schools, and modern buildings.

Curriculum

Basic Instructions

Cape Insulator

(adapted from
http://www.ehow.com/how_5084779_make-insulated-window-quilts.html)

1. Cut 2 pieces of fabric about the size of window and using the Super Hero costume templates (see Energy Efficiency Holiday Series write up) and shape the fabric accordingly. These will become the front and back pieces of your window drape. Cut an identical piece of polyester batting to create the insulation of the drape. Make sure you leave enough excess fabric to fold over and create the hems of the drape when sewn together.
2. Unlike the costume capes, you will only need to cut fabric strips towards the top of the cape thick enough to create a hook along the hemline so you can hang them from your window.
3. Lay 1 piece of fabric flat on the table and place the polyester batting on top.

Draft Stoppers

1. Cut a piece of burlap or cloth long enough to cover the bottom of a door. Make sure that you cut the cloth wide enough that when rolled, it is also thick enough to cover the bottom of the door.
2. Fold your fabric and half and sew the open edges shut, leaving only the top part open.
3. Turn the fabric inside out to conceal your sewing, and this creates the tube for your draft stopper.
4. Using rice, or cloth scraps, stuff the tube to a reasonable size. Once you have filled the tube, you can use yarn to close off the open end. This end works great as a tail if you will be making a draft stopper animal!

5. Using the miscellaneous craft supplies, hot glue and some imagination, you can transform your draft stopper into a variety of things!

Discussion Topics

Insulation, energy efficiency.

Required Supplies List & Budget

Cape Insulators:

- **Fabric**
- **Polyester Batting**
- **Miscellaneous craft items (ribbons, lace etc)**

Draft stoppers:

- **Burlap or cloth**
- **Cloth scraps or rice**
- **Pipe cleaners**
- **Googly eyes**
- **Felt**
- **Hot glue gun and glue sticks**
- **Yarn**

Both Items:

- **Scissors**
- **Needle and Thread**

Program Follow up & Suggestions

Because time is limited during open REC hours, rather than hand sewing, using hot glue to seal the seams works just as efficiently. Make sure to glue the inside of the fabric and then turn the fabric inside out in order to conceal the glue (just like the draft stopper tube).

Pledge Stepping Stones

Program Description

Arts & Crafts

Goals & Objectives

1. Create energy efficiency themed stones.
2. Place stones in outdoor areas, including the local community garden, to act as a reminder to save energy, and natural resources.
3. Examine the importance of reducing our carbon footprint in relation to energy consumption.

Program Impact

Participants prepare themed, concrete, stepping stones to place in gardens and outdoor spaces. Each stone emphasizes energy efficiency, conservation, or taking a step towards a less wasteful, more efficient future.

Curriculum

Basic Instructions

1. Gather tile pieces, marbles, stones, and other decorative items.
2. Using a 5 gallon or larger bucket, mix bags of "quikcrete" or other concrete mix according to instructions on the bag (usually just adding water).
3. Pour mix into stepping stone molds and quickly decorate the top of the stone with energy related themes and imagery.
4. Let stepping stones cure over a week long period before removing from the mold and placing in a garden or outdoor space.

Design examples: Light bulbs, electrical outlets, wind turbines, hydro electric dams, solar panels, etc.

Discussion Topics

1. Discuss how smart energy use can save natural spaces by producing less carbon emissions (a smaller carbon footprint) and requiring less physical space for power stations, transmission lines, and mining operations.
2. Discuss what images could be used as symbols for various energy types and which ones are prevalent in the "green movement" such as the energy star or recycling symbols.

3. Alternatively, discuss "green washing," which is a marketing heavy technique used by individuals, businesses, and corporations to promote themselves as environmentaly friendly even though they may or may not be the best practices. Green labels don't necessarily mean sustainable.
4. For example, a box that is made of recycled material is different than a box that is recyclable over and over again (self sustaining) ; or a bottle is made of recycled material but is typically not recyclable again because of the % plastic that remains and can be reprocessed.

Required Supplies List & Budget

Quikcrete

Mixing tools (buckets and shovels)

Stepping stone molds

Decorative material such as mosaic pieces, tile, aquarium stones, beading, stamping, etc.

Program Follow up & Suggestions

1. Concrete dries quickly and decorative items must be positioned firmly into the concrete while still wet.
2. Upon completion of the project or during placement, facilitate a discussion about how each person designed their stones and what they would like people to think about every time they step on it while walking through the newly decorated area.

PEAK Character Cartoons

Program Description

Arts & Crafts

Goals & Objectives

1. Learn more about the PEAK characters.
2. Learn more about vampire energy and energy saving techniques.
3. Create individualized characters to help inspire behavior modification among participants.

Program Impact

Participants create an energy sucking villain and energy saving hero for their comic books. Participants must include examples of saving electricity in their storylines.

Curriculum

Basic Instructions

1. Introduce the PEAK characters to participants.
2. Bulbman, Energy Sucker, Energy Monster, Ivana Waste.
3. Facilitate a discussion about the significance of each character and how they relate to energy efficiency and household energy savings.
4. After the discussion concludes, have participants create and illustrate their own energy saving adventures using PEAK characters or their own characters.

Discussion Topics

Vampire energy, waste, ways to save energy.

Required Supplies List & Budget

Comic book art boards (~$12)

Program Follow up & Suggestions

Refer to the PEAK student's website for character descriptions:
www.peakstudents.org

Wall Stickers

Program Description

Arts and Crafts

Goals & Objectives

Empower ESA participants and give them ownership of the ESA resource room.

Program Impact

Projects use existing materials to maximize potential of a resource. Participants enhance the ESA resource room themes and highlight energy efficiency and conservation through art.

Curriculum

Basic Instructions

1. Cut out a square of contact paper and tape down the 4 corners to the table.

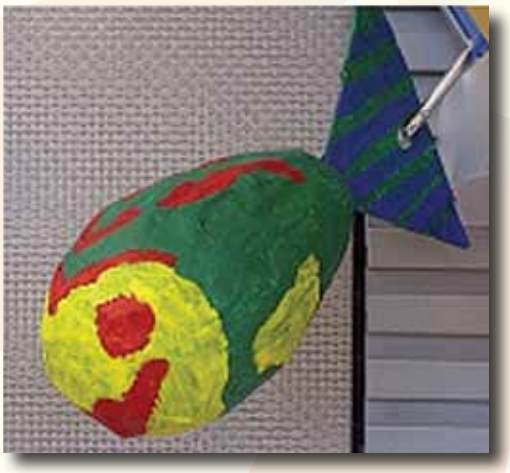
2. Using ballpoint pen, sketch the sticker design of your choice onto the contact paper.
3. Paint the sticker design and let it dry overnight.
4. After the sticker has dried, cut the design out of the square.
5. Peel off the back of contact paper and apply to resource room wall.

Discussion Topics
Waste, energy efficiency, significance of the ESA resource room murals (energy in action adventures, resource conservation, energy preservation, alternative energy).

Required Supplies List & Budget
- Contact paper
- Tape
- Paint
- Paintbrushes

Program Follow up & Suggestions
This is a very popular last minute activity that participants of all ages enjoy!

Paper Maché Creatures



Program Description
Arts and Crafts

Goals & Objectives
Create an ESA "mascot" to help promote energy efficiency.

Program Impact
Projects use existing materials to maximize potential of a resource. Participants create ESA "mascots" out of recycled paper to promote energy efficiency.

Curriculum

Basic Instructions

1. Blow up balloons using a balloon pump. The balloons will be used as the body for the paper maché creature.
2. Mix glue and water to create the paper maché solution. Soak newspaper strips in the solution.
3. Wrap strips around the balloon, making sure to cover the entire surface of the balloon. The more layers that surround the balloon, the stronger and more durable the creature will be.
4. To make limbs and fins, use cardboard as the template and wrap newspaper strips around cardboard shapes.
5. Let the paper maché dry over night. Once dry, the balloon can be popped and the pieces can be removed before additional pieces are added on.
6. Once all additional limbs/fins are attached and dried, participants can paint their creatures.
7. Once painted, paper clips and string can be used to hang creatures from the ceiling of the ESA resource room.

Discussion Topics

Recycling, energy efficiency

Required Supplies List & Budget

Balloons	**Scissors**	**Cardboard**
String	**Paper clips**	**Water**
Balloon pump	**Paintbrushes**	**Newspaper strips**
Paint	**Glue**	**Phone book strips**

Program Follow up & Suggestions

1. Paper maché can get extremely messy! Make sure to lay trash bags or plastic table covers over your work area prior to starting the activity.
2. Rather than dipping paper strips in the glue mixture, use a paintbrush to brush the glue onto each strip.

Eco Cars

Program Description

Arts and Crafts

Goals & Objectives

Examine the relationship between waste and energy consumption.

Program Impact

1. Participants are inspired to change behaviors; to move towards making more energy efficient choices when building art projects.
2. Participants learn to transform their thinking of traditional marketing; inspire youth to save energy by using non-traditional materials to promote energy efficiency.

Curriculum

Basic Instructions

Gather materials from around the facility.

Discussion Topics

Waste, energy efficiency, recycling, "up"cycling.

Required Supplies List & Budget

Miscellaneous materials such as leftover pieces of craft kits (for example dowels, cardboard pieces etc)

Glue

Program Follow up & Suggestions

1. Encourage participants to be creative. Thinking "outside of the box" is one of the best ways to promote energy efficiency because participants "learn without learning."
2. To prevent having to gather materials every time you program a "thrifty" arts and crafts activity, collect materials into a box and use it as a "resource supply box". This tool provides an easy way to teach participants to use limited resources efficiently, because once resources run out, there is nothing left for them to use for activities.

Light Bulb Characters

Program Description

Arts and Crafts

Goals & Objectives

Create an energy saving character to protect the ESA resource room.

Program Impact

Participants are challenged to design unique characters based off of energy efficient light bulbs.

Curriculum

Basic Instructions

Preparation

1. Using the attached light bulb templates, copy and paste them into Microsoft publisher and adjust to a reasonable size to allow participants to create a character (recommended size- a quarter of a page).
2. Cut out templates and trace them onto cardboard to create stencils for the participants.

Participant Instructions

1. Using the provided stencils trace a light bulb onto a sheet of construction paper.
2. Be creative and turn your light bulb into a unique energy saving character!

Discussion Topics

Energy efficiency, recycling (light bulbs).

Required Supplies List & Budget

Markers **Printer paper** **Cardboard**

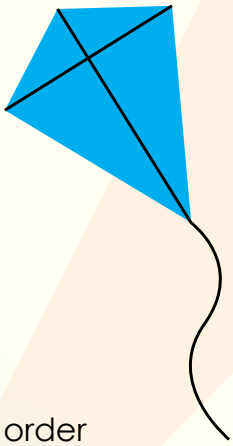
Pens/pencils **Construction paper**

Light bulb templates (see appendix)

Program Follow up & Suggestions

Cardboard from the back of an old spiral notebook or a loose leaf paper package are thin enough to cut easily and sturdy enough to create stencils.

DIY Kites



Program Description

Arts & Crafts, Science of Energy

Goals & Objectives

1. Compare traditional energy with wind energy.
2. Examine the pros and cons of wind energy.

Program Impact

Participants compare and contrast forms of energy in order to successfully fly their kites. Participants learn that wind is not always readily available and are inspired to save energy in order to avoid relying on alternative sources such as wind.

Curriculum

Basic Instructions (adapted from LINK)

1. Using a single sheet of construction paper, instruct participants to fold corners and edges down in order to make a diamond shape.
2. Trim the excess edges off the paper.
3. Secure craft dowels/sticks onto the back of the kite in shape of a cross using tape.
4. Punch a single hole towards the center (where the dowels intersect) and tie a piece of yarn through it.

Discussion Topics

Alternative energy, energy efficiency.

Required Supplies List & Budget

- Yarn
- Hole punch
- Scissors
- Tape
- Dowels/Craft sticks
- Construction paper (various colors)

Program Follow up & Suggestions

1. If time allows, let the participants work together to brainstorm their kite designs. This way, participants remain actively engaged and the foundation for lesson implementation is built.
2. Other variations of this lesson plan can include creating paper airplanes because the concepts of design and aerodynamics remain the same.

Lunch Bag Whales

Program Description

Arts and Crafts

Goals & Objectives

Discover alternative ways to insulate items.

Program Impact

Participants are inspired to save energy by using old paper as fillers; similar to using old paper as insulation for homes.

Curriculum

Basic Instructions

1. Collect materials listed below.
2. Stuff lunch bags approximately ½ to ¾ full with paper shreds. If paper shreds are unavailable, you can crumple old papers to create stuffing for the lunch bags.

Discussion Topics

Recycling, insulation

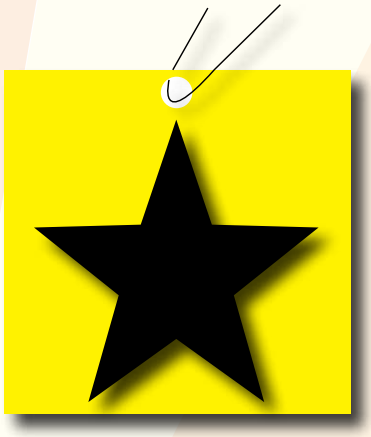
Required Supplies List & Budget

Lunch bags	Paper shreds/ old papers	Markers
Construction paper	Glue or tape	Scissors

Program Follow up & Suggestions

The shreds from a paper shredder are perfect for this activity!

Sunroom Decor



Program Description

Arts and Crafts

Goals & Objectives

Explore the pros and cons of solar power.

Program Impact

Participants learn to reuse materials to create festive decorations. To teach participants to limit energy consumption rather than depend on alternative resources such as solar power.

Curriculum

Basic Instructions

1. Using cardboard as the frame, use stencils to trace the desired light catcher pattern.
2. Cut out portions of the pattern (these will be the areas that will capture sunlight).
3. Cut out an identical piece of gift tissue to place behind the stencil.
4. Using a glue stick, glue the tissue to the back of the stencil.
5. Hole punch a single hole at the top of your creation and use yarn to create a display loop.
6. Hang your light catcher up and watch as the room illuminates with sunroom décor!

Discussion Topics

Solar energy, energy efficiency.

Required Supplies List & Budget

- Cardboard
- Glue Stick
- Scissors
- Yarn
- Gift tissue

Zoots and Zingers

Program Description

Arts and Crafts, Problem Solving and Critical Thinking

Goals & Objectives

Create "Zoots" and "Zingers" to be used as an ongoing reward system around the REC.

Program Impact

Participants observe how easily watt consumption adds up through everyday behaviors.

Curriculum

Basic Instructions

Using the below materials, encourage participants to create pom pom creatures. "Zoots" are friendly and serve as awards for EE behaviors. "Zingers" are mean and are given out for negative behaviors.

Discussion Topics

1. "Zoots" are awarded to participants for energy efficient behaviors/ choices, such as turning off the light switch before leaving the building for a fitness activity or turning off the video games when they are through playing.
2. "Zingers" are representative of wasted energy (when lights or video games are left on etc).
3. At the end of the REC club day, participants tally how many "Zoots" and "Zingers" they have collected.

Required Supplies List & Budget

Pom poms
Glue (Hot glue is preferred)
Googly eyes
Felt
Scissors

Program Follow up & Suggestions

If time allows, participants can create personalized carrying bags to keep their "Zoots" and "Zingers" in during the day.

Fused Energy Bags

Program Description

Science of Energy, Arts and Crafts

Goals & Objectives

Consolidate waste into a re-usable product.

Program Impact

Bags are fused together to help construct a re-usable product. Youth are encouraged to minimize waste and spending in order to reduce energy consumption.

Curriculum

Basic Instructions

1. Cut off the bottom and the handles of the old plastic bags.
2. Take the remaining portions of the bags and stack them together. The more layers you stack, the thicker and sturdier your bag will be.
3. Place foil on both sides of the stack. This prevents the plastic bags from fusing to the table and the iron.
4. Once you have your sheet(s) of fused plastic, trace the template (see appendix) and cut out the bag pieces.
5. Using a hot glue gun, glue the tabs together to create your reusable bag. You can use excess pieces to create a handle or arm strap for your bag.

Discussion Topics

Waste, recycling

Required Supplies List & Budget

Old plastic bags	Foil
Hot glue gun	Iron

Program Follow up & Suggestions

The iron can get extremely hot! Make sure to closely supervise participants or have staff fuse the plastic together. Allow yourself adequate workspace so that the iron's electrical cord is not in the way of other REC activities taking place.

Light Houses

Program Description

Arts & Crafts

Goals & Objectives

1. Learn how vital electricity is, not only for our homes, but for safety in everyday life.
2. Learn how technological advancements help ease energy burdens.

Program Impact

Participants use recycled materials to create mock lighthouses which, in the real world, use solar powered energy, and modern technology like Fresnel Lenses to increase energy output at minimal cost. Not taking light and electricity for granted.

Curriculum

Basic Instructions

1. Using plastic bottles or cones of rolled paper and tape, construct a freestanding tower.
2. Cut a roof using a circle of construction paper wider or as wide as the base of the tower.
3. Smaller roofs may be left intact while larger circles may wish to cut a slit in the circle extending to the middle, and then shaped into a cone using glue and tape.
4. Attach the roof to the top of the tower using glue or tape.
5. Decorate dried lighthouses using shells, sand, markers, paints, construction paper, old Christmas lights, led lights, and other decorative items.

Discussion Topics

Energy efficient technologies, re-using materials.

Required Supplies List & Budget

Construction paper	**Markers**	**Pens**	**Pencils**	**Paints**
Recycled plastic bottles	**Sand**	**Leaves**	**Dirt**	**Shells**
Old light-bulbs (working or non-working)			**Glue**	**Tape**

Program Follow up & Suggestions

1. Have pictures and facts about light houses readily available as references.
2. If materials are not readily available, consider The Pre packaged Light House Kit from S & S Worldwide (24 lighthouses, 29.99).

Rocket Pinwheel

Program Description

Arts & Crafts, Science of Energy Experiment

Goals & Objectives

1. Demonstrate and observe wind power.
2. Experiment with creative ways to harness wind power.

Program Impact

Participants demonstrate that, just like a wind farm, which converts wind into electrical energy, wind from a balloon can be harnessed and used to propel pinwheels (which are a lot like turbines).

Curriculum

Basic Instructions

1. Using a flexible "bendy" straw as a base, participants place the long end of the straw into the balloon approximately one-inch, and secure it with tape. The balloon should be able to be inflated and stay secured to the straw.
2. Bend the opposite end of the straw at a right angle.
3. Find the balance point of the straw using your finger.
4. Secure this point to a pencil eraser using a pin. Spin the straw to loosen it up.
5. Inflate the balloon through the straw, release the straw, and witness wind power spinning the makeshift turbine.

Discussion Topics

1. The pinwheel spins because of the action-reaction principle described in Newton's Third Law of Motion (very important in the energy world!). Every action is, accompanied by an opposite and equal reaction. The balloon squeezes the air inside of it, causing it to rush out the straw. The air, traveling around the bend in the straw, imparts force out of the end at a right-angle, this chain of energy is what makes the balloon spin around the pin.

2. How turbines create electricity, wind and renewable sources of power.

Required Supplies List & Budget

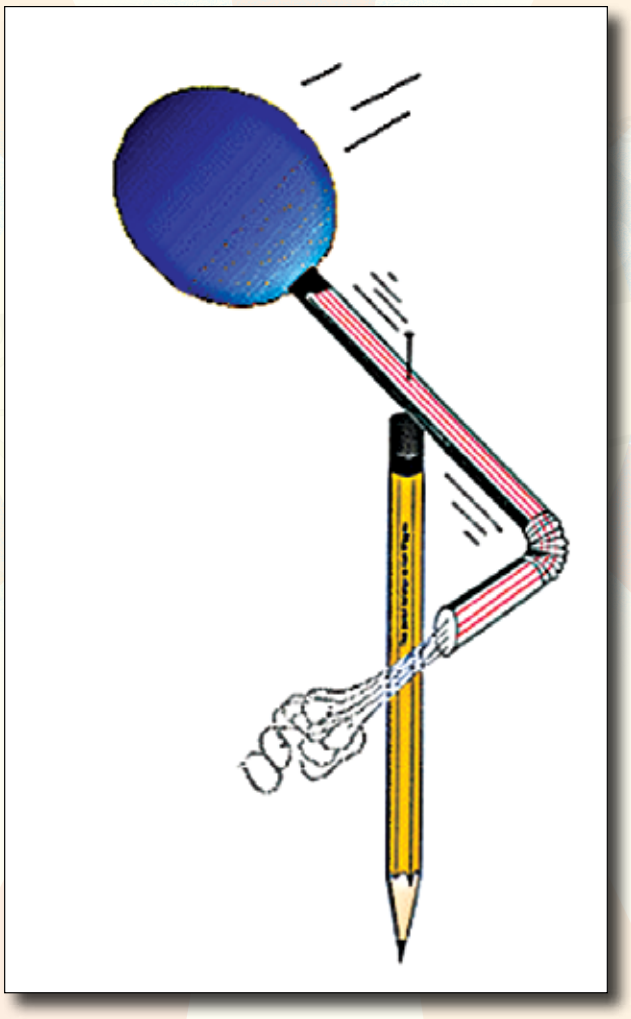
Balloon **Pencil**

Pin/Safety pin **Straw with a bendable neck**.

Program Follow up & Suggestions

1. If straw does not spin or encounters resistance check the balance point and make sure the pin is not crushing the opening in the straw.
2. Project should look like the picture below:

(http://exploration.grc.nasa.gov/education/rocket/TRCRocket/IMAGES/rocketpinwheelgif)



Remove the straw from the pencil and have air-powered balloon races! Attach to a car to get a rocket car activity.

Make Your Own Camel Pack

Program Description

Arts and Crafts

Goals & Objectives

1. Minimize waste and purchases.
2. Learn about the importance of hydration and the relationship between water intake and performance efficiency.

Program Impact

Participants use existing materials to maximize potential of a resource. Participants also learn the importance of staying hydrated to ensure maximum performance efficiency when participating in fitness activities.

Curriculum

Basic Instructions

1. Poke a hole into the cap with the Phillips screwdriver and widen it out with the scissors to fit the cap snuggly.
2. Cut the rubber tubing to fit the size of the bottle and the person using it. Remember to let tubing touch the bottom of the bottle so it can all of the water.
3. Put the tube through the cap and twist it onto the bottle.
4. Warm up the glue gun and glue around the edges of the tube to prevent from water dripping out. Tape also works but I found glue looks cleaner and more efficient.
5. Slide it in the pouch bag and you have made your first rigged "Camelback."

Discussion Topics

Performance efficiency, hydration, waste.

Required Supplies List & Budget

Hot glue gun with glue	**Phillips Screwdriver**	**Scissors**
2 Liter Soda Bottle	**3/8 " Rubber Tubing**	**Pouch Bag**

Program Follow up & Suggestions

For more information visit **http://www.instructables.com/id/Create-a-Cheap-Camelback-Like-Bag/step5/The-Pouch/**

Inspired by Others

Program Description

Problem Solving, Critical Thinking, Arts & Crafts

Goals & Objectives

1. Use pre-packaged educational kits/instructional books to teach EE concepts.
2. Interpret the science concepts behind each kit and relate them to EE lessons.

Program Impact

1. Pieces of Spring

Participants learn how to place puzzle pieces together efficiently, similar to strategically placing everyday appliances on smart strips.

2. Late Spring

Participants discover the science behind energy. As light bulb usage increases, heat rises, while CFL's are just as bright, they produce less heat, making them more efficient.

3. Whirly Birds

Participants compare and contrast the efficiency of wind power to fossil fuel power. Participants are inspired to save energy based on results.

4. Code Switches

Participants learn the science behind open and closed circuits by creating a switch that is easily flipped on/off, just as light switches are easily turned off when exiting a room in order to save energy.

5. Make your own paper

Participants learn various uses for scraps, from creating insulation to another piece of paper.

6. Renew our State (Peak)/ Exploring Energy Sources

a. Using PEAK approved curriculum, participants complete the Energy Action Activity and "install" energy efficient systems throughout California based on provided information and materials.

b. Using PEAK approved curriculum, participants discuss the best areas of California for alternative energy sources (Unit 11).

7. Chocolate Chips Cookie Mining

Participants race to mine for resources and learn the importance of saving finite resources.

8. Energyville

Participants build a virtual city and must meet the required energy demands by using resources efficiently.

9. Energy Pirates Adventure

Participants play an interactive game to prevent energy pirates from wasting energy and learn the importance of turning off/ unplugging appliances when not in use.

10. Alternative Racing/Robots

a. Participants discover the science behind solar energy. Individuals are encouraged to save energy because of how easily solar panels can fail to provide energy despite having ideal conditions.

b. Participants assemble 1 of 6 different, motor driven, solar robots from a D.I.Y. kit. The models are then positioned in varying angles/ degrees of sunlight in order to find the most efficient position for solar panels.

c. Participants consult the ESA resource room library and solar kits in an effort to most efficiently harness solar power and race solar cars against opposing teams.

11. Pinhole Camera Design contest

Rather than use a digital camera which uses an average of 500 watt seconds (watts needed per functioning second), participants design pin hole cameras which uses direct light exposure to capture images.

12. Make a Printing Press

a. Part 1- Commercial printers account for 7% or 1.8 billion dollars in energy costs. In order to contribute to reducing energy consumption, participants prep materials to build their own ESA inspired printing press.

b. Part 2- Using the materials prepared the day before participants construct a fully functioning printing press in the ESA Resource room in order to cut down on energy used by the office printers.

13. Making Methane (Peak)

Using PEAK based lesson plans, participants set up glass bottles with varying ingredients to test which items produce the most methane gas when broken down. Participants also learn more about the methane to energy component at the Miramar Landfill.

14. Lip Balm Kits

Participants harness solar energy to heat, melt, and mix ingredients into their own homemade lip balm.

15. Earth Lab

Participants explore the National Geographic "Earth Lab" collection to learn how the Earth benefits from efficient energy resource management on global, local and individual levels.

16. Electricity Kit

The "Electricity Kit" provides users a hands on opportunity to familiarize themselves and experiment with how electricity works and is conducted between materials.

17. Inventions Kit

Participants use everyday materials to foster understanding of energy and how design of motors, telegraphs, radios and light flashing generators impacts performance efficiency.

18. Electric Lemons

Participants discover the science behind energy and save energy by completing circuits with lemons instead of batteries or generators.

Curriculum

Basic Instructions

Using pre-approved science kits/curriculum, follow the directions as instructed.

Discussion Topics

Vampire/pirate energy, CFL's, energy, heat, alternative energy (wind, solar) fossil fuels, renewable/nonrenewable energy, circuits(open/closed), insulation, energy efficiency, finite resources, demand response, watt seconds, methane gas, energy management, conduction.

Required Supplies List & Budget

Refer to kit instructions for accurate supply lists for each activity.

Program Follow up & Suggestions

Make sure that you are familiar with each activity and their instructions prior to implementing lessons with participants. This helps to ensure that the activity will go smoothly. Make sure that all materials are accounted for and/or if needed replenish missing pieces of each kit with available resources in your office.

WATTS COOKING

Overall Program Description

Participants learn about the importance of preparing fresh, home cooked meals and the relationship it has to both nutrition and energy efficiency.

Goals & Objectives (pick one of the following per session)

1. **Jeopardy**
   (categories will include EE, taste testing, nutrition questions).
2. **Small Appliance Cook Off**
   (EE lessons on various appliances, nutrition and cooking tips).
3. **Kitchen Cook Off**
   (EE lessons regarding small appliances and larger commercial appliances, nutrition and cooking tips).
4. **Fear Factor**
   (test of knowledge of EE cooking and nutrition, test of strength and test of will).

Program Impact: (Pick one per session)

1. Participants learn proper maintenance of kitchen appliances in order to ensure they continue to run efficiently. Studies show that with proper care any appliance can reduce energy consumption.

2. Participants learn to shop for foods more efficiently by trying various dehydrated food recipes. Dehydrating foods reduces the need to consume energy while cooking on a daily basis by extending the shelf life of prepared items.

3. Participants learn to save energy at home by preparing their own meals instead of buying from fast food businesses that use high voltage appliances to prepare the same meal.

4. Participants learn about saving energy in the kitchen by preparing dishes with fresh, raw, ingredients in order to lessen the energy used by stoves, microwaves, and ovens.

5. Participants examine their favorite food choices for nutritional value while learning which similar meals and foods can produce the same energy for their own body's power plant, but in a more beneficial and efficient manner.

6. Participants learn about efficiency while trying dehydrated ingredients. Dehydrated meals reduce the need to consume energy while cooking or preserving foods.

7. Participants discover the efficiency of conventional hot plates and learn that this efficiency is ex-pressed as a percent and the closer to 100% the less energy is wasted.

8. Participants learn to plan and prepare multiple meals efficiently as opposed to cooking individual meals requiring several times the appliance energy.

9. Participants identify recipes and kitchen appliances in order to increase awareness of energy efficient meals and cooking methods.

10. Participants learn to save energy by covering pots and pans while cooking to generate higher temperatures which decreases cooking time.

11. Participants save energy by turning off the stove before the food is done and using excess heat to finish cooking. This saves up to 2 minutes of cooking time.

12. Participants answer trivia questions to learn more about energy efficient cooking.

13. Participants learn to be energy efficient by keeping the oven door closed to prevent losing up to 20% of heat while baking.

14. Participants learn to reduce the amount of gas & energy used when cooking by preparing the cooking ingredients before turning on the stove.

15. Participants learn that they can save energy by simply saving left over's. The concept of the activity is to compare the amount time and watts used to reheat food instead of starting from scratch.

16. Participants learn that by using the proper amount of water to cook, it helps to reduce the amount of energy used to heat the water.

17. Participants learn to reduce the amount of gas & energy used when cooking by preparing the cooking ingredients before turning on the stove.

18. Participants discover the science behind energy and learn a new way to conserve energy by drying pumpkin seeds prior to baking them in the oven in order to decrease cooking time.

19. Participants learn the difference between the various amounts of energy appliances consume. Participants are encouraged to create meals using energy efficient alternatives/recipes (based on cook time/ watts consumed).

20. Participants learn that the average restaurant uses more kilowatt hours at any given time in the day than the average household uses during peak demand hours when preparing meals.

21. Participants conduct a lab to discover the efficiency of a conventional hot plate. Individuals learn that efficiency is expressed as a percent and the closer to 100% the less energy is wasted.

22. Participants examine their favorite food choices for nutritional value.

23. Participants learn which meals and foods provide energy for their bodies, which intakes resources and outputs energy just like a power plant. Participants learn which foods can efficiently be processed by the human body and which foods we can benefit from.

Curriculum

Basic Instructions

1. Research healthy recipes and nutritional info.
2. Depending on the cooking method, introduce to participants how each method (traditional stove, slow cooker, crock pot etc) ties in to energy efficiency.

Curriculum Example: (see appendix)

Discussion Topics

Appliance maintenance and the link to efficient energy use.

Required Supplies List & Budget

About $30-$40 per recipe per 10 participants

Crock Pot $20—$40 (varies by size)

Dutch Oven $50-$80 (varies by size)

Coal/Chimney $5/$20

Foil $5

Lighter $3

Food Dehydrator $30-$40 (varies by size)

Griddle $60

Program Follow up & Suggestions

1. Advertise cooking classes (including what recipes will be offered per week) helps draw in participant numbers.
2. Hosting "Fear Factor" challenges when introducing new foods to youth participants helps to alleviate resistance to trying new foods/ vegetables.
3. Fear Factor challenges include:
    a. **Test of Will**: Participants compete head to head to see who has an iron stomach, true to "Fear Factor" game play.
    b. **Test of Knowledge**: Participants answer trivia relevant to past EE lessons and other health/wellness related topics.
    c. **Test of Strength**: Participants compete in a physical challenge.

Online Resources

Recipes

http://www.theperennialplate.com/recipes/

http://recipes.howstuffworks.com/black-bean-chili-recipe.htm

Energy Efficient Cooking Research

http://www.dehydratorbook.com/money.html

http://www.healthycookingrecipes.com/crockpotrecipes/crockpotcooking.htm

http://fastcooking.ca/pressure_cookers/energy_savings_pressure_cooker.php

http://www.care2.com/greenliving/save-kitchen-energy-10-cooking-tips.html

http://www.greenlivingtips.com/articles/252/1/Saving-energy-when-cooking.html

SKATE

Program Description

Skate curriculum capitalizes on existing and successful programming at the teen centers. This new style of innovative programming not only introduces energy efficiency to one of our largest target demographics, but provides a fresh, exciting and challenging programming.

Goals & Objectives

1. Present a skateboard film while teaching EE tips.
2. Host a skateboard race or game of S.K.A.T.E.
3. Explore the concepts of centripetal force, rotational inertia and work forces.
4. Create and design an energy efficient skate park.

   Explore real time energy demands and apply it to skate park design.
5. Learn about skateboard technology and design and its relationship to energy and performance efficiency.
6. Host a review game of the previous lessons.
7. Design your own skateboard.
8. Host a high-ollie contest using tools to measure energy used and vertical distance.
9. Skateboard Long- Jump: measure their horizontal ollie distance and examine technique and inertia to increase distances while keeping the energy used during the Ollie the same.
10. Tic-Tac Race: learn to conserve and expend energy efficiently while learning techniques to maximize the body's potential energy through a "1 push" race.

Program Impact

Goal 1

Participants will enjoy a skateboard film while being taught EE lessons they can do around the home. Participants will be taught about peak hour consumptions and emphasis will be placed on why they should be outside skating and enjoying the beautiful San Diego weather during these times (utilizing daylight instead of energy inside on video games). Films are designed to inspire kid's to go outside and skate for the remainder of the day in order to work on new tricks and lessen their effects on the peak hour strain.

Goal 2

The center will be shut down to promote outdoor activity to lessen our consumption during the peak hour times. Participants will take part in a skateboard race. Participants will be taught the importance effectively using their muscles and surroundings to spin their wheels the fastest to finish the race first. After the race, a conversation can take place to discuss more efficient techniques that could have been used to win the race.

Goal 3

This "Wired Wednesday" experiment will take participants out of the center to a local skate park to illustrate the idea and theory of centripetal force, rotational inertia, and work forces. Participants will have to pump in a bowl for a certain number of minutes without pushing. This will illustrate centripetal force, a force that keeps a body moving in a circular path; and rotational inertia, a measure of an object's resistance to being turned in relation to both the object's mass and mass distribution. Participants will try different techniques and board sizes to simulate peak hour and non peak hour consumption by local power plants. The result- participants fatiguing during peak hour consumption (lighter materials but increased run time // minimal wattage kept on for long periods of time); participants cruising during non peak hours (sustainable and constant energy distribution over a shorter run).

Goal 4

Participants will create and design an EE skate park. The design with the most unique and innovative EE features will win a unique prize. Such items will include the color of concrete used to increase its albedo and lessen its need for additional lighting, adding an energy efficient water pump system to deal with storm runoff.

Participants use Cal ISO to investigate real time energy demands in relation to available resources. Teens use this information and apply it to skate park design (Kinetic Energy/Potential Energy patterns) and explore how and why skate parks place obstacles accordingly (what's potentially available as skaters cruise vs. what is needed to clear an obstacle.)

Goal 5

Participants learn about "the dimpled skateboard". Participants are taught that with proper form (rigidity/balance), tricks can be performed. Boards that do not maintain rigidity throughout the duration of the trick, fatigue and tricks cannot be completed. Participants are taught that just like the skateboarder performing tricks circuits in appliances must maintain balance, as "sagging circuits are inefficient in fulfilling energy demands because they must work harder to try and meet increased peak energy demands.

Goal 6

Free for all Friday will allow participants to explore the ESA room and ask questions to the staff about lessons learned that week. A review game may be created to test participants on lessons learned that week; winners will qualify for/receive a premium prize.

Goal 7

ESA staff challenge youth to design a daily reminder to hang on the wall to shut down appliances prior to leaving their households. This will help inspire behavioral change in participants to remember to turn off appliances when they leave home.

Goal 8

Participants create a physical, action sports version of a "Smart Meter" in order to read, evaluate, and draw conclusions based on performance. These Ollie Meters will measure the height and energy used to clear vertical checkpoints as well as provide insight on how to get better numbers through more efficient body and board movements.

Goal 9

Using chalk lines and various "take off" points, participants take note of the energy needed to push the distance traveled further and counter-act a skater's mass and gravity itself. While ollie mechanics stay the same, velocity is inversely proportional to energy used (as speed increases less energy is required to travel the same distances). Participants discuss how increased performance and energy efficiency is possible while using the same methods and tools in place.

Goal 10

Using only one push, participants maneuver their scooters, skateboards, and bodies in order build momentum and maximize the distance gained from the starting point. Riders must then work to transform this initial momentum into continuous movement that will get them back around a cone and back to the starting line before other riders. This is similar to how a transformer station can take in electricity, increase the voltage, and send it longer distances across transmission lines.

Basic Instructions

Using pre approved curriculum, pick a goal and objective along with the coinciding program impact. These will serve as tools for leading a successful activity.

Goal 1

Choose an age appropriate skate video to present in the ESA resource room.

Compile a list of EE tips that can be shared and discussed as the film is being shown (for example, discussing installing Energy Star appliances in your homes to save energy). Focus participant attention on to single electronic component while keeping the rest of facility shut down.

Facilitate a discussion among participants about techniques present in the video. The ultimate goal is to inspire youth to go outside and utilize as much daylight during peak hours instead of staying inside and playing video games.

Move group participants outdoors, making sure to have participants shut down the facility before leaving.

Goal 2

Using cones, create a skate slalom race track. Set up a course that accommodates all participant skill levels.

Participants will race with 2 different board set ups, 1 with larger wheels, and the other with smaller wheels.

After the race, lead a discussion about efficient techniques that would ultimately lead to improved performance. Provide feedback to participants to help encourage behavior modification in order to help them achieve their performance goals.

Goal 3

Arrange a skate park field trip following agencies protocol and promote accordingly to encourage participation.

During a pre-trip meeting, introduce the following concepts:

Centripetal force (a force that keeps a body moving in a circular path).

Rotational inertia (a measure of an object's resistance to being turned in relation to both the object's mass and mass distribution).

Work forces in relation to potential energy (stored energy) and kinetic energy (movement energy).

During the trip, participants will experiment with various boards and techniques.

Afterwards, lead a discussion about their perceptions of the differences between boards and techniques.

Goal 4

Research EE upgrades incorporated into skate parks and provide a list to participants (such as lighting, pavement options, recycled obstacles etc.).

Construct contest/design rules prior to having contest specific to participant age range and skill level.

Goal 5

Prior to leading an outdoor activity, have participants investigate (compare/contrast) a traditional board to the newer "dimpled" skateboard.

Refer to PEAK manual unit on Circuits and have participants investigate sagging circuits.

During the skills workshop, discuss techniques for skate performance and how it relates to board positioning (rigidity). Rigidity and balance are crucial parts to completing a trick as well as completing a functional and efficient electrical circuit.

Goal 6

Open up resource room for participant exploration. Resource materials should be displayed and easily accessible to participants so they can review the week's EE lessons while socializing with other ESA participants and staff.

Discussion Topics

Goal 1

Peak hours, if available, use a kilowatt meter to have participants observe the differences in energy consumption between multiple electrical components running simultaneously and a single electrical unit operating alone.

Goal 2

Techniques, Body positioning, Board maintenance.

Goal 3

Why were certain obstacles and upgrades included in the design of the skate park?

Goal 4

Why were certain obstacles and upgrades included in the design of the skate park?

Goal 5

Circuits, balance, rigidity, physics behind board design (dimples).

Goal 6

Any combination of Goals 1-5 discussion topics.

Required Supplies List & Budget

Goal 1

Internet access or access to DVD player/TV; open courtyard to skate in

Elbow and Knee pads, Helmets- for use in accordance to site regulations and state law.

Goals 2, 3, 5, 6

Complete skateboards and/or scooters for participants to use.

Mobil skate obstacles that can be waxed, grinded, etc are not necessary but if available help with demonstrations.

Access to skate videos, a video camera and a computer help illustrate videography techniques as well as allow participants play back video and think critically about technique and serve as a tool to facilitating discussions around behavior modification and performance efficiency. Elbow and Knee pads, Helmets- for use in accordance to site regulations and state law .

Goal 4

Paper, drawing supplies, Arts & craft supplies.

Goal 6

Any combination of supplies required for Goals 1-5; EE/SDG&E resources.

Program Follow up & Suggestions

If you are working with larger groups a wide variety of skill levels, break down events/activities by age, skill level, etc.

For contests, print out rules and have participants verbally agree to them as a group. This will avoid arguments.

MUSIC ROOM

Program Description

Based on the popularity of the music room and DJ trends in both communities, ESA has created curriculum tailored to the previously untapped demographic of participants.

Program Impact

1. The goal of the music production program is to teach participants how to use the available equipment efficiently to create both personal and school projects.
2. With the increase in the music industry creating energy efficient/ eco-friendly studios, (for example brushfire records in Hawaii) REC members will first evaluate (audit) each music room and work with staff to make the room more energy efficient like the rest of the center (ESA offices and main rooms).
3. Once upgrades have been made in each music room, participants will experiment with online music exhibits and labs (Exploratorium. edu/music) to learn more about the science of music.
4. The ultimate goal of the music program is to have staff collaborate with current participants to create a "theme song"/slide show of past ESA activities for use as outreach material at the centers and at special events.

Goals & Objectives

1. Youth will take part in auditing music rooms, upgrading and learning proper equipment maintenance and use.
2. Participants will use what they learn to create a film/slideshow to be used as a marketing tool.
3. Taking what participants have learned, REC members will work with staff to create and host an event to boost program attendance based on the need to continually adapt to the changing trends among our teen demographic.

Curriculum

Music Room Audit

Participants will use Kilowatt meters to measure how much energy is used by the equipment located in each music room. Individuals will also evaluate the current set up of the equipment and work with staff to reduce the amount of energy consumption through a series of upgrades (installation of smart strips, watt meters etc.).

Exploratorium – "Listening Unit"

An integral part of efficient communication is not only being able to verbally translate our thoughts and ideas, but to also be able to listen to others. Whether we are listening to nature, or listening just to process the sounds around us, listening enables us to use audio clues as additional resources for situational comprehension.

*Listening Guides Videos- Nature, Music, To Solve Problems.

*Interactive Labs- Audio Pong, Memory, Build a soundscape, sound puzzles.

Exploratorium – "Music"

Whether participants are young musicians or music enthusiasts, music is a very powerful tool. Participants will experiment with interactive lab activities to discover what makes variations in music structure an effective communication tool. REC members will also discover the importance of context when interpreting sounds that we hear, and learn ways to effectively override the concept of visual dominance.

*Interactive Labs- Dot Mixer, Kitchen Sink-o-pation, Step Re-mix.

REC Club Music

Taking what participants have learned thus far, members will work with staff to create their own projects as well as a collective ESA theme song/video that can be utilized to enhance the ESA brand for use at community outreach events.

Basic Instructions

To begin the Music unit, have participants use a watt meter to audit the current set up of the facility. Document the amount of energy used.

Assist participants with installing upgrades such as the Insight Monitor and power strips. Make sure to place emphasis on the reasons why consolidating plugs onto smart strips helps increase energy efficiency and decrease vampire energy.

For the Exploratorium units, navigate through the Listening exercises listed above prior to moving on to the Music exercises. This will help participants identify and connect with the importance of the components of efficient communication. As individuals, we must communicate clearly and efficiently to ensure that our messages are received and interpreted.

Appliances are similar in this sense, that their circuits must be able to transmit electrical signals and use energy efficiently to operate.

Music is another form of communication. Participants will use what they have learned from previous units and work with staff to create a theme song or video that can be used at outreach events.

Discussion Topics

Watt, audit, energy efficiency, vampire energy, circuits and maintenance

Required Supplies List & Budget

Surge Protecting Power Strips: $24.67

Belkin-Conserve Insight Energy Use Monitor: $30

Kilowatt meter (Available for checkout from California Center for Sustainable Energy library or PEAK partnership educational kit).

Program Follow up & Suggestions

In order to ensure success, familiarize yourself with the tools and the website for each lesson. Only lead units that you are the most familiar with and comfortable teaching. This helps close the learning gap between leader and participant and helps facilitate participant buy in to the activity.

Before starting any unit, establish a set of facility rules. Safety of participants and respect of equipment is important when implementing this level of programming.

Programming allows for various mentoring opportunities between both peers and staff and participants. Encourage mentorship when available.

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APPENDIX

Local Resources Fact Sheet

Information adapted from acwf.org/california/renewable-energy-lakeside

Resources available in San Diego County

Wind

Solar

Biofuels

San Diego is currently the research leader in algae energy
Coal/fossil fuels-our main sources of energy. Both sources are non-renewable which is why we must learn to conserve these resources.

Resources available in the Lakeside Community

Coal/fossil fuels

Solar

Available only if residents choose to invest in installing solar capable upgrades to their homes.

Resources are not readily available because alternative energy upgrades can be rather expensive. However, because of the financial investment required to use alternative resources, many look into cooperating energy systems for more affordable energy services.

The community center at the park currently runs off a cooperating energy system that uses both solar panels and traditional energy services.

Definitions of Commonly Used Terms

Awareness - The state or condition of being aware; having knowledge.

Biofuel - Fuel made from biomass such as veggie oils, animal fats and grease.

Carbon emissions/Greenhouse gas emissions - Gases that absorb and emit radiation within the thermal infrared range.

Circuit - complete path of an electric current.

Open- an incomplete electrical circuit in which no current flows; a broken path.

Closed- a complete electrical circuit around which currents flow; no gaps or breaks in the pathway.

Compact Fluorescent Lightbulb (CFL) - Heats mercury to generate an ultraviolet light; uses a quarter of the energy needed to power an incandescent lightbulb; has a longer life span than incandescent lights (6-12 times longer).

Conduction - the transfer of heat between two parts of objects ; caused by the difference in temperatures.

Conductors - Substance that allows electricity, heat or sound to pass through.

Conservation - The act of conserving, prevention of injury, decay, waste or loss; see also preservation.

Consumption - To use/ consume of a resource.

Energy Efficiency - Reducing energy or demand requirements without reducing the end-use benefits.

Using less energy to accomplish the same task, such as heating or lighting a building. Using less energy lowers costs and reduces emissions.

Energy Management System - A road map of energy efficiency, an energy action plan.

Energy Transference - the transfer of energy from one system or organism to another system or organism; part of the law of Conservation of Energy.

Footprint - The total amount of greenhouse gas emissions caused by an organization, event, product or person.

Fossil Fuel - a fuel such as coal, oil or natural gas that is formed in the earth from plant and animal remains.

Heat - Sensation caused by heat energy; a form of energy that is transferred by a difference in temperature.

Hydration - absorption or containment of water.

Hydro - The production of electrical power through the use of gravitational force of falling or flowing water.

Wind-air flows turns the blades of a turbine and powers a gearbox that is connected to a generator which then produces energy.

Incandescent Lightbulbs - The traditional source of lighting.

Innovative - To introduce something new; make changes in anything established.

Insulation - The action of insulating something or someone; The state of being insulated, the material or substance used to insulate.

Kilowatt hour - Equal to 1000 watts; energy in watt hours is the product of watts and time; billing unit for energy for utilities.

Law of Conservation of Energy - Energy cannot be created or destroyed, only transferred or transformed from one form to another.

LED – Light-emitting diodes; use between 2 -10 % of the energy needed to power an incandescent lightbulb; uses a semiconductor instead of a filament; has a longer life span than incandescent lights (6-12 times longer).

Loading - Refers to the state of California's "loading order," which places energy efficiency as the top priority resource. Allows demand reduction on resources that are effective, reliable and feasible.

Methane Gas - A flammable gas that results from decaying or organic material.

Nonrenewable energy/Finite resource - An energy source that is used up and cannot be recreated (i.e. coal, fossil fuels).

Parallel Circuit - An arrangement of a circuit in which the same current is applied 2 or more parallel branches.

Performance efficiency - Actual output of a person compared with the desired or planned output, expressed usually as a percentage.

Preservation - To keep alive or in existence; make lasting.

Peak Hours - When energy demands are its highest during the day, between the hours of 12 p.m. and 6 p.m.

Recycling - The processing used materials (waste) into new products to prevent waste of potentially useful materials, reduce the consumption of fresh raw materials, reduce energy usage, reduce air pollution incineration and water pollution from land filling; by reducing the need for "conventional" waste disposal, and lower greenhouse gas emissions.

Recycling (continued)
"It almost always takes less energy to make a product from recycled materials than it does to make it from new materials. For example, using recycled aluminum scrap to make new aluminum cans, for example, uses 95% less energy than making aluminum cans from bauxite ore, the raw material used to make aluminum."
From http://www.eia.doe.gov/kids/energy.cfm?page=environment_recycling-basics

Air leaks-usually caused by tears in weather stripping or gaps in insulation; results in energy being wasted because facilities must work harder to heat/cool the area.

Reforestation - The action of renewing a forest by planting seeds or young trees.

Renewable Energy/Infinite Resource - An energy source that can be easily replenished.

Resources - Any source of supply, support, or aid, especially one that can be readily drawn upon when needed.

Series Circuit - An arrangement of a circuit where the whole current passes through each part of the circuit without branching.

Solar - Uses photovoltaics to absorb sunlight and convert it into usable energy.

Stewardship - Responsible planning and management of resources.

Supply and Demand - The relationship between consumer demand and available resources.

Sustainable - Capable of being supported or upheld.

Thermal energy (or heat) - The vibration and movement of the atoms and molecules within substances. Geothermal refers to heat from the Earth.

"Up"cycling- process of converting waste materials or useless products into new materials or products of better quality or a higher environmental value.

Vampire energy - The electric power consumed by electric appliances while they are switched off or in standby mode; also called standby power.

Waste - Unwanted or useless materials.

Watt seconds - A derived unit of energy equivalent to a Joule; commonly used when measuring energy consumption of high end electronics such as cameras.

Insulation Calculator

(http://www.homedepot.com/webapp/wcs/stores/servletTHDCalcInsulationView?metric=true&storeId=10051&langId=-1&catalogId)

Help Decorate/Insulate the REC!

Calculator Inputs

Wall Dimensions

(also for slab edge and interior/exterior basement)

Wall 1 Length	_____	M	_____	cm
Wall 1 Height	_____	M	_____	cm
Wall 2 Length	_____	M	_____	cm
Wall 2 Height	_____	M	_____	cm
Wall 3 Length	_____	M	_____	cm
Wall 3 Height	_____	M	_____	cm
Wall 4 Length	_____	M	_____	cm
Wall 4 Height	_____	M	_____	cm

Attic Dimensions

(also for foot/crawl space)

Width	_____	M	_____	cm
Length	_____	M	_____	cm

Windows

Number of Windows	_____			
Width	_____	M	_____	cm
Length	_____	M	_____	cm

Doors

Number of Windows	_____			
Width	_____	M	_____	cm
Length	_____	M	_____	cm

Watts Cooking Worksheet

The Efficiency of a Hot Plate

When any type of energy is used/converted to do some useful work or job, some of the input energy is wasted and not used productively. When we measure the amount of useful energy use vs. wasted energy we obtain a measurement called **EFFICIENCY**.

EFFICIENCY is always expressed as a percent. The closer the EFFICIENCY is to 100% the better we are at doing that particular job; that is; we are wasting less energy when we do it.

PURPOSE: When heating water when cooking on a hot plate, how efficient is it? How much energy going into the hot plate is actually being used to heat the water?

Instructions

1. Read the entire lab before continuing.
2. Record the wattage of the hot plate using the Kill-A-watt meter. Turn on the hot plate to a setting of "10" or "high" and let it warm up for 2 minutes before starting.
3. Using the REC measuring tools, measure exactly 300 ml of water into the metal pot. Record this volume in the data table.
4. Measure the temperature of the water in the pot **BEFORE YOU PLACE IT ON THE HOT PLATE**. Record this temp in the data table.
5. You will be heating the water for exactly 7 minutes. As you place the pot on the hot plate, begin the stop watch to keep track of the time.
6. When time has passed, remove the pot from the hot plate (make sure to use the handle!) Immediately measure the temperature of the water and record it in your table.
7. Remember to be careful when disposing of the hot water in the sink and make sure you turn off the hot plate.
8. Look around; have you put everything that you have used back where it belongs? Have you cleaned up your area?

DATA

Wattage rating of the hot plate	
Volume of water to (start)	300 ml
Beginning temp of the water	
Final temp of water	

Heat energy = calories= mass of water (g) x temp change (C°) x Calories g C°

ELECTRICAL ENERGY is measured by how much you use (WATTS) and how long you use it.

_____Watts x _____Minutes =_____ watt-minutes

Convert Watt-minutes into Watt-hours

_____watt-minutes x 1 watt-hour = _____ watt-hours of electrical energy
60 watt-minutes

We now have to convert the watt-hours of electrical energy used by the hot plate in heating the water to calories of heat energy so that we can compare the energy in the water to the energy used by the hot plate.

1 watt hour = 860.4 calories

The amount of heat energy produced by the hot plate = _____.

Now we can FINALLY calculate the efficiency of the hot plate:

Energy used (calories of heat energy absorbed by the water) x 100%.

Energy supplied (calories of heat energy produced by the hot plate).

Under staff supervision, have participants prepare each meal, making sure that they clean up afterwards.

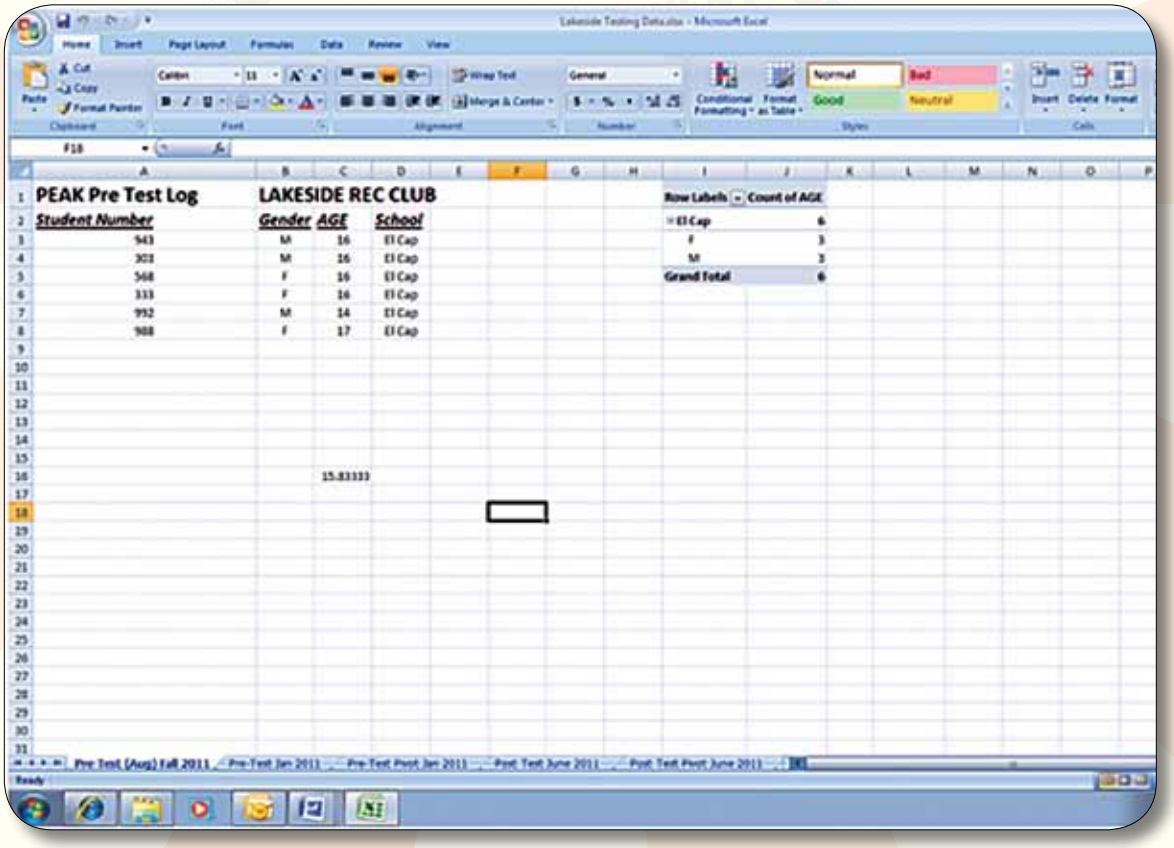
A How-To Guide to PEAK Curriculum Tracking

In accordance to the partnership Memorandum of Understanding (MOU), four lessons need to be completed per school year.

1. Conduct a PEAK pre-test at the beginning of each MOU.
2. Complete a PEAK teacher log for each unit implemented through daily programming.
3. Administer a PEAK post-test after the last unit is completed.
4. How to track PEAK testing anonymously:

Use Excel to create a data sheet that includes (Student ID, Gender, Age, School).

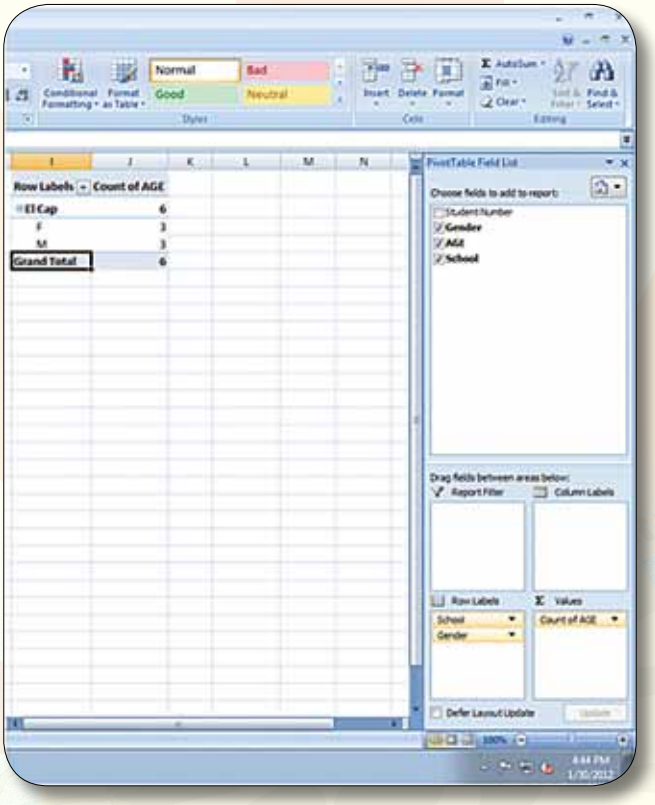
Submit test results via e-mail (pdf's and test log) or enter tests online on www.peakstudents.org and e-mail testing data (excel log) to PEAK liaisons.



Ella Grossberg: egrossberg@energycoalition.org

Alyssa Austin: aaustin@energycoalition.org

After administering each test, enter participant data into Excel log and create a Pivot table to summarize participant data.

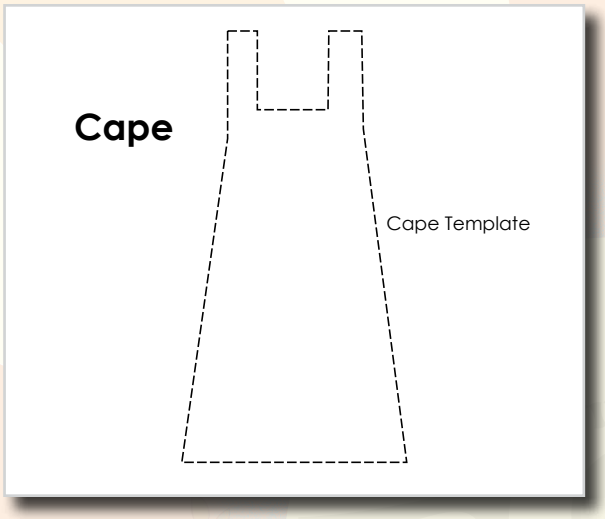


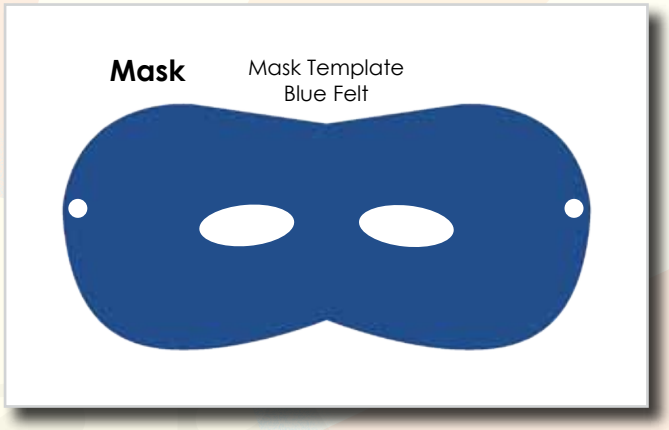
Backup student data using interactive PDF files of pre/post tests.

Activity Templates

Fall Costumes Templates

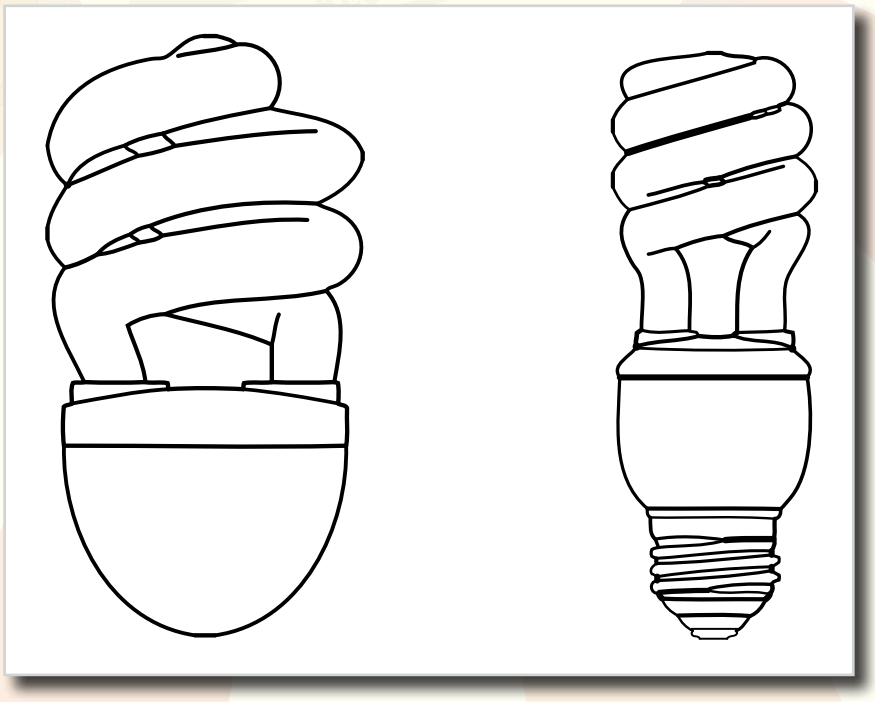
Copy and paste into Microsoft publisher and size accordingly, or use as a shape reference.





Lightbulb Character Templates

Copy and paste into Microsoft publisher and adjust size accordingly.



Energy Inspectors		
Turn off lights/computer when not in use	Uses CFL lightblubs	Washes laundry in cold water
Takes baths	Takes short showers	Uses a dishwasher when it's only half full
Hangs up clothes to dry	Dries dishes by hand	Closes blinds to keep out summer sun/winter cold
Uses window/door guardians to block drafts	Unplugs rarely used appliances	Limits use of AC/heater

Fused Bag Template

Energy Saving Tips

10 easy ways to use energy sensibly

1	Unplug all electronic devices when not in use	Check-Off ☐
2	Adjust your thermostat 3-5 degrees or more	Check-Off ☐
3	Turn your water heater thermostat to "normal" setting	Check-Off ☐
4	Take short showers instead of baths	Check-Off ☐
5	Wash only full loads of dishes and clothes	Check-Off ☐
6	Air dry dishes and clothes	Check-Off ☐
7	Install low-flow water saving devices	Check-Off ☐
8	Change over to compact fluorescent lights	Check-Off ☐
9	Use smart power strips	Check-Off ☐
10	Make energy-efficient home improvements such as adding insulation and selecting energy-efficient appliances	Check-Off ☐

what is ESA?



Energy Saving Adventures (ESA) is a new REC Club perspective, taking charge of our future through resource preservation. This daily after-school program inspires and empowers youth to create change in the world around them. Through films, tournaments, experiments, and field trips, each day, teens tackle important concepts through an Energy Saving Adventure.

For more program information, please call **858 • 966 • 1328**
or email **caroline.bartolome@sdcounty.ca.gov**



RECXplorers is an outdoor adventure program which is focused on developing an appreciation for the outdoors and an ethic of environmental stewardship.

Working together, ESA and RECXplorers have developed programs that culminate in what has been named Environmental Energy Education, a hybrid project of sustainability and outdoor recreation.

For more program information, please call **858 • 966 • 1337**
or email **kevin.payton@sdcounty.ca.gov**

Two Different Locations. Twice the Fun!

Lakeside Teen Center
(REC Club)
9911 Vine St. • Lakeside, CA
619 • 443 • 4169

Spring Valley Teen Center
(REC Club)
838 Kempton St. • Spring Valley, CA
619 • 667 • 6835

ENERGY SAVING ADVENTURES
ESA
REC Club Unplugged

PARKS AND RECREATION
COUNTY OF SAN DIEGO
www.sdparks.org

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