

Power UP



January 2010 - Den Leader Handout

Boys explore the science of energy through solar, electrical, and wind power and how this energy is used in their everyday lives. They can explore different ways to conserve energy and protect the world we live in. Work on the Science or Weather belt loop and pin. Boys can invite friends to join in the pinewood derby and discover the power behind those little cars. What types of things are powered up by the flip of a switch? A field trip to the local water works or power plant might be part of the den's monthly plan. Finish up the month with a real power-packed pack meeting. The boys can power up by being physically fit and working on the Physical Fitness belt loop and pin.

Some of the purposes of Cub Scouting developed through this month's theme include:
Good Citizenship - Cub Scouts will see that a small act of conservation can have a large impact upon their community.

Family Understanding - Family relationships will be stronger as Cub Scouts and their families work together on energy conservation.

Fun and Adventure - Boys will enjoy exploring various forms of energy through games and activities.

This theme is designed to promote character development by emphasizing these core values:

Responsibility - Cub Scouts learn that everyone should share in the responsibility of conserving energy.

PRE-OPENERS

Scrambled Energy Words



1. DIWN
2. NSU
3. LOI
4. TERCIELYITC
5. GEYRNE
6. LOSRA
7. TNARLAU SGA
8. OEPWR



(answers: wind, sun, oil, electricity, energy, solar, natural gas, power)

Making Electricity

Have different stations set up for people to try to make electricity (static electricity).

1. Rub a non-plastic playing card on a wool sweater or blanket. Press the card onto the wall. (If the wall is slick or oily, it will not stick.)
2. Rub a piece of copier paper quickly back and forth on the wall. The paper should stick to the wall. (If the wall is slick or oily, it will not stick.)
3. Comb your hair briskly with a dry comb. Hold the comb close to your hair and watch your hair stand up on end. (This will not work with wet or oily hair.)
4. Briskly comb your hair with a dry comb and touch it to a small piece of tissue. Slowly lift the comb and watch the tissue paper come with it. (This will not work with wet or oily hair.)

OPENING CEREMONIES

POWER

Have cards with the following letters on one side and the words on the other. Have cubs holding the cards read the words, then the cubmaster read the last line before reciting the Pledge of Allegiance.

P - Perseverance to keep trying until we succeed.

O - Open to new ideas and ways to develop new skills.

W - Willing to test our limits and beyond.

E - Eager to help others whenever we can

R - Ready to have fun and adventure

The POWER is within each of us. It is in each of us whether or not we decide to turn it on.

GAMES

Zip Zap

Form a circle with one person in the middle. The person in the middle points to someone and yells either "Zip!" or "Zap!". If "Zip" is yelled, the person pointed to must name the person on his/her right before the person in the middle counts to ten. If "Zap" is yelled, the person pointed to must name the person on his/her left before the person in the middle counts to ten. If the person pointed to can name the person on time, he/she can stay in the circle. If not, he/she must exchange places with the person in the middle.

Electric Squeeze

Everyone forms a circle with "it" in the center. Someone starts sending electricity through the group by squeezing the hand of the person next to them. This electric shock is passed from person to person with "it" trying to catch who has the electricity. If someone is caught with the electricity, they must exchange places with "it".

Stick Twist

Everyone grabs a stick in front of them with both hands palms down holding the stick horizontal. Lower the stick and step over it. Without letting go, pull the stick up behind the back and over the head back to the starting position. Remember, you cannot let go of the stick.

Recycle

Divide into teams. Set up a recycle bin on the opposite side of the room across from each team. Provide recycled plastic bottles for each team, at least 1 per player. Have a relay race to see which team can recycle their bottles fastest by taking the bottles one at a time to the recycle bin.

CRAFTS

Food Pyramid Poster

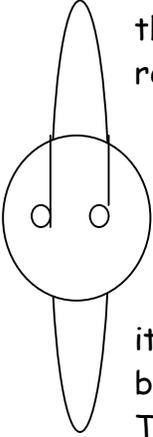
Materials: large paper or posterboard; markers; scissors; glue; grocery ads or magazines

Directions: Using www.mypyramid.gov/kids for a pattern, draw the food pyramid on a large sheet of paper or posterboard. Cut pictures out of grocery ads or magazines and glue them onto the pyramid in the appropriate spot. This is how people get their "power" to survive.

Energy Saver Switch Plate Cover

Materials: switch plate covers; permanent markers

Directions: Using permanent markers, write the words "Turn Me Off!" on a light switch cover, then decorate as desired. Replace your current light switch cover with this energy saving reminder. You can also use paint to decorate cover,



Button Toy

Materials: button or wood disc with 2 holes; 36" string; markers or paint

Directions: Decorate a 2-hole button or wood disk with markers or paint. Thread a 36" string through both holes and tie into a loop. Holding the ends of the string with both hands, with the button in the center. Place the button against your body or a table and roll it until the string is tightly wound. Then alternate pulling the hands apart and relaxing them back together. The button will make a great noise and will spin, first one way, then the other. This is an old-fashioned toy that uses you for its power,

Balloon Hovercraft

Materials: plastic soft drink bottle; sharp knife; large balloon

Directions: Cut off top from a plastic soft drink bottle. (Make sure the rim is perfectly flat). Punch an 1/8-inch hole in the cap. Blow up the balloon then pinching the neck to keep the air in, stretch the mouth over the bottle top. Once the balloon is secure, let go of the neck, and watch it go!

Pinwheel

Materials: Construction paper, brad, penny, straw, hole punch, scissors, pencil

Directions: Cut paper into a 6" x 6" square. Draw diagonal lines from corner to corner. Using the penny, trace a circle in the center. Cut the diagonal lines to the edge of the circle in the center. Punch 4 holes in the pinwheel, to the right of each cut close to the edge, and one in the center. Punch a hole through the top of straw using hole punch. Fold each corner, without creasing, to the center and fasten together with the brad. Push the brad through the hole in the top of the straw and loosely fasten the brad. Hold in the wind and watch the power of the wind!

Glow in the Dark Hats

Materials: Baseball cap; Glow-in-the-dark paint; Glitter; Black permanent marker; Glow-in-the-dark item (we used the kind that stick to the ceiling); Needle; Thread in contrasting color; Scissors

Directions: With the permanent marker, write the child's name on the cap. Using the needle and thread, sew the glow-in-the-dark item on the hat. Using the glow-in-the-dark paint, paint stars or aliens on the hat. Sprinkle glitter on the paint while wet. Let dry.

Balloon Rocket

Materials: balloons; string; tape; plastic straws

Directions: Cut the straw into 2-3" pieces. Feed the string through the straw pieces. Attach the string from wall to the other wall in the room. Blow up the balloon and hold the neck with your fingers so no air escape. Tape the balloon to a piece of straw. Let go of the balloon and watch it shoot across the room.

Melted Crayon Earth

Materials: Earth Pattern; Blue and Green Crayon Shavings; Wax Paper; Adult with Warm Iron

Directions: Place a piece of wax paper over Earth pattern. Sprinkle crayon shavings (sparingly!) on wax paper following the pattern. Place another piece of wax paper on top of shavings and a blank sheet of paper or a cloth over that. Gently press down with a warm iron. Crayon will melt quickly. Cut wax paper into a circle around the design. Tape or hang in window.



Litter Bug

Materials: Trash (Newspaper, String, Straws, Bottle Tops, Caps); Tacky Glue or Low Temp Glue Gun

Directions: Crumple up a piece of newspaper. Wrap another piece around it. Wrap with string and tie off to hold newspaper in a ball. Add straws, bottle tops, caps... anything to make it look like a litter bug.

Anemometer (device to measure wind speed)

Materials: glue; empty spool of thread; small block of wood; pencil; needle or thin nail; thin cardboard; scissors, stapler; foil muffin cups; bright sticker

Directions: Glue the spool to the block of wood. Wedge the pencil, eraser side up, into the spool. Cut 2 strips of cardboard 2' x 16'. In the middle of each piece, cut a slit so they stack together. Push them onto the needle allowing them to move freely. Staple a muffin cup onto each end, making sure that each cup points the same direction to catch the wind. Place the bright sticker on one of the cups. Place outside in the open. Using the sticker, count how many revolutions it makes in one minute.

CUB GRUB

Energy Bars

Ingredients: 1 egg; $\frac{1}{2}$ cup brown sugar; 1 teaspoon vanilla extract; 1 cup granola; $\frac{1}{2}$ cup raisins; $\frac{1}{2}$ cup chopped nuts; 1.69 ounce package candy-coated chocolate pieces

Instructions: Preheat oven to 350. Generously grease an 8x8 pan. Crack the egg into a bowl and add sugar and vanilla. Mix thoroughly. Stir in granola, raisins, nuts, and chocolate and mix well. Press firmly into prepared pan. Bake for 25 minutes. Cool and cut. Serves 8-12.

Lightning Bolt Cookies

Roll out sugar cookie dough (either store bought or homemade). Let the Cubs cut out lightning bolt shapes using a butter knife. Bake as directed. Frost with white or yellow frosting.

Cheese Lightning

Using a butter knife, cut a lightning bolt shape out of a slice of American or Swiss cheese.

RUN-ONS

Q - What did the light bulb say to the generator? A - *"I really get a charge out of you!"*

Q - How do you pick out a dead battery from a pile of good ones? A - *It's got no spark!*

Q - Why do transformers hum? A - *They don't know the words.*

Q - What did the baby light bulb say to the mommy light bulb? A - *"I love you watts and watts!"*

Q - Why was the free electron so sad? A - *It had nothing to be positive about!*

ACTIVITIES

Lightning in a Pan

http://www.yesmag.bc.ca/projects/lightning_pan.html

Materials: Aluminum pie plate; Ball-point pen; Thumb tack; Wool sock; Piece of styrofoam

Instructions: Push the thumb tack up through the center of the pie plate. Push the end of the pen on to the tack. Secure it with glue if necessary. Rub the styrofoam quickly with the wool sock. Pick up the aluminum pie plate with the pen and put it down on top of the Styrofoam. Be sure not to touch the pie plate with your hands. Turn out the lights and slowly bring your finger close to the pie plate. You should hear, feel, and see a tiny spark.

What's Happening? As you rub the styrofoam, it steals electrons from the wool and becomes negatively charged. Because like charges repel (move apart) and opposite charges attract (move together), the excess electrons on the styrofoam repel the electrons on the pie plate and push them to the top edge of the plate. The pen acts as an insulator, preventing the built-up charge from moving through you to the ground until you are ready. When you bring your finger close to the edge of the plate, the repelled electrons jump across the gap and escape through your body, giving you a small shock. When you turn off the lights, you should be able to see (as well as hear and feel) the discharge.

Candy Lightening

Make lightning - in your mouth. Go into a dark room and chew up a few Wint-O-Green LifeSavers while looking in the mirror. (This is one time when it's okay to chew with your mouth open!) Can you see the flashes in your mouth? Crunching the candy breaks the sugar crystals and builds up opposite electrical charges on the pieces. Electrons jump the pieces, colliding with nitrogen molecules to make invisible ultraviolet (UV) radiation. The candy's wintergreen flavoring absorbs the UV radiation and re-emits it as the spark you can see. It's science in your mouth. Try it!

Static Electricity Experiments

Materials: 2 inflated balloons with string attached; Your hair; Aluminium can; Woolen fabric

Directions:

1. Rub the 2 balloons one by one against the woolen fabric, then try moving the balloons together, do they want to or are they unattracted to each other?
2. Rub 1 of the balloons back and forth on your hair then slowly pull it away, ask someone nearby what they can see or if there's nobody else around try looking in a mirror.
3. Put the aluminium can on its side on a table, after rubbing the balloon on your hair again hold the balloon close to the can and watch as it rolls towards it, slowly move the balloon away from the can and it will follow.

What's happening? Rubbing the balloons against the woolen fabric or your hair creates static electricity. This involves negatively charged particles (electrons) jumping to positively charged objects. When you rub the balloons against your hair or the fabric they become negatively charged, they have taken some of the electrons from the hair/fabric and left them positively charged. They say opposites attract and that is certainly the case in these experiments, your positively charged hair is attracted to the negatively charged balloon and starts to rise up to meet it. This is similar to the aluminium can which is drawn to the negatively charged balloon as the area near it becomes positively charged, once again opposites attract. In the first experiment both the balloons were negatively charged after rubbing them against the woolen fabric, because of this they were unattracted to each other.

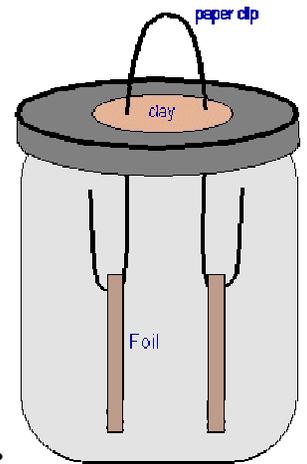
Field Trips

Arrange to visit a recycling plant; the water district; a power substation; or listen to a weather station through TV or radio. Tour a health spa or a gym. This could tell your den the importance of different exercises and why a balanced diet is needed. Be sure to invite parents to help with permission forms and transportation.

Charger

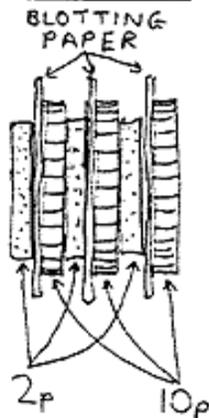
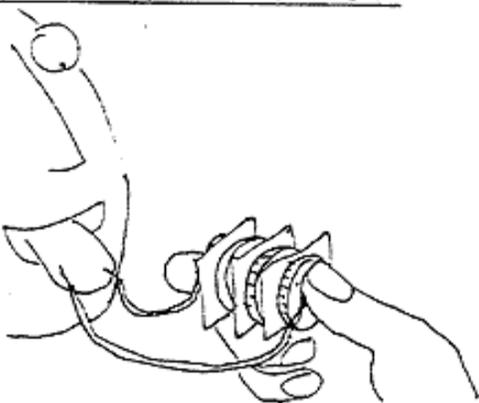
Materials: Scissors; Ruler; Aluminum foil; Pencil; Needle-nose pliers; Large paper clip; Poster board; 1-quart glass jar; Modeling clay; Masking tape; Wool scarf; 9-inch round balloon

Directions: Cut two $\frac{1}{2} \times 2$ inch strips of foil. Use the pencil to make a small hole near one edge of each piece of foil. Reshape the paper clip as shown in the picture. Cut a circle from the posterboard to fit over the jar's top. Use the pencil to make a hole in the middle of the posterboard. Push the loop of the paper clip through the hole in the paper circle. Mold a small piece of clay around the base of the loop to hold the paper clip in place. Hang the foil strips on the wire hooks. They should jiggle back and forth. If they do not, enlarge the hole with the pencil point. Place the paper circle over the mouth of the jar with the foil strips inside the jar. Tape the paper cover onto the mouth of the jar. Inflate the balloon and rub it on the scarf. Hold the balloon over the jar. The pieces of foil should move away from each other. This is because when you rub the balloon on the scarf you positively charge the balloon. When you move the charged balloon over the jar you charge both pieces of foil negatively. Because they're both charged negatively they repel or move away from each other.



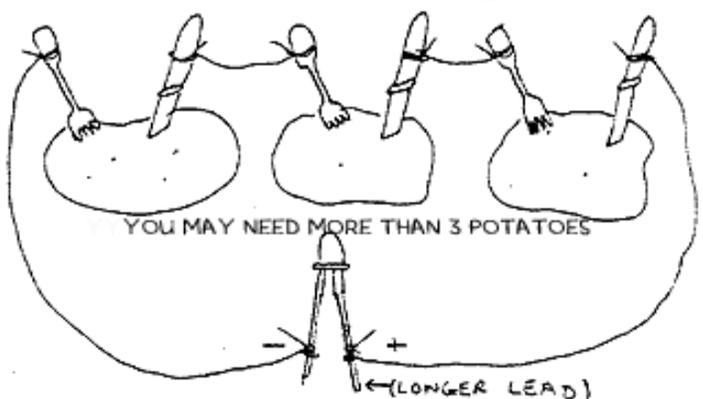
+ BATTERIES -

HOW TO MAKE A BATTERY OUT OF MONEY



ARRANGE BITS OF BLOTTING PAPER SOAKED IN SALT WATER BETWEEN COINS AS SHOWN. CLAMP OR HOLD PILE TOGETHER & INSERT WIRES TOUCHING OUTSIDE COINS. CURRENT DEVELOPED IS VERY LOW, BUT CAN BE DETECTED BY THE TONGUE. TOUCH WIRES TO TONGUE & YOU WILL FEEL A TINGLING SENSATION.

HOW TO MAKE A BATTERY OUT OF POTATOES



YOU WILL NEED A LIGHT EMITTING DIODE (FROM AN ELECTRONICS SHOP), SOME WIRE, POTATOES, SILVER PLATED FORKS & STEEL KNIVES. STICK A KNIFE & FORK IN EACH POTATO. CONNECT WIRES IN CIRCUIT AS ABOVE AND DIODE WILL LIGHT UP (WIRES MUST MAKE GOOD CONTACT & DIODE MUST BE CONNECTED RIGHT WAY ROUND).

AUDIENCE PARTICIPATION

Franklin Discovers Electricity

Franklin: "A Penny Saved"

Lightning: "Zap-Zap-Zap"

Experiment: "Try it! Try it! Try it!"

Electricity: "Shocking!"



It was the 1740's when Ben FRANKLIN started working with ELECTRICITY. He conducted many different EXPERIMENTS to try to understand more about it. His most famous EXPERIMENT being his kite flying one in June of 1752. FRANKLIN believed that LIGHTNING was a flow of ELECTRICITY taking place in nature. To test his hypothesis, he tied a metal key to a child's kite and flew the kite during a thunderstorm. The key became charged with ELECTRICITY, and Ben had proof that LIGHTNING is really a string of ELECTRICITY. His kite EXPERIMENT and his others helped him develop many of the words and terms that we still use today when dealing with ELECTRICITY: charge, discharge, conductor, minus, plus, electrician, electric shock, and others.

FRANKLIN's numerous EXPERIMENTS with LIGHTNING led to his invention of the LIGHTNING rod. The LIGHTNING rod is used to protect buildings and ships from getting struck by LIGHTNING. Benjamin FRANKLIN was a huge contributor to the field of ELECTRICITY. He is said to be the first man to discover anything spectacular about ELECTRICITY, and he is well known by people everywhere for that.

Unlike some other inventors in ELECTRICITY, FRANKLIN did not spend his entire life working with it. He invented many other things that had nothing to do with ELECTRICITY, such as bifocals, the FRANKLIN Stove, and the odometer. In 1831, he founded what is considered as the first public library. He wrote Poor Richard's Almanac, which was published from 1732 to 1757. He also established the first Fire department, and a police force. FRANKLIN was also a huge political power in colonial America. Benjamin FRANKLIN died at age 84 on April 17, 1790. He will forever be remembered for his contributions to ELECTRICITY and the rest of the world.

APPLAUSES

Lightning Bolt: Divide the audience into two groups. The first group yells "Zip!" The second group yells "Zap!" Then everyone yells "Boom!"

Light Bulb: Pretend you are screwing in a light bulb while saying "Bright, bright, bright!"

Power Up: Everyone crouches down and while standing, says "Power" then jumps in the air while shouting "up!"

Amateur Electrician: Fix light switch then turn on light and get shocked. Say: "Buzz-z-z-z," while shaking arm.

