PLANET ENERGY

4-H AGGIE ADVENTURES FOR KIDS

Utah State University
COOPERATIVE EXTENSION

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PLANET ENERGY

Aggie Adventures for Kids

CAMP DESCRIPTION:

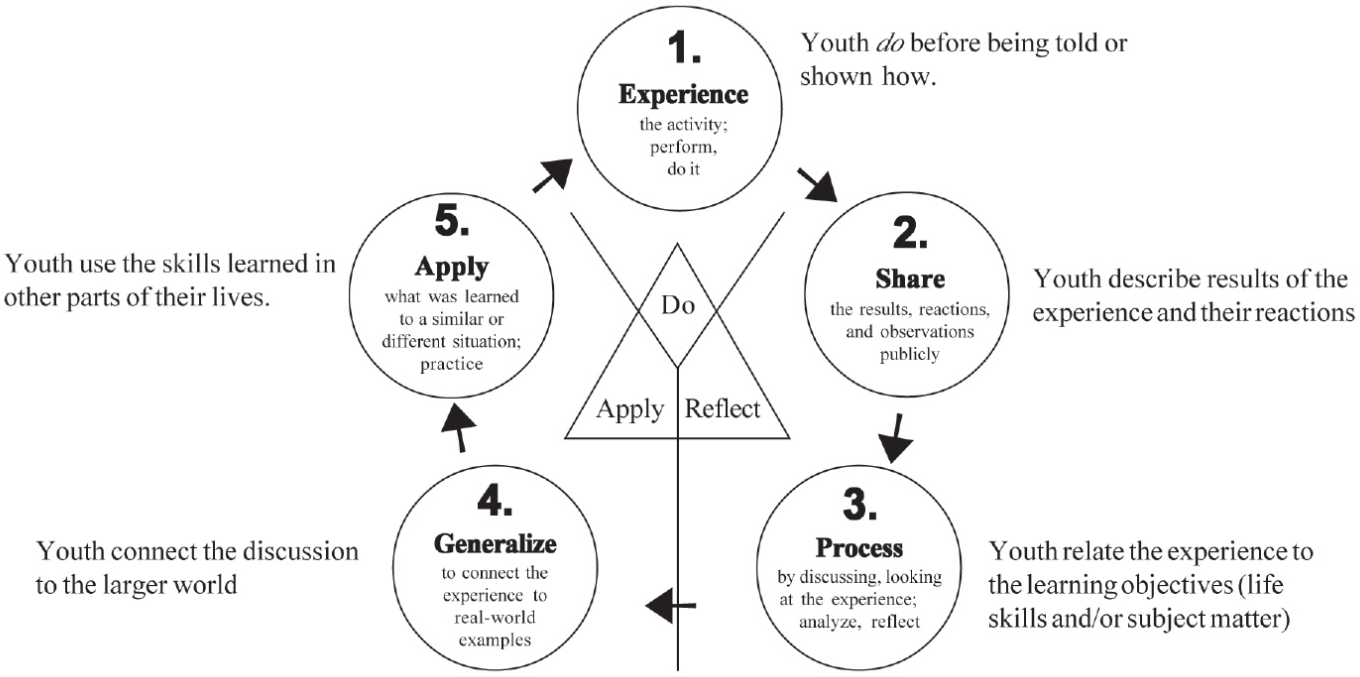
This camp involves learning about the powers of light, motion, and heat energy. We'll be launching a solar balloon, working with magnetism, experiencing solar energy, learning more about nature, and conducting energizing hands-on experiments!

GOAL:

To have students understand the work of scientists and to see the aspects of performing experiments. Students will also be able to relate to the work of scientists by doing hands-on and meaningful activities.

4-H "LEARNING BY DOING" - DO, REFLECT, APPLY LEARNING MODULE

The "Do, Reflect, Apply" approach allows youth to experience the learning process with minimal guidance from adults. Instead of being told the answers from activities, youth are exposed to experiential learning by using the following module:



Experiential learning is based on the theory of "learning from experiences". This camp and its activities are based on the "Do, Reflect, Apply" module, which will allow youth to: experience the activity, reflect on new knowledge, and apply the new knowledge and skills in many aspects of life.

PLANET ENERGY

Aggie Adventures for Kids

CAMP RULES:

1. Have a good attitude
2. Once split into groups you cannot change groups
3. Do not wander off without a counselor
4. Listen to instructions

SET UP:

Have desks facing the front of the classroom, facing a white board. Create a simple science journal for the kids to be working on when they come in.

GETTING STARTED:

Divide campers into small groups. This will depend on the size of the camp, but the groups should consist of 3-5 campers. Have one youth counselor in charge of each group of students if possible.

Let campers choose a name for their group. Keep the group names on theme with the camp. Let them choose from a list of different kids of natural energy or "Planet Energy". Each group will be able to share their energy with the camp. The counselors will help the campers for their group "sharing time."

EXAMPLES OF PLANET ENERGY:

Electricity
Magnetism
Wind
Sun
Solar
Water

**The times listed throughout this curriculum are the suggested times for a five day camp, held for three hour per day. We listed these times as a convenience only. The length of time needed to complete each activity is listed, so times and activities may be adapted to fit the needs of different camps.

PLANET ENERGY

Aggie Adventures for Kids

Dear Campers,

We're excited to have you join us at the 4-H Aggie Adventures Planet Energy Camp! We will be learning about the powers of light, motion, and heat energy. We'll be launching a solar balloon, working with magnetism, experiencing solar energy, learning more about nature, and conducting energizing hands-on experiments!

The Planet Energy camp will be held (DATE), from (TIME) in the Agriculture Systems Technology and Education (ASTE) building on the USU campus at 1498 North 800 East, Logan. Enclosed in this packet is a map to the ASTE building. If you have not yet paid the camp fee, please bring it the first day of camp (check or cash), along with the completed enclosed forms. Please read the following information, and contact us if you have any questions or concerns.
**Please drop campers off no earlier than 8:50AM and pick them up no later than 12:10PM.

(If you are unable to attend the camp, please notify us so we can accommodate others on the waiting list.)

- We may be spending some time outdoors, so please dress appropriately for the weather conditions.

- No toys or electronics will be allowed at camp. If you bring a cell phone, please turn it off or keep it on silent.

- Parents and guardians, please read and sign the enclosed 4-H Code of Conduct and Medical History forms. Campers who cannot abide by the Code of Conduct may be asked not to return.

- During camp, the Aggie Adventure staff can be reached by cell phone at (435) 770-2802.

We'll see you soon!

4-H Aggie Adventures for Kids
Office: (435)797-8444 Cell: (435)770-2802
aggieadventures@usu.edu

EXAMPLE OF CAMP LETTER

Aggie Adventures for Kids

(CAMP NAME)

We're excited to have you join us at the (Name of Camp) Science camp where we'll (Camp description, description of activities).

The Planet Energy of Science camp will be held (Date) from (time to time) at the (place). Enclosed in this packet is a map to the (_____) building and the drop-off area near the building. If you have not yet paid the camp fee, please bring it the first day of camp (check or cash). Please read the following information and the enclosed forms, and contact us if you have any questions or concerns.

- We may be spending some time outdoors, so please dress appropriately for the weather conditions.
- No toys or electronics will be allowed at camp. If you bring a cell phone, please turn it off or keep it on silent.
- Parents and guardians, please read and sign the enclosed 4-H Code of Conduct and Medical History forms. Campers who cannot abide by the Code of Conduct may be asked not to return.
- During camp, the Aggie Adventure staff can be reached by cell phone at (_____).

We'll see you soon!

4-H Aggie Adventures for Kids
Office: (435)797-8444 Cell: (435)770-2802
aggieadventures@usu.edu

YOUTH COUNSELOR

Information and Responsibilities

(For the Youth Counselor)

We are excited to have you participate as a youth counselor in our Aggie Adventure Summer Camp Program. The Aggie Adventure Camps are designed to give youth ages 4-11 opportunities to explore the world around them. As a counselor, you will assist the camp staff in running these camps. We look forward to working with you this summer.

We have included some important information that will help you as counselors to create a positive camp experience for everyone.

COUNSELOR RESPONSIBILITIES:

- Counselors will have their own small group of approximately 5-6 campers. Because of this, counselors must model appropriate behaviors at all times. Any counselor that does not display appropriate behaviors will not be allowed to participate in the program.
- Counselors are expected to teach their group in small group activities, and help manage all campers during large-group activities. Some camps will take field trips that require leaving campus. During field trips, counselors are responsible for keeping track of their groups.
- Counselors will be given staff t-shirts that they must wear during the camps. All other attire should be modest and weather appropriate as we will be spending time outdoors.

DAILY PROCEDURES:

- Be at the camp 30 minutes before camp starts to help set up.
- Stay after camp ends approximately 30 minutes or until camp is cleaned up.
- Know the activities that you will be teaching your groups that day (counselors will be provided the camp activities in advance).
- Have a positive attitude and help campers have a good time at the camps. If you are having fun, the campers will too.

SCHEDULE:

- Each counselor has been assigned specific weeks to come and volunteer at the camps. Once you have agreed to work at a camp, you must come on time every day you are scheduled.
- If something comes up and you have advanced notice that you will be unable to work a specific camp, you may call another counselor and see if they are willing to trade camps with you. If this happens, please notify the camp staff of the change immediately.

COUNSELOR INCENTIVES:

- Upon completion of 100 volunteer hours, or five camps, counselors will receive a life skill activity of their choice (piano lessons, ski pass, horseback riding lessons, guitar lessons, etc.).
- Incentives will be arranged with camp staff before counselors begin their volunteer hours.
- Counselors will receive their incentives at the end of the summer camp program.

EMERGENCIES:

- If any accidents happen, report them to the camp staff immediately.
- In case of an emergency, help keep the campers calm and follow directions given by camp staff.

UTILIZING
the Youth Counselor
(For the Facilitator)

GOALS:
- To teach knowledge and life skills which enhance quality of life.
- To create opportunities which promote positive youth development.

COUNSELOR RESPONSIBILITIES:
- Counselors will have their own small group of approximately 5-6 campers. Because of this, counselors must model appropriate behaviors at all times. Any counselor that does not display appropriate behaviors will not be allowed to participate in the program.
- Counselors are expected to teach their group in small group activities, and help manage all campers during large-group activities. Some camps will take field trips that require leaving campus. During field trips, counselors are responsible for keeping track of their groups.
- Counselors will be given staff t-shirts that they must wear during the camps. All other attire should be modest and weather appropriate as we will be spending time outdoors.
- Counselors are encouraged to interact with ALL campers in appropriate manners. They need to know that they are also considered "adults" in this situation.

DAILY PROCEDURES:
- Counselors are required to be at the camp 30 minutes before camp starts to help set up.
- Counselors are also required to stay after camp ends approximately 30 minutes or until camp is cleaned up.
- Counselors should get to know the activities that you will be teaching your groups that day (counselors will be provided the camp activities in advance).
- Counselors should be reminded to have a positive attitude and help campers have a good time at the camps. If you are having fun, the campers will too.

COUNSELORS IN THE CLASSROOM/INVOLVEMENT:
- Counselors should ALWAYS be encouraged to work with their groups and be involved in the activities for the day.
- It's important that counselors are encouraged to work with campers. Camps can be effective for campers as well as counselors.
- Counselors can be an effective classroom management tool. They should be encouraged to walk around their group and help their campers. By encouraging participation by all campers, behavioral and disruptive issues will be decreased.
- It's also important to realize that counselors are not only there to be the "run-around" people. Keep them involved throughout each activity.
- Always encourage TEAMWORK among counselors and campers. It's important that this is emphasized.

GROCERY LIST
and Daily Supplies

DAILY SUPPLIES: Scissors, crayons, glue, tape, craft sticks, paper towels, measuring spoons, measuring cups, plastic spoons, name tags, pencils. For Camps being held in Cache Valley, see page 67 of this packet for items that are in the USU Storage Shed.

DAY 1

- 2-3 pieces of each color: white, black, green, red, and blue construction paper, all the same size,
- (all per camper) one pizza box from a local pizza delivery store, newspapers, scissors/box cutter, clear plastic wrap/transparency, aluminum foil, 2 pieces black construction paper, chart paper and brown craft paper, a piece of notebook paper
- (all per camper) clear plastic drinking straw, clear narrow-necked plastic bottle (11- ounce water bottles work well), small plastic cup, ingredients for S'mores (marshmallows, graham crackers, chocolate), 2 dried lima beans
- 1 timer, 5-6 plastic soda bottles, 2-3 baking dish or other pan, 2 boxes plastic sandwich bags,
- 1 bag uniformly-sized ice cubes, water, food coloring, 1 bag soil, plastic scoop (for soil), 1-2 boxes modeling clay
- (all per group) 6 cups flour, 2 cups salt, 4 tablespoons cooking oil,
- dish washing detergent, vinegar, 1 box baking soda, 2-3 bottles rubbing alcohol (note: rubbing alcohol is poisonous so be careful with it)

DAY 2

- (all per camper) 1 sheet of 8 1/2" x 11" copier paper, 3 feet of paper streamer
- 4 styrofoam plates, 2 styrofoam bowls, 2 styrofoam cups, large lawn garbage bags, dry cleaning bags, 1 - coat hangers
- (all per camper) 1 tablespoon sugar, 1/2 cup milk or half & half, 1/4 teaspoon vanilla, 6 tablespoons rock salt, 1 pint-size Ziploc plastic bag (2 boxes), 1 gallon-size Ziploc plastic bag, ice cubes
- scotch tape, construction paper, crepe paper, paper punch ,masking tape,
- (all per group) 1 hair dryer, 1 box of bendy straws, string, black paint (non-water soluble spray paint is easiest), liquid dish soap, large disposable pie plate, small disposable pie plate, clear plastic food wrap, newspapers
- 1 inflatable wading pool filled with water,
- thermometer, 3-4 kinds of sunscreen, color changing UV beads (stevespanglerscience.com)

GROCERY LIST
and Daily Supplies

DAILY SUPPLIES: Scissors, crayons, glue, tape, craft sticks, paper towels, measuring spoons, measuring cups, plastic spoons, name tags, pencils. For Camps being held in Cache Valley, see page 67 of this packet for items that are in the USU Storage Shed.

DAY 3

- (all per camper) 5 drinking straws, 1- 4x6 inch index card, 4 Life Savers® (hard, individually-wrapped mints work best), 15-20 paper clips, 2-4 paper cups, 1 plastic bag, several rubber bands, sheet of paper
- kite string, 2-3 electric fans
- (all per group) bowl of cold water, coin (bigger than the bottle opening), glass Coke/Root beer bottle with a small opening/mouth), two plastic soda bottles (1 or 2 liter size)
- 2-3 pitchers
- stopwatch or watch, 2-3 fluorescent lights, 1 package of balloons, one wool sweater
- 5 Geyser Tubes (stevespanglerscience.com), Solar Bag (stevespanglerscience.com), 6-7- 2 liter bottles of various diet soda, 6-7 rolls of Mentos-minty and fruity flavors

DAY 4

- (all per camper) 4-5 sheets of newspaper, a piece of cardboard
- (all per group) glass bowl, 2-3 per paper-clips, 1-2 clear glasses, 2 potatoes or any fruits, 2 small cups of garden dirt, water, 2 forks, 1 lemon-halved, 1 Green Science Enviro Battery Kit: (purchased from: www.4m-ind.com), 2 Solar Racers (stevespanglerscience.com), tracks,
- hot water, 2 boxes cornstarch (2 boxes) aluminum foil, wooden spoon, a plastic spoon
- decorations for your paper, like construction paper scraps, dried flowers, confetti, or glitter
- timer, a magnet
- baby oil or vegetable oil, food coloring, water
- clear plastic bottle with lid (small) (baby soda bottles from stevespanglerscience.com)

GROCERY LIST
and Daily Supplies

DAILY SUPPLIES: Scissors, crayons, glue, tape, craft sticks, paper towels, measuring spoons, measuring cups, plastic spoons, name tags, pencils. For Camps being held in Cache Valley, see page 67 of this packet for items that are in the USU Storage Shed.

DAY 5

- (all per camper) colored cardstock, masking tape, 2 popsicle sticks, aluminum foil, 2 Sun Print Paper (purchased from stevespanglerscience.com)
- 1- 9-volt battery, 1 buzzer
- 1 container salt
- (all per camper) cardboard and push pins to keep your prints in place or a shallow tub where the paper will be protected from blowing away in the wind
- objects to take a "picture" of on the photosensitive paper
- (1-2 per camper) fresh mushrooms (Use one with a flat cap that hasn't opened yet.)
- 1 can of non-aerosol hairspray (Aqua-Net works well)

DAY 1
PLANET ENERGY

Activities for the day:

Camper Check In
Introduction to Camp
What Color Absorbs the Sun's Energy Best?
Build a Pizza Box Solar Oven
Make a Thermometer
Plant the Lima Beans
Build a Volcano

UtahStateUniversity
COOPERATIVE EXTENSION

WEEK CAMP: 9-12 STARTER ACTIVITY

Aggie Adventures for Kids

9:00-9:15 Starter Activity:	• Have kids go outside with the counselors to play a game, while you finish registering all the campers. Example Starter Activities: • Children will sit in a circle, say their name and favorite ice cream. • On stickers or pieces of paper, write several animal names (make sure that each animal is written twice). Children can't talk, but they have to find their partner making the noise of that animal. • The name game: everyone sits in a circle. The first person says their name. The person on the left says their own name plus the first persons name. The next person says their own name, the 2nd person's name and the 1st person's name. This continues until the last person must name everyone in the circle. • Have a coloring page or crossword puzzle for kids to be working on while other kids arrive. • Have kids play a quick game outside with counselors.
9:15-9:30 Science Camp Basics to Know:	• Talk to campers about what they think a scientist is. Tell them that a scientist is according to the dictionary a person who studies science. And science is knowledge (of something) acquired by study or also the observation, identification, description, experimental investigation, and theoretical explanation of phenomena. • Scientist figure out why big/little things happen that have to do with chemicals, nature, all sorts of things. Talk about how scientists have to perform experiments to figure out the answers to their questions. How they have to try different experiments with different components etc. Explain to campers that we will be performing experiments and sometimes they may not work exactly how we planned. That's part of being a scientist sometimes you think things are going to work that don't etc. This can be frustrating but we just have to keep working on the experiment or activity.

ABSORBING THE SUN'S ENERGY

Aggie Adventures for Kids (9:25 - 9:40)

What to "Do":

1. Ask students to predict (and record their prediction in their journal - see pages 67-70), which color will melt an ice cube first.
2. Place sheets of construction paper in a sunny window or outside in direct sunlight.
3. Place an ice cube in the center of each sheet of construction paper.
4. Start a timer.
5. Observe the rate at which each ice cube melts.
6. Record the time it takes for each ice cube to completely melt. Students can record their observations of the experiment in their journals.

Reflect:

- On a hot day, would you rather wear white clothes or black clothes? Why?
- Why did the black paper melt the ice cube faster?
- Would any dark color of paper work fast?

continued...

TIME: 15 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will learn about heat and light with this simple experiment.

MATERIALS:
- White, black, green, red, and blue construction paper, all the same size
- Timer
- Uniformly-sized ice cubes

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

This activity was taken directly from: http://www.wattsonschools.com/pdf/le-1.pdf

ABSORBING THE SUN'S ENERGY CONTINUED...

Aggie Adventures for Kids (9:25 - 9:40)

Apply:

- Of all the colors of the rainbow, black is the most absorbent. This is because black materials absorb light.

- Students learn that some colors are better at absorbing or reflecting light and heat than others. This lesson can be applied to deciding what clothes to wear. Some colors are better at keeping things cool in the summer, while others are better at keeping things warm in the winter.

- When a black material absorbs light, some of the energy in the light is transferred to the molecules composing the black material. This causes the molecules composing the black material to vibrate more quickly, which leads to a rise in temperature. Therefore, some of the light energy absorbed by black materials is converted to heat energy. On the other hand, shiny or white substances reflect almost all colors of light, and therefore do not experience such a large temperature change.

- This is the reason black is best worn in cold weather, since it takes in more light energy and changes it to heat, and white is best worn in hot weather, since it reflects light energy.

- This phenomenon also explains the use of black in the construction of solar water heaters, which are designed to heat water using energy from the sun.

- The heart of a solar water heater is the solar collector, which is like a box painted black on the inside and with a transparent lid. The transparent plate of glass or plastic allows the solar radiation to get inside the box, and the black interior is made to absorb as much solar radiation as possible. Water travels through black tubes inside the box, where it is heated by the sun.

This activity was taken directly from: http://www.wattsonschools.com/pdf/le-1.pdf

BUILD A PIZZA BOX SOLAR OVEN

Aggie Adventures for Kids (9:40 - 10:20)

What to "Do":

1. Campers need to make a prediction in their journals before beginning.
2. Make sure the cardboard is folded into its box shape and closed. Place the piece of notebook paper in the center of the lid of the box and trace its outline on the lid. Put the piece of paper aside.
3. Carefully cut the two long edges and one of the short edges of the rectangle that you just traced on the lid of the box, forming a flap of cardboard.
4. Gently fold the flap back along the uncut edge to form a crease.
5. Wrap the underside (inside) face of this flap with aluminum foil. Tape it on the other side so that the foil is held firmly. Try to keep the tape from showing on the foil side of the flap. The foil will help to reflect the sunlight into the box.
6. Open the box and place a piece of black construction paper in so it fits the bottom of the box. This will help to absorb the sun's heat.
7. Close the box, roll up some newspaper, and fit it around the inside edges of the box. This is the insulation that helps hold in the sun's heat. It should be about 1 to 1 1/2 inches thick. Use tape to hold the newspaper in place, but only tape it to the bottom of the box, not the lid.
8. Cut two pieces of plastic wrap an inch larger than the flap opening on the box top. Open the box again and tape one piece of plastic wrap to the underside of the flap opening. After taping one side, BE SURE TO PULL THE PLASTIC WRAP TIGHT, and tape down all four sides so the plastic is sealed against the cardboard. Then close the box and tape the other piece of plastic wrap to the top of the flap opening. Again, be sure the plastic wrap is tight and tape down all four edges to form a seal. This creates a layer of air as insulation that helps keep the sun's heat in the box.

continued...

TIME: 40 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will learn about solar energy and how heat and light can cook food

MATERIALS:

- One pizza box from a local pizza delivery store. Newspapers
- Tape, scissors/box cutter
- Black construction paper
- Clear plastic wrap/ Transparency
- Aluminum foil
- A piece of notebook paper
- A pencil or pen, a ruler or a wooden dowel or a stick
- Ingredients for S'mores (Marshmallows, Graham Crackers, Chocolate)

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

This activity was taken directly from: http://www.solarnow.org/pizzabx.htm

BUILD A PIZZA BOX SOLAR OVEN CONTINUED...

Aggie Adventures for Kids (9:40 - 10:20)

Reflect:

- Does it matter if we use tinfoil or not?
- How does the heat stay in the box?

Apply:

- On a sunny day, pick a treat to warm up and carry it and the box outside to a sunny spot.
- If it's cold outside, put a towel or blanket under the box so the bottom doesn't get cold.
- Open the box, put the treat in the center, and close the box. Now open the flap and turn the box so the foil is facing the sun. The shadow of the flap should go straight back from the back of the box.
- Move the flap up and down and note how it reflects the sunlight.
- Use a dowel, ruler, or stick to prop up the flap so that it bounces the sunlight into the box.
- Wait about a half hour for the box to warm up in the sun. Then enjoy your warmed-up treat!

This activity was taken directly from: http://www.solarnow.org/pizzabx.htm

GAME & MAKE A THERMOMETER

Aggie Adventures for Kids (10:20 - 10:40, 10:40 - 11:00)

What to "Do":

1. Pour equal parts of tap water and rubbing alcohol into the bottle filling about 1/8 to a ¼ of the bottle.
2. Add a couple of drops of food coloring and mix.
3. Put the straw in the bottle, (DO NOT DRINK MIXTURE) but don't let the straw touch the bottom.
4. Use the modeling clay to seal the neck of the bottle, so the straw stays in place.
5. Now hold your hands on the bottle to warm it and watch what happens to the mixture in the bottle.

Reflect:

- What happened when we put the thermometers in the sun?
- Would the thermometer work in the shade?

Apply:

- A thermometer is an instrument that measures the temperature. Temperature is measured in a scale called Fahrenheit (in the United States) and in Celsius or Centigrade (in many other countries). The point where water freezes is 32° Fahrenheit (F for short) and 0° Celsius (C). The point where water boils is 212°F and 100°C. If you want to know how to convert from F to C or from C to F, see the end of this page. Some scientific thermometers use the Kelvin scale, where 0° Kelvin is called absolute zero - a place where there is no movement of any parts of matter, where substances have no thermal energy. It's about minus 273. 15°C (below 0° C) or 459.67° below 0° F. Scientists have never been able to measure anything at absolute zero. Thermometers help us know what the weather is like. If it will be 90°F outside, we're not going to put on a winter coat. Or if it's below zero, we won't be wearing shorts. This activity presents a way to show how a simple thermometer works. In the thermometer we made in this activity, the air in the bottle expands when it is warmed. This makes the liquid no longer fit in the bottom of the bottle. As the air expands it forces the colored liquid mixture to move up through the straw. If the bottle were to get very hot, the liquid would come out through the top of the straw.
- Students can watch the thermometer and see how the liquid changes throughout the day.
- This is to see how a thermometer works just for fun.
- After students are finished, dispose of the liquid properly and rinse the bottle well. Cut it in half, or have a teacher cut it in half, so the bottle can't be reused. Then recycle the plastic. The used bottle could have some left over alcohol in it, and you don't want anyone to reuse the bottle for drinking water.

TIME: 40 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will see how thermometers work and will be able to build their own.

MATERIALS:
- Tap water
- Rubbing alcohol (note: rubbing alcohol is poisonous so be careful with it)
- Clear, narrow-necked plastic bottle (11-ounce water bottles work well)
- Food coloring
- Clear plastic drinking straw
- Modeling clay

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

This activity was taken directly from: : "THE NEED PROJECT" 1-800-875-5029

PLANT THE LIMA BEANS

Aggie Adventures for Kids (11:00 - 11:30)

What to "Do":

1. First of all, soak the seed only overnight.
2. Invite children to work in small groups to prepare the first experiment. Provide children with a plastic cup. Assist them in filling their cups halfway with soil. Place two lima beans in the soil. Cover with more soil. Add water. Write each child's name on a piece of masking tape and attach to the cups. Place the cups in a plastic bin or container to prevent it spilling and keep them in a sunny area of the room.
3. For the next experiment, provide each child with a plastic sandwich bag, a damp paper towel, and two lima beans. Ask children to carefully wrap their lima beans in the damp paper towel and then place them into the plastic bags. Label children's bag with their names. Find another sunny area in the classroom to place the bags.
4. Plan a time each day for children to observe the growth of their beans. Remind children to water their beans when the soil feels dry and to dampen the cloth if it becomes dry.

Reflect:

- How does our lima bean grow?
- Would it grow if we left it in the shade?
- Can you give a plant too much water? Too little water?

Apply:

- Lima beans are seeds! They need sunlight to grow water too!
- Just like us, plants need sunlight and nutrients to stay alive. So you think people need sunlight? We do!
- It's good for you to be in the sun, but remember to wear sunscreen when we go outside to keep our skin healthy!

TIME: 30 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will see how the sun helps grow our food and will get to take the plant home. We will be observing our beans all week!

MATERIALS:

- Dried lima beans
- Paper towels
- Plastic sandwich bags
- Small plastic cup or milk container
- Soil
- Chart paper and brown craft paper
- Marker
- Plastic scoop (for soil)

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

BUILD A VOLCANO

Aggie Adventures for Kids (11:30 - 12:00)

What to "Do":

1. First make the 'cone' of the baking soda volcano. Mix 6 cups flour, 2 cups salt, 4 tablespoons cooking oil, and 2 cups of water. The resulting mixture should be smooth and firm (more water may be added if needed).
2. Stand the soda bottle in the baking pan and mold the dough around it into a volcano shape. Don't cover the hole or drop dough into it.
3. Fill the bottle most of the way full with warm water and a bit of red food color (can be done before sculpting if you don't take so long that the water gets cold).
4. Add 6 drops of detergent to the bottle contents.
5. Add 2 tablespoons baking soda to the liquid.
6. Slowly pour vinegar into the bottle. Watch out - eruption time!
7. Campers need to record their observations in their journals.

Reflect:

- What happened when we added the vinegar?
- Would it make a difference if we added more vinegar? More baking soda?

Apply:

- The cool red lava is the result of a chemical reaction between the baking soda and vinegar.
- In this reaction, carbon dioxide gas is produced, which is also present in real volcanos.
- As the carbon dioxide gas is produced, pressure builds up inside the plastic bottle, until the gas bubbles (thanks to the detergent) out of the 'volcano'.
- Adding a bit of food coloring will result in red-orange lava!
- Orange seems to work the best. Add some red, yellow, and even purple, for a bright display.

TIME: 30 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will see chemical reactions at it's best as we build our own volcanos!

MATERIALS:

- 6 cups flour
- 2 cups salt
- 4 tablespoons cooking oil
- Warm water
- Plastic soda bottle
- Dish washing detergent
- Food coloring
- Vinegar
- Baking dish or other pan
- Baking Soda

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

DAY 2
PLANET ENERGY

4-H AGGIE ADVENTURES FOR KIDS

Activities for the day:

Camper Check In
Crazy About Kites
Soap Powered Boat
Hot Air Balloon
Game & Making Ice Cream
Color Changing UV Beads
Collecting Energy: Is Bigger Better?
Wind Catcher

UtahStateUniversity
COOPERATIVE EXTENSION

CRAZY ABOUT KITES

Aggie Adventures for Kids (9:10 - 9:35)

What to "Do":

1. Fold the paper in half.
2. On each side of the paper, draw two dots: one 3 inches in from the fold (Point A) and the second 1 inch in from the fold (Point B). Draw a line between Points A and B.
3. Fold the paper on these lines to make the wings.
4. Put tape over the center line. Tape on the wooden skewer and tail.
5. Flip the kite so it rests on its top. Fold the flap back and forth a couple of times until it stands straight up from the wings.
6. Punch a hole in the flap three inches from the smallest end of the flap.
7. Tie one end of the string to the hole. You're ready to fly!
8. Fly your kite. Here are some tips for flying your kite:
9. Your body can block the air that the kite needs to fly properly. Keep the kite away from your body by holding it with your arm straight out to the side.
10. Hold the string lightly where it attaches to the kite. Let it out gradually when the kite tugs as it begins to fly.

Hints for flying your kite:

1. Your body can block the air that the kite needs to fly properly. Keep the kite away from your body by holding it with your arm straight out to the side.
2. Hold the string lightly where it attaches to the kite. Let it out gradually when the kite tugs as it begins to fly.
3. Try walking at different speeds. Just be sure the runway is clear.

Reflect:

- What is important to have when building a kite?
- Can you make your kite too light? Too heavy?
- What helped your kite to fly?

TIME: 25 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Students will test their critical thinking skills as they build their own kites and try them against wind power.

MATERIALS:
- 1 sheet of 8 1/2" x 11" copier paper
- 3 feet of paper streamer
- Scissors
- 4 straws
- Tape
- String
- Ruler

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

continued...

This activity was taken directly from: http://pbskids.org/fetch/parentsteachers/activities/act/act-goflyakite.html

CRAZY ABOUT KITES CONTINUED...

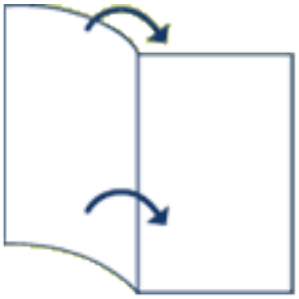
Aggie Adventures for Kids (9:10 - 9:35)

Apply:

Whether they're building a kite or designing a rocket, people use a similar process to figure out a problem:

- Identify a problem. How can I make my kite fly better?
- Brainstorm solutions. One idea is to use a longer tail.
- Test an idea. The kite flew okay when it had a tail twice as long as its body.
- Revise the design. Let's try an even longer tail. Share what you learned. My kite flew best when its tail was four times as long as its body.
- How do kites stay in the air? Remember, air is something - it is made of gas particles, such as oxygen, carbon dioxide, and nitrogen. As kites move through the air, the air pushes on the kite. But to keep a kite up, the air has to keep moving. Think of a water skier. If the boat pulling a water skier stops, the water skier sinks. So for the kite to stay up, either you need to pull the kite through the air, or the wind needs to blow against the kite. To keep a kite from falling, the upward force of the air hitting it must equal gravity's downward pull.

1.



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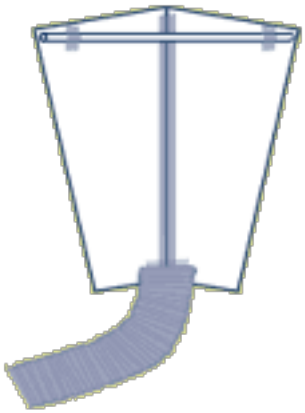

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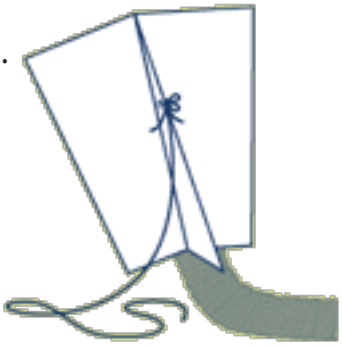

This activity was taken directly from: http://pbskids.org/fetch/parentsteachers/activities/act/act-goflyakite.html

SOAP POWERED BOAT

Aggie Adventures for Kids (9:35 - 9:55)

What to "Do":

1. You'll need a place to experiment with your boats like the bathtub or an inflatable wading pool. Make sure it's okay to fill up the tub or wading pool before you get started.
2. To make a boat, glue two plates together face to face so that their top edges meet.
3. Glue the bowl upside down on top of one of the plates.
4. Poke a hole near the bottom of the cup and glue the bottom of the cup to the bottom of the bowl.
5. Put the short end of the bendy straw through the hole in the cup. The other end of the straw should point down. Make two boats.
6. When the glue dries, decorate your boats with paints or markers.
7. To make your boat move, just set it on the water, pour water into the cup and watch it go.
8. Now here's where things get sudsy. To try it out; mix some liquid dish washing soap with water and pour it into the cup on top of the boat. What other liquids might affect the speed of your boats? Try powering a boat with fizzy water, sugar water or any other kind of liquid you can think of.

Reflect:

- How do you think the boat moved forward?
- Are there things we could change on our boat to make it go faster?
- Did the boat go faster the first time of the second?

Apply:

- When you put water into a cup without a hole, the water pushes on the cup in all directions. When you put a hole in the cup, part of the cup is missing, so the water can no longer push there. But the water is still pushing on the other parts of the cup. That's what moves the cup and the boat along.
- What's all the suds about soap, you ask? The attraction between water particles at the water's surface produces surface tension. This gives the surface a skin-like quality. Think of this thin, skin-like quality like a balloon. Adding liquid soap is like popping the balloon. You break the surface tension; the thin "skin" breaks and pulls away to the sides. If there's something floating on these water particles, like the boat, it goes along for the ride.

TIME: 20 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will learn about water particles and surface tension!

MATERIALS:

- 4 Styrofoam plates
- 2 Styrofoam bowls
- 2 Styrofoam cups
- 2 bendy straws
- Glue
- Water
- Liquid dish soap
- Inflatable wading pool filled with water

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

This activity was taken directly from: http://pbskids.org/zoom/activities/sci/soappoweredboatii.html

HOT AIR BALLOON

Aggie Adventures for Kids (9:55 - 10:15)

What to "Do":

1. Can you make a hot air balloon? It doesn't have to carry people, but it has to go high.
2. You can use garbage bags, dry cleaning or shopping bags, straws, coat hangers, string, and scotch tape. Use a hair dryer to create hot air. Before you start, make sure to get permission from an adult to use the hair dryer.

Reflect:

- How did you use your materials to build your balloon?
- Did you get it to float?
- How high?
- Why do you think hot air balloons rise?
- What do you think would happen to your balloon if you put more or less hot air into it?

Apply:

- In a hot air balloon, a gas burner is used to heat air to a temperature of about 212°F (100°C).
- Since hot air is lighter and less dense than the cool air around the balloon, the heated air causes the whole balloon to rise.
- When the air inside the balloon cools down, or when the hot air is let out, the balloon goes down.

TIME: 20 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will experiment with building a simple hot air balloon and will learn about air density.

MATERIALS:
- Large lawn garbage bags
- Dry cleaning bags
- Straws
- Coat hangers
- String
- Scotch tape
- Hair dryer

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

This activity was taken directly from: http://pbskids.org/zoom/activities/sci/hotairballoon.html

GAME & MAKING ICE CREAM

Aggie Adventures for Kids (10:15 - 10:55)

What to "Do":

Milk can become ice cream in five minutes! This homemade ice cream in a bag is a summertime delight for kids and adults alike.

1. Fill the large bag half full of ice, and add the rock salt. Seal the bag.
2. Put milk, vanilla, and sugar into the small bag, and seal it.
3. Place the small bag inside the large one and seal again carefully.
4. Shake until mixture is ice cream, about 5 minutes.
5. Wipe off top of small bag, then open carefully and enjoy

TIPS: To make a larger amount, try doubling the recipe. Anything larger might be too big for kids to pick-up, because the ice itself is quite heavy.

Reflect:

- Why did we need to add salt to make our ice cream?
- Can we make ice cream without ice?

Apply:

- Ice has to absorb energy in order to melt, changing the phase of water from a solid to a liquid.
- When you use ice to cool the ingredients for ice cream, the energy is absorbed from the ingredients and from the outside environment (like your hands, if you are holding the baggie of ice)! When you add salt to the ice, it lowers the freezing point of the ice, so even more energy has to be absorbed from the environment in order for the ice to melt. This makes the ice colder than it was before, which is how your ice cream freezes.
- Ideally, you would make your ice cream using 'ice cream salt', which is just salt sold as large crystals instead of the small crystals you see in table salt.
- The larger crystals take more time to dissolve in the water around the ice, which allows for even cooling of the ice cream.

TIME: 30 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will be making their own ice cream using their own "energy" while also seeing more chemical reactions.

MATERIALS:

- 1 tablespoon sugar
- 1/2 cup milk or half & half
- 1/4 teaspoon vanilla
- 6 tablespoons rock salt
- 1 pint-size Ziploc plastic bag
- 1 gallon-size Ziploc plastic bag
- Ice cubes

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

COLOR CHANGING UV BEADS

Aggie Adventures for Kids (10:55 - 11:20)

What to "Do":

1. Make a prediction on which sunscreen is best in the journal.
2. With all of the SPF (Sun Protection Factor) numbers available, we want to know what SPF lotion really works best at keeping out the sun's harmful UV rays.
3. Start by collecting various strengths of sunscreen (SPF 4, 15 and 50, for example).
4. Since the UV Color-Changing Beads are very sensitive to changes in UV energy, you can use the beads to determine the blocking potential of the sunscreen.
5. Place the beads in a Ziploc bag and apply a layer of sunscreen to the outside of the bag.
6. Use a permanent marker to write the SPF number of the sunscreen you're testing on the outside of the bag.
7. Be sure to set-up one bag without any sunscreen coating for comparison purposes.
8. Expose the beads to direct sunlight for 5 minutes and look for any changes in color.
9. The beads will always change color regardless of how good the sunscreen blocks UV - the beads are very sensitive!
10. The key is to rate the color of the beads on a scale of 1-5, with 5 showing the most color or "burning" and 1 showing the least color.
11. The bag without any sunscreen is an automatic "5".
12. You can also test the difference between new and old sun screen. Sunscreen manufacturers suggest that you throw away old sun screen because it does not block out harmful UV light.
13. Campers need to record their observations in their journal.

Reflect:

- Which sunscreen worked the best?
- If the sun does this to beads, do you think it's very harmful to our skin?
- What is one thing you learned by doing this experiment?

continued...

TIME: 25 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will learn about UV rays by testing sunscreen on UV beads!

MATERIALS:
- Color Changing UV Beads (stevespanglerscience.com)
- String
- Sunscreen
- Ziploc bags

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

This activity was taken directly from http://www.stevespanglerscience.com

COLOR CHANGING UV CONTINUED...

Aggie Adventures for Kids (10:55 - 11:20)

Apply:

Steve Spangler stated the following:

- UV Beads have a chemical substance embedded into the plastic that will change color when exposed to UV radiation (sun light). The beads will remain white indoors as long as they are kept away from windows or doors where UV light can leak into the room.

- The UV Beads contain different pigments that change color when exposed to ultraviolet light from any source including the sun. The beads are all white in visible light. In UV light, depending on the pigment added to each bead, you will see different colors. Each bead will change color about 50,000 times before the pigment will no longer respond to UV light.

- The term "light" is often used as a generic word to describe many different forms of light such as incandescent light, fluorescent light, or sunlight, for instance. However, not all light is made up of the same energy. Using Energy Beads, you will be able to uncover an invisible form of light energy called ultraviolet light. None of the energy in the ultraviolet region of the light spectrum is visible to the naked eye. Just as there are many different colors of wavelengths in the visible spectrum (red, yellow, green, blue...), so are there many wavelengths of ultraviolet light.

- First, there is long wave ultraviolet light (300 to 400 nanometers), which most of us recognize as "black light" the light that is often used to make decorations glow in discos and theatrical productions. Long wave UV passes easily through plastic and glass.

- Short wave ultraviolet light (100 to 300 nm) is used to kill bacteria, hasten chemical reactions (as a catalyst), and is also valuable in the identification of certain fluorescent minerals. Unlike long wave UV, the short wave UV cannot pass through ordinary glass nor most plastics. The shortest wavelengths cannot even travel very far through the air before being absorbed by oxygen molecules as they are converted into ozone.

- UV Beads are the perfect tool for understanding how solar radiation can be harmful and to recognize preventative measures that can be taken to reduce the risks associated with exposure to sunlight. When you expose bare skin to sunlight, your skin will either burn or tan (which doctors warn is still not healthy for your body). UV radiation wavelengths are short enough to break chemical bonds in your skin tissue and with over prolonged exposure, your skin may wrinkle or skin cancer may appear. These responses by your skin are a signal that the cells under your skin are being assaulted by UV radiation.

This activity was taken directly from http://www.stevespanglerscience.com

COLOR CHANGING UV CONTINUED...

Aggie Adventures for Kids (10:55 - 11:20)

Additional Tests

LIGHT TEST

- Place a handful of UV beads near a fluorescent light. Do any of the beads change color? Can you get a sun burn or a tan by sitting next to a fluorescent light?

BLACK LIGHT

- "Black light" (long wave ultraviolet light) can also be used to change the color of the beads. You can purchase a black light at many specialty stores or hardware stores that have a large section of light bulbs. Steve Spangler Science also sells them. Sometimes those high intensity lights (mercury vapor) found in a gymnasium emit just enough UV light to make the beads barely change color.

CLOUDY DAY

- Test to see if the beads change color on cloudy day. If they change color, then you can see why doctors warn people to wear sunscreen even on a cloudy day. Observe how well the beads change color when exposed to sun light at different times of the day. According to your data, what time of day does the sun give off its most intense UV light?

SUNGLASSES

- Test the ability of your sunglasses to block out ultraviolet light by covering a few beads with the lens of your sunglasses. If the bead do not change color, your sunglasses block out harmful ultraviolet light from your eyes. If not, you paid too much for that UV coating!

UV FILTERS

- Test a variety of glass and plastic containers to determine which materials block out UV light. Place different transparent filters between a UV light source and the beads. Try eyeglasses and UV absorbing window film. You will find that the front windshield of most automobiles absorbs UV radiation. Usually the side windows do not have this built-in protection.

MAKE A UV BEAD BRACELET

- Thread a few beads onto a piece of leather rawhide or string to make a bracelet. Remember to stay away from any door or windows where ultra-violet light could come into the room. When you're finished, cover the bracelet with your hand and walk outside into the sunlight. Don't take your eyes off the beads as you expose them to sunlight. Like magic the beads change from white to a rainbow of colors.

This activity was taken directly from http://www.stevespanglerscience.com

COLLECTING ENERGY: IS BIGGER BETTER?

Aggie Adventures for Kids (11:20 - 11:40)

What to "Do":

1. Before conducting the activities, prepare the pie plates by painting their insides black. Also create a table (on paper or on the blackboard) for students to record their observations, as shown below.
2. When the paint dries, add a measured amount of water (100 ml. or 1 cup) to each pie plate.
3. Record the temperature of the water in each plate in science journals.
4. Wrap plastic tightly around the top of the pie plate, and tape the plastic securely.
5. Place each pie plate on a newspaper in the sun for 10 minutes.
6. Now pour the water into Styrofoam cups and measure the temperatures. Record the temperatures on the table in the science journal.

Reflect:

- Why paint the plates black?
- Why use plastic wrap?
- Why use newspapers?
- Why pour the water into cups before taking the temperature?
- Which plate had the hotter water?
- How can this information help you design a solar collector?
- Is solar energy free?
- Do bigger solar collectors collect more energy than smaller collectors?

Apply:

- More solar energy can be collected by increasing the size of the collector.
- The percentage that can be collected depends on the amount of sunlight that is available in a particular area. In central and southern Texas a solar collector with 60 to 80 square feet can provide hot water for the average family. In northern Texas more collector area is recommended. One major problem with solar energy is that it is spread out and very dilute.
- In order to collect a usable amount of energy, a large area must be exposed to the sun.
- Before conducting the activity, the instructor can ask students to predict the water temperatures at the end of the experiment.

TIME: 20 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will observe solar energy by making energy collectors and testing if a bigger collector is better!

MATERIALS:

- Large disposable pie plate
- Small disposable pie plate
- Black paint (non-water soluble spray paint is easiest)
- Thermometer
- Measuring cup
- Clear plastic food wrap
- Newspapers
- Styrofoam cups
- Masking tape,
- Water

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

This activity was taken directly from: http://www.wattsonschools.com/pdf/ue-1.pdfl

WIND CATCHER

Aggie Adventures for Kids (11:40 - 12:00)

What to "Do":

1. Make a cylinder out of the construction paper.
2. Decorate the outside of the catcher.
3. Punch several holes in the bottom of the paper.
4. Cut crepe paper about 3 ft. long.
5. Lace the crepe paper through these holes and tie.
6. Punch 4 holes in the top of the box.
7. Lace 4 strings through these holes.
8. Tie the strings together and tie these to a longer string.
9. Hand the wind catcher outside. Watch the wind go to work!

Reflect:

- Why do we use wind catchers?
- Where have you seen wind catchers?

Apply:

- The wind fills the catcher and blows the end that is furthest from your hand (or whatever you hand the wind catcher on) in the direction the wind is blowing.
- They also work to determine wind strength in a limited way.
- If the wind catcher is fully inflated, the wind is strong.
- If it is limp, it is not strong.

TIME: 20 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will be able to make a fun craft while also seeing how wind catchers work.

MATERIALS:

- Construction Paper
- Glue
- Crepe paper
- Scissors
- Paper punch
- String
- Crayons

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

DAY 3
PLANET ENERGY

Activities for the day:

Camper Check In
Wind Powered Car
Solar Bag
Jumping Coin
Exploding Diet Coke
Hurricane in a Bottle
Human Conductor of Electricity

UtahStateUniversity
COOPERATIVE EXTENSION

WIND-POWERED CAR

Aggie Adventures for Kids (9:15 - 9:35)

What to "Do":

1. Build your car: assemble the car body and wheels as shown in the illustration.
2. Design a "Wind Catcher:" brainstorm some ways to modify your car to capture the wind to make it move.
3. Build your "Wind Catcher:" choose one of your ideas. Build your system and add it to your car.
4. Attach a load: tie ten paper clips together with string. Tape the free end of the string to the back of the car so that the paper clips trail an inch or two behind the car. These paper clips are your load. Adding them to your car makes it a bigger challenge- you have to catch a lot of wind to make your loaded car move!
5. Test your design: mark a finish line two feet from the fan. Set your car and paper clips next to the fan. Turn the fan on low speed. (You may need to aim the fan so the wind hits your wind catcher.)
6. Did your car pull the paper clips across the finish line? If not, make a change and try again. If your car was successful, try the *Dig Deeper* challenges listed on the following page.

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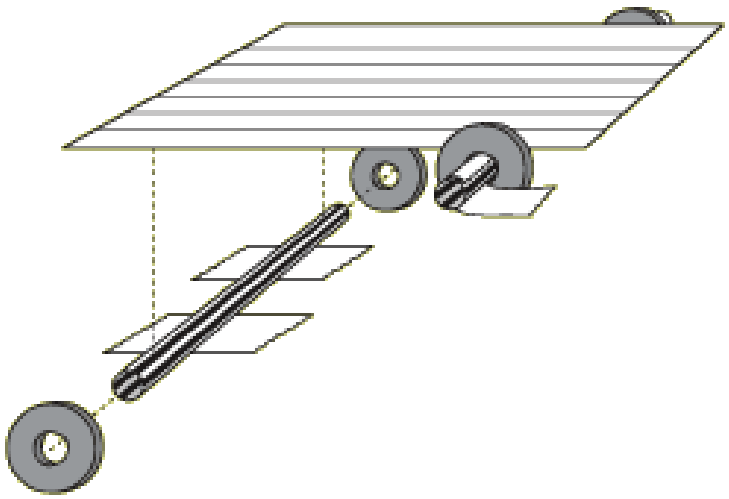


TIME: 30 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will learn about wind power and have to build and design their own car.

MATERIALS:
- 5 drinking straws
- Electric fan (ask an adult before using)
- 1 4x6-inch index card
- 4 Life Savers® (hard, individually-wrapped mints work best)
- 15-20 paper clips
- 2-4 paper cups
- 1 plastic bag
- Several rubber bands
- Ruler, scissors, sheet of paper, string, tape

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

This activity was taken directly from: http://pbskids.org/fetch/parentsteachers/activities/act/act-blowitaway.html

WIND-POWERED CAR CONTINUED...

Aggie Adventures for Kids (9:15 - 9:35)

Reflect:

- How did you decide to build your car?
- What helped your car move?
- Is you car strong enough to drag things behind it?

Apply:

- The wind from the fan applies a force to your "wind catcher." Since the wind catcher is attached to the car, this force from the wind moves the car.
- The more wind you catch, the faster your car goes.
- You can also help your car go faster by getting the wheels to roll smoothly and evenly (i.e., by reducing friction).
- The more friction there is, the more force it takes to move the car.

Dig Deeper:

- Do a "monster truck pull." How many paper clips can your car pull? Add five at a time.
- Put your "breeze mobile" to the test. Can your car cross a finish line that's three feet away from the fan? Four feet?
- Create a completely different kind of system to catch the wind. Compare it to your first design. Which one works best? Why?

This activity was taken directly from: http://pbskids.org/fetch/parentsteachers/activities/act/act-blowitaway.html

SOLAR BAG

Aggie Adventures for Kids (9:35 - 10:00)

What to "Do":

1. Simply fill with air by running, tie off the ends, and let the solar energy of the sun heat the air inside the bag.
2. Within minutes, the bag rises to the sky and floats like a giant science sausage. Better tie it down or you'll be flying as well!

IMPORTANT: The Solar Bag is about 50 Feet long. This experiment is best conducted in a large, open field where the bag will not catch on trees, power lines, etc.

Reflect:

- What happened when we filled the bag with air?
- How does it stay in the air?
- What happens if we don't fill the bag with enough air?

Apply:

Steve Spangler states the following about the Solar Bag:

- A Solar Bag is a long plastic bag made from a very thin plastic and colored black to absorb solar energy.
- The heated air inside the bag provides buoyancy and causes the bag to float.
- Over the years, it's become a very popular science demo for teachers to share with their students as they explore the properties of air.
- Scientists from Pioneer Astronautics and Jet Propulsion Laboratory conducted successful tests of its Mars solar balloon inflation system using the Steve Spangler Solar Bag.

TIME: 25 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will learn about the properties of air and air pressure. They will discover the science behind density and buoyancy and how they are affected by heat.

MATERIALS:

- Solar Bag (stevespanglerscience.com)
- Kite string

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

Adapted from: http://www.stevespanglerscience.com/

JUMPING COIN

Aggie Adventures for Kids (10:00 - 10:15)

What to "Do":

What happens to air's push when you heat it up?
Air's pressure or air's pushing power changes when it is heated.

1. Fill a bowl with some cold water.
2. Place the bottle neck and coin in the bowl of water to chill them. This helps to make an airtight seal when you place the coin on the top of the bottle.
3. Place the coin on the top of the bottle.
4. Wrap your hands around the bottle and wait for several seconds.
5. What happens to the coin?
6. Remove your hands from the bottle and wait.
7. What happens to the coin now?

Reflect:

- Why does the coin jump?
- What would happen if we added hot water instead of cold?

Apply:

- When you hold the bottle with your hands, the air inside the bottle heats up.
- The warm air pushes harder than the cool air that is outside the bottle so it forces the coin up.
- When the air inside the bottle cools down the coin will stop jumping.

TIME: 20 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will be able to experiment with air pressure and heat!

MATERIALS:

- Bowl of cold water
- Coin (bigger than the bottle opening)
- Glass Coke/Root beer bottle (with a small opening/mouth)

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

This activity was taken directly from: http://www.kids-science-experiments.com/magiccoin.html

SNACK, GAME & EXPLODING DIET COKE

Aggie Adventures for Kids (10:15-10: 35, 10:40 - 11:05)

What to "Do":

1. This activity is probably best done outside in the middle of an abandoned field, or better yet, on a huge lawn.
2. Carefully open the bottle of soda. Position the bottle on the ground so that it will not tip over.
3. Unwrap the whole roll of Mentos. The goal is to drop all of the Mentos into the bottle of soda at the same time (which is trickier than it looks). One method for doing this is to roll a piece of paper into a tube just big enough to hold the loose Mentos. You'll want to be able to position the tube directly over the mouth of the bottle so that all of the candies drop into the bottle at the same time.
4. Don't drop them into the bottle just yet! Warn the spectators to stand back. Okay, you're going to drop all of the Mentos into the bottle at the same time and then get truckin' (move out of the way... so long... bye-bye... hasta la vista!)
5. Have each kid in the group contribute to putting in Mentos, counting down, measuring, etc.
6. It's just like fireworks on the 4th of July. The spectators erupt, of course, in a chorus of ooohs and ahhhs. Someone yells out, "Do it again" and you do.
7. Record measurements in the journal.

Reflect:

- Does it matter what kind of Mentos we use?
- Does it matter what kind of soda we use?
- What would happen if we only added half of the Mentos?

continued...

TIME: 50 Minutes

GRADE LEVEL: 1-2

OBJECTIVE:
Campers will learn about gasses and eruptions using diet coke and candy.

MATERIALS:

- A roll or box of Mentos (candy mints) Fruity and minty
- 2-liter bottle of diet soda (get many different kinds of soda). Either diet or regular soda will work for this experiment, but diet soda is less sticky when you're cleaning it up!
- Geyser Tube (stevespangler.com)

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

Adapted from: http://www.stevespanglerscience.com/

EXPLODING DIET COKE CONTINUED...

Aggie Adventures for Kids (10:35 - 11:05)

Apply:

- Why do Mentos mixed with soda produce this incredible eruption? You should know that there is considerable debate over how and why this works.

Steve Spangler stated the following:

- "While we offer the most probable explanations below, we also understand and admit that other explanation could be possible... and we welcome your thoughts.

- As you probably know, soda pop is basically sugar (or diet sweetener), flavoring, water and preservatives. The thing that makes soda bubbly is invisible carbon dioxide gas, which is pumped into bottles at the bottling factory using tons of pressure. Until you open the bottle and pour a glass of soda, the gas mostly stays suspended in the liquid and cannot expand to form more bubbles, which gases naturally do.

- But there's more... If you shake the bottle and then open it, the gas is released from the protective hold of the water molecules and escapes with a whoosh, taking some of the soda along with it. What other ways can you cause the gas to escape? Just drop something into a glass of soda and notice how bubbles immediately form on the surface of the object.

- For example, adding salt to soda causes it to foam up because thousands of little bubbles form on the surface of each grain of salt. Many scientists, including Lee Marek, claim that the Mentos phenomenon is a physical reaction, not a chemical one.

- Water molecules strongly attract each other, linking together to form a tight mesh around each bubble of carbon dioxide gas in the soda. In order to form a new bubble, or even to expand a bubble that has already formed, water molecules must push away from each other. It takes extra energy to break this "surface tension." In other words, water "resists" the expansion of bubbles in the soda.

- When you drop the Mentos into the soda, the gelatin and gum arabic from the dissolving candy break the surface tension. This disrupts the water mesh, so that it takes less work to expand and form new bubbles. Each Mentos candy has thousands of tiny pits all over the surface. These tiny pits are called nucleation sites - perfect places for carbon dioxide bubbles to form. As soon as the Mentos hit the soda, bubbles form all over the surface of the candy.

- Couple this with the fact that the Mentos candies are heavy and sink to the bottom of the bottle and you've got a double-whammy. When all this gas is released, it literally pushes all of the liquid up and out of the bottle in an incredible soda blast. You can see a similar effect when cooking potatoes or pasta are lowered into a pot of boiling water. The water will sometimes boil over because organic materials that leach out of the cooking potatoes or pasta disrupt the tight mesh of water molecules at the surface of the water, making it easier for bubbles and foam to form. "

Adapted from: http://www.stevespanglerscience.com/

HURRICANE IN A BOTTLE

Aggie Adventures for Kids (11:05 - 11:25)

What to "Do":

Many large thunderstorms come together over ocean water and begin to swirl like a vortex. When this vortex becomes powerful enough, it is called a hurricane. It's easy to make your own model of a hurricane using plastic soda bottles.

1. Fill the soda bottle to the top with water. If you do not have access to a sink nearby or you don't want to move the dinner party to the kitchen, use a large pitcher to fill the bottle.
2. Here's the challenge: How long will it take to empty all of the water in the bottle into the pitcher on the table? Record your prediction on a piece of paper.
3. Without squeezing the sides of the bottle, time how long it takes to empty all of the water. You might want to repeat this several times to validate your time.
4. Fill the bottle to the top with water just as you did before. However, this time swirl the water by moving the bottle in a clockwise or counter - clockwise motion while the water is pouring out. Keep swirling the water until you see the formation of what looks to be a tornado! The water begins to swirl in shape of a vortex and flows out of the bottle very quickly. To everyone's amazement, you are the Quick-Pour Soda Bottle Master.
5. Twist of Color - Try adding 2 ounces of colored lamp oil to the water. Lamp oil is available at most department stores were oil lamps are sold. The oil will float on the surface of the water since oil is less dense than water. When the oil and water swirl together, the less dense oil travels down the vortex first and creates a "colored" tornado effect.

continued...

TIME: 20 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will learn more about tornado's with this "hands-on" experiment!

MATERIALS:
- Two plastic soda bottles (1 or 2 liter size)
- Pitcher of water
- Stopwatch or watch with a second hand to record your times

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

Adapted from: http://www.stevespanglerscience.com/

HURRICANE IN A BOTTLE CONTINUED...

Aggie Adventures for Kids (11:05 - 11:25)

Reflect:

- What happened when we let the water run on its own?
- What happened when we swirled the water?
- How is this like a hurricane or tornado?

Apply:

- Swirling the water in the bottle while pouring it out causes the formation of a vortex.
- The vortex looks like a tornado in the bottle. The formation of the vortex makes it easier for air to come into the bottle and allows the water to pour out faster.
- If you look carefully, you will be able to see the hole in the middle of the vortex that allows the air to come up inside the bottle.
- If you do not swirl the water and just allow it to flow out on its own, then the air and water have to essentially take turns passing through the mouth of the bottle.

Adapted from: http://www.stevespanglerscience.com/

HUMAN CONDUCTOR OF ELECTRICITY

Aggie Adventures for Kids (11:25 - 11:50)

What to "Do":

Ordinary people use standard electricity from the wall to power a light. Oh, but not you! Why use normal electricity from the wall outlet when you can make your own? Get ready to amaze everyone with this shocking display of science.

1. Darken the room. Hold the fluorescent bulb in one hand and the balloon in the other. Rub the balloon vigorously on your hair.
2. Bring the balloon near the bulb and watch what happens. Was that a flicker of light? Did the bulb really light up?
3. Move the balloon up and down the bulb without touching the bulb. The light should sort of follow the balloon.
4. Touch the balloon to the glass and see if you can get a spark to jump.
5. You can't believe your eyes... so, go back to step one and do it again.

Reflect:

- What happened when we rubbed the balloon against our hair?
- What happened when the balloon touched the light bulb?

Apply:

- Electrons are relatively free to jump from one atom to the next, and they're attracted to some materials more than others. When you rub a balloon on your hair, electrons from your hair jump over to the balloon and stay there.
- The inside of a fluorescent tube is coated with a white material made up of phosphors. If you bombard phosphors with ultraviolet light, they re-emit visible light. In normal operation, the fluorescent tube is connected to a source of electrical current. The current supplies electrons that slam around inside the tube. Inside the tube there is also mercury vapor.
- When electrons collide with the mercury vapor, they cause the vapor to emit ultraviolet light, which hits the phosphors and the tube lights up. Bringing a negatively charged balloon near a fluorescent tube stirs up the electrons in the mercury vapor.
- This produces an electrical current, which excites the mercury atoms. The excited mercury atoms emit ultraviolet light and cause the phosphors to glow. When a spark jumps, you get a big release of energy and a correspondingly brighter glow.

TIME: 25 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will learn about electricity and will be able to make their own!

MATERIALS:
- Fluorescent light
- Balloon
- Wool sweater

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

Adapted from: http://www.stevespanglerscience.com/

DAY 4
PLANET ENERGY

Activities for the day:

Camper Check In
Recycling Paper
Potato-Powered Clock
Musical Mud
Freaky Fork: Make a Fork Battery
Solar Race Cars
Magnetism Project: Testing the Pull
Mixing and Separating Experiment

UtahStateUniversity
COOPERATIVE EXTENSION

GAME & RECYCLING PAPER

Aggie Adventures for Kids (9:15 - 9:45)

What to "Do":

To make your own recycled paper, you need to turn paper into pulp, and then back into new paper. Here's how to do it:

1. Start by cutting the newspaper into small pieces. About 4 or 5 sheets of newspaper will be enough to make two small pieces of recycled paper. Put the newspaper scraps into bowl, cover them with hot water and mix it up until all of the paper is wet.
2. Let the paper sit for a few hours, until it's all mushy. Stir it occasionally. When it looks and feels like oatmeal, you're ready to make new paper. Add a few tablespoons of cornstarch and a little more hot water. Mix it all up once more.
3. Now you have a pulpy, watery mess. Pulp is what you need to make paper, but you need to get rid of extra water first. You can make a strainer to help you do that.
4. Take a piece of aluminum foil and fold into a square or rectangle about the size of the paper you want to make. Punch holes in the aluminum foil with a sharp pencil.
5. Now it's time to make the paper. Take a new sheet of aluminum foil and put it on top of extra newspapers.
6. Then, spoon some pulp on top. When the aluminum foil is covered with a layer of pulp, use your strainer to press out the extra water. The pulp that's left behind will become your new sheet of paper.
7. Add decorations to your paper, if you want. You can use dried flowers, confetti, or anything else you find.
8. Pinch together any holes in the paper. You're almost done!
9. Finally, put aluminum foil and books on top of your paper and press it flat. Then take off the books and the top layer of foil and leave it out overnight so that it can dry.
10. When it's done, peel the paper from the aluminum foil. You can leave the edges rough or trim them to look like a card you buy in the store, and there you have it - recycled paper!

TIME: 30 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will have the opportunity to share what they learned yesterday and how it relates to science.

MATERIALS:
- 4-5 sheets of newspaper
- Glass bowl, aluminum foil, scissors, sharp pencil, wooden spoon
- Hot water
- Cornstarch
- Measuring spoons
- Decorations for your paper, like construction paper scraps, dried flowers, confetti, or glitter

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

Reflect:

- What other materials besides newspaper can you recycle to make paper?
- What about empty cereal boxes or old magazines?
- Why is it good to recycle?

Apply:

- Recycling paper is good for the environment. It cuts down on the amount of garbage you throw away and it means fewer trees have to be chopped down to make new paper.

This activity was taken directly from: http://pbskids.org/zoom/activities/sci/recyclingpaper.html

POTATO-POWERED CLOCK

Aggie Adventures for Kids (9:45 - 10:00)

What to "Do":

1. Connect the black wire from the LCD watch (negative) to one of the zinc plates by carefully threading the wire's exposed metallic end through the hole on the plate. Gently twist the wire to secure it to the plate.
2. Connect the red wire from the watch (positive) to a piece of copper plate.
3. Assemble a "connection pair" by connecting the other pair of copper and zinc plates with a connection wire.
4. Now that all of the components are connected, insert the copper and zinc plates into the potatoes as shown in the diagram. Now you have created a battery to power the LCD clock!
5. After your experiments are complete, clean the zinc and copper plates to prevent rust and oxidization.
6. This activity was taken directly from the Green Science Enviro Battery instruction manual (included in each kit.)

Reflect:

- Do you think this clock would work using other fruits and vegetables?
- How do you think it worked?
- Do you think this is something we could design for our houses instead of using electricity?

Apply:

- There are universal standards for positive and negative terminals. The positive terminal is always the red colored wire, whereas the negative terminal is always black. Always connect the negative terminal to a zinc plate (or a reactive metal) and the positive terminal to the copper plate (or a less reactive metal).
- Note: it is important the exposed wire and the plate touch. Use the transparent tape provided in the kit to further secure the connection.
- The Enviro Battery woks by immersing a pair (or pairs) of connected zinc and copper plates into a medium, such as a potato, mud, water, or fruit.
- The zinc plate is the negative electrode; the copper plate is the positive electrode. When the metals are immersed into the medium, a chemical reaction takes place. The acid breaks down the copper and zinc.
- When the electrons break down, it causes a small current which is strong enough to power a small light bulb.

TIME: 15 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will experiment with fruits and vegetables to build an environmentally safe clock.

MATERIALS:

- From the Green Science Enviro Battery Kit: (purchased from: www.4m-ind.com)
- LCD watch movement and protective cover
- 2 zinc plates
- 2 copper plates
- Adhesive tape
- Connecting wire
- 2 potatoes or any fruits

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

This activity was taken directly from: Green Science Enviro Battery Kit: (purchased from: www.4m-ind.com)

MUSICAL MUD

Aggie Adventures for Kids (10:00 - 10:15)

What to "Do":

1. Make sure the cups of soil are reasonably moist.
2. Connect the sound chip to a pair of copper and zinc plates using the same technique as in the mini clock (i.e. red wire to copper plate, black wire to zinc plate).
3. Make a connection pair with the other zinc and copper plate.
4. Insert the zinc and copper plates into the soil as shown in the diagram.
5. This activity was taken directly from the Green Science Enviro Battery instruction manual (included in each kit).

Reflect:

- Would it make a difference if the dirt was dry?
- Could be use other things besides dirt?
- Is there electricity flowing through the wires?

Apply:

- If the experiment worked, you should hear a faint noise coming from the round metal plate of the sound chip.
- To amplify the sound, tape the base of the sound chip to the paper cup. The sound should now be louder.
- You should be able to hear a bird singing. Why?
- The paper cup resonates with the sound wave generated by the sound chip making it louder.
- Experiment using different "amplifiers" e.g. a water glass, a soda can etc. You'll be amazed with the different sound effects the produce!

TIME: 15 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will learn more about electricity as they explore using copper, zinc, and mud!

MATERIALS:

- From the Green Science Enviro Battery Kit: (purchased from: www.4m-ind.com)
- Electronic sound chip
- 2 pairs of copper and zinc plates
- Adhesive tape
- Connecting wire
- Paper cups
- 2 small cups of garden dirt
- Water

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

This activity was taken directly from: Green Science Enviro Battery Kit: (purchased from: www.4m-ind.com)

SNACK, GAMES & FREAKY FORK: FORK BATTERY

Aggie Adventures for Kids (9:10:15 - 10:35, 10:35 - 10:50)

What to "Do":

1. Connect one end of the red wire to the fork. Use adhesive tape to secure the connection.
2. Connect the clack wire to the zinc plate.
3. Now get another fork and zinc plate, connect them with a wire to make a "connection pair".
4. To activate the clock, insert all metals into the lemon as shown in the diagram.
5. This activity was taken directly from the Green Science Enviro Battery instruction manual (included in each kit).

Reflect:

- How does the fork make the battery work?
- Could we use other fruits or vegetables?
- Could we use other metal objects?

Apply:

- The fork acts like the positive electrode of the battery, like the copper plates in previous experiments.
- Most tableware utensils are plated with a metal which is less reactive than zinc.
- When both the utensils and zinc plates are inserted in the lemon, a reaction takes place.
- Electrons move from the zinc plates to the fork forming the current.

TIME: 35 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will learn more about electric currents using lemons and forks.

MATERIALS:

- From the Green Science Enviro Battery Kit: (purchased from: www.4m-ind.com)
- 2 Zinc plates
- LCD clock
- Adhesive tape
- Connection wire
- 2 Forks
- 1 Lemon-halved

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

This activity was taken directly from: Green Science Enviro Battery Kit: (purchased from: www.4m-ind.com)

SOLAR RACE CARS

Aggie Adventures for Kids (10:50 - 11:10)

What to "Do":

1. Have students put the race tracks together.
2. Students will race the solar powered cars on the tracks.
3. Students will stay with their group and one person in each group will put the car on the track.
4. We will time the cars and the students will predict what will happen.
5. We will have a tournament to see which car is the fastest.
6. Students will record the results in their packets.

Reflect:

- Were any of the cars faster than the others?
- Do you think it's possible to make real cars using solar energy?
- Should all of the cars be equally fast?

Apply:

- These solar powered micro vehicles use real solar cells to convert sunlight into energy.
- Just take the cars outside and place them in the sun.
- The cars will automatically start to moving the moment the sunlight touches the solar panel located on the back of the car.
- Place the cars on the track and let them go!

TIME: 20 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will experiment with solar energy!

MATERIALS:
- 2 Solar Racers per group
- Tracks
- Packets
- Timer

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

Adapted from: http://www.stevespanglerscience.com/

Magnetism Project: Testing The Pull

Aggie Adventures for Kids (11:10 - 11:30)

What to "Do":

1. Draw a maze on a piece of cardboard. Can you guide a paper-clip through the maze?
2. Place the paperclip on the top of your cardboard with the maze facing up. Place the magnet under your cardboard where the paperclip is resting on top. Now move your magnet around and see what happens.
3. Can you rescue a paper-clip from a glass of water without getting wet?
4. Fill you glass with water and drop the paper-clip inside the glass. Take the magnet and place it on the outside of the glass close to the magnet and see if you can pull the paper-clip to the side of the glass and up to the top (without getting wet).
5. Will the paper-clip climb the ruler? (You can use a plastic or a wooden ruler).
6. Hold your ruler so that one end is resting on a flat surface and hold the other end up at a angle. Place the magnet on the under side of the ruler (the end that it resting on the flat surface) and then place the paperclip on the top of the ruler (again, the end of the ruler that is resting on the flat surface). Move the magnet to go up to the top end of the ruler.

Reflect:

- Can you think of things with magnets?
- Did you know that magnets hold the fridge door closed?
- Did you know that magnets are used to lift cars in a scrapyard?
- Did you know that cranes with giant magnets are used to pick/pull out metals from landfills?
- Did you know that magnets fasten hand bags?

Apply:

- How magnets pull: Magnets pull on magnetic materials, such as iron and steel, but pull through non-magnetic things, like cardboard, glass, plastic and wood. Magnets can even travel through water.

TIME: 20 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will learn about magnetism and water.

MATERIALS:
- Water
- A Magnet
- A Paper-Clip
- A Clear Glass
- A Piece of Cardboard
- A Plastic or Wooden Ruler

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

MIXING AND SEPARATING EXPERIMENT

Aggie Adventures for Kids (11:30 - 11:50)

What to "Do":

1. Fill the bottle three fourths (3/4) of the way with vegetable oil.
2. Fill the rest of the bottle with colored water.
3. Close the lid tightly.
4. Turn the bottle on its side - watch as the color moves through the oil in funny shapes and blobs.

Reflect:

- Why do you think the water and oil separate from each other?
- Would the oil and water stay mixed forever if we shook it for a long time?
- How do you think it separates?

Apply:

- "Water is what is known as a "polar" molecule. This means that there is unequal sharing of electrons between the hydrogen and the electronegative oxygen. This results in a slight positive charge on the hydrogens and a slight negative on the oxygen in the bent-shaped molecule. This makes water a "polar" solvent. Therefore, only hydrophilic (water-loving) substances are appreciably miscible in water. Oils, on the other hand, are made of hydrocarbon chains. These are chains of carbon atoms bonded to hydrogens. The elements and structure of oils make them non-polar, or "hydrophobic" (water fearing)."

TIME: 20 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will learn about water and oil densities.

MATERIALS:

- Water
- Baby Oil or Vegetable Oil
- Food Coloring
- Clear Plastic Bottle with Lid (Small)
- (Baby soda bottles from stevespanglerscience.com)

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

Statement taken directly from: http://answers.yahoo.com/question/index?qid=20080222185936AAgbSYI

DAY 5
PLANET ENERGY

Activities for the day:

Camper Check In
Mushroom Spore Prints (Part 1)
Salt Water Tester
Finding Objects and Sun Paper
Mushroom Spore Prints (Part 2)
A Paper Sundial

UtahStateUniversity
COOPERATIVE EXTENSION

GAMES & MUSHROOM SPORE PRINTS (PART 1)

Aggie Adventures for Kids (9:15 - 9:35)

What to "Do":

1. Gently pull the stem away from the mushroom cap.
2. Place the cap on a piece of colored paper, and cover with a glass jar.
3. Leave it alone for about four hours.
4. The mushroom cap will open, and the spores will drop onto the paper.
5. Try spore prints on different colors of paper, looking for interesting contrasts.
6. Some spores are dark, some light.
7. To preserve your print and keep it from smearing, spray lightly with extra-hold hair spray in a non-aerosol pump can.
8. Spore prints done on colorful pieces of paper make very attractive stationery.

Reflect:

- What did you like best about this activity?
- What other things can we use from nature to create art?

Apply:

- Discuss with the campers the fun things that they can make with things from nature (grass whistles, dandelion curls, apple star stamps, etc.).
- Briefly show the parts of mushroom and talk about how mushrooms are a fungus.
- Fungi: mushrooms are part of a larger group of plants known as fungi.
- A fungus is different from an ordinary green plant because it can't make it's own food.

TIME: 20 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will learn more about nature and make fun art out of mushrooms!

MATERIALS:

- Fresh mushrooms (Use one with a flat cap that hasn't opened yet.)
- Colored cardstock
- Non-aerosol hairspray
- Glass jar

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

Adapted from: http://www.howcast.com/guides/1784-How-To-Make-a-Mushroom-Spore-Print

SALT WATER TESTER

Aggie Adventures for Kids (9:35 - 9:55)

What to "Do":

1. How can you tell if water is salty? You could taste it - or you could use a saltwater tester!
2. A saltwater tester uses electricity to tell you if water is salty or not. Here's how to make your own.
3. First, cover two Popsicle™ sticks with metal - we used aluminum foil.
4. Then, get a buzzer - you can buy one at an electronics store - and tape the red wire of the buzzer to the positive end of the battery. The positive end will have a plus sign on it.
5. Next, tape one foil-covered Popsicle™ stick to the black wire of the buzzer. Tape the other one to the negative end of the battery. The negative end will have a minus sign on it.
6. You can see if your tester is working by touching the metal together. This will complete the circuit and make the buzzer buzz. If it doesn't buzz, check your connections to make sure everything is taped together in the right way.
7. Now to use your saltwater tester, put just the tips of the metal in saltwater, about an inch apart. Make sure the two metal parts don't touch. The saltwater will act like a wire, connecting the metal sticks, completing the circuit, and making the buzzer buzz.

Reflect:

- Why do you think this worked?
- Do you think there are other things that would make it buzz?

Apply:

- Here's the science scoop on how this works: the buzzer buzzes in saltwater because the saltwater acts like an invisible wire to connect the circuit. That's because when you add salt to water, the salt molecules dissolve in the water and break into smaller parts called ions. The ions carry electricity through the water.
- Fresh water doesn't have these ions. So it's harder for the electricity to move through the water. It doesn't complete the circuit, and the buzzer doesn't buzz.

TIME: 20 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will learn about salt water and salt molecules.

MATERIALS:

- Masking tape
- 9-volt battery
- Buzzer
- 2 Popsicle™ sticks
- Aluminum foil
- Water
- Saltwater

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

This activity was taken directly from: http://pbskids.org/zoom/activities/sci/saltwatertester.html

FINDING OBJECTS AND SUN PAPER

Aggie Adventures for Kids (9:55 - 10:25)

What to "Do":

1. Make predictions on what will happen in the science journal.
2. Place your Sun Print Paper, blue side UP, in the shallow tub or pin the corners to a piece of cardboard for stability.
3. Place the objects you wish to "print" on top of the paper. If your objects are particularly light-weight, you can hold them in place with a piece of clear plastic wrap.
4. Expose the paper to the sun for 2-4 minutes, until the Sun Print Paper turns very pale blue.
5. Remove the paper from the tray or cardboard and soak it in water for about one minute. In the video, Steve uses the Split Demo Tank to better observe the change that occurs when the paper is placed in water.
6. Remove the paper from the water and let it dry flat. The image will sharpen as it dries. Campers need to make observations in journal.

Reflect:

- What happened as soon as we put the paper outside?
- How do you think the paper works?
- Do you think it would be hard to make our own?

Apply:

Steve Spangler states the following about the sun paper experiment:

- The sun print paper is coated with light-sensitive chemicals, which react to light waves and particles when exposed to light. When you place objects on the paper, they block the light and turn white while the paper around them remains blue. Water stops the process and fixes your images on the paper.

- In the lab, photosensitive paper is made by coating a sheet of paper with a water-soluble, bluish-green compound called iron (III) hexacyanferrate (III), Fe[Fe(CN)6]. The common name for this chemical is Berlin green - a well-known photosensitive chemical. When exposed to ultraviolet light (UV), a chemical reaction takes place where the water-soluble Berlin green changes into a water-insoluble chemical called iron (III) hexacyanoferrate(II), Fe[Fe4(CN)6]3 The common name for this chemical is Prussian blue. When you rinse your print in water, the water-soluble Berlin Green washes away, but the water-insoluble Prussian Blue remains fixed on the paper. The intensity of the Prussian Blue depends on the amount of time the paper is exposed to the light source and the intensity of the light source. For example, Sun Print Paper doesn't work nearly as well on a cloudy day as it does on a sunny day.

TIME: 30 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will learn about the nature of sunlight and how light-sensitive chemicals work.

MATERIALS:

- Sun Print Paper (purchased from stevespanglerscience.com)
- Water
- Cardboard and push pins to keep your prints in place or a shallow tub where the paper will be protected from blowing away in the wind
- Objects to take a "picture" of on the photosensitive paper

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

Adapted from: http://www.stevespanglerscience.com/

AGGIE ICE CREAM & MUSHROOM SPORE PRINTS (PART II)

Aggie Adventures for Kids (10:25 - 10:45, 10:45 - 11:15)

What to "Do":

1. We will be using the mushrooms we set from the previous day.
2. Remove the mushroom from the paper and look what design the spores have made.
3. Lightly spray with non-aerosol hair spray to preserve the design.

Reflect:

- Why do you think we got a design?
- Would this work if we used paint instead of letting them dry on paper?

Apply:

- Remember, that some mushrooms you find in nature are poisonous. So be careful and make sure to wash your hands when you're done…or you can use store bought portabellas.
- Mature mushrooms are rich with spores, and you can make several prints with a single cap.
- Gills should be fully visible; avoid prospects with bruises, dried edges around the cap, or gills that are darkening or covered by a membrane.
- The printing process brings out the moisture in the mushroom, which can damage wood, so protect work surfaces with waterproof covering.

TIME: 50 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will reuse old, broken crayons that you might normally throw away and learn more about recycling.

MATERIALS:

- Fresh mushrooms (Use one with a flat cap that hasn't opened yet.)
- Colored card stock
- Non-aerosol hair spray
- Glass jar

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

Adapted from: http://www.howcast.com/guides/1784-How-To-Make-a-Mushroom-Spore-Print

PAPER SUNDIAL

Aggie Adventures for Kids (11:15 - 11:45)

What to "Do":

Bark Rubbings:

1. Cut the paper along the marked line: one half will serve as base, the other will be used to construct the pointer (or gnomon).
2. In the gnomon part, cut away the two marked corners.
3. Fold the sheet in its middle, in a way that the two secondary printed lines (leading to the cut-off corners) remain visible. The line of the fold is the gnomon.
4. Note: in stiff paper, straight folds are helped by first scoring the paper, by drawing a line along them with a black ballpoint, guided by a ruler and pressed down hard.
5. With the page folded in its middle, cut out along the curved line, cutting a double thickness of paper in one cut. The cut begins near the top of the gnomon-fold and ends on the secondary line. Do not cut along the secondary line. No pieces come off.
6. Score the other two secondary lines, then fold the gnomon sheet along them. The fold is opposite to that of the fold in the middle. These two folds should form 90-degree angles, so that the two pieces with the corners not cut in step 2 can be placed flat on the table, and the triangular gnomon rises above them.
7. In cut (4), the fin of the gnomon was separated from two pieces with curved outlines. Fold those pieces so that they, too, are flat with the table. One goes above the other, and the slots they form near the secondary lines create a place for the fin to fit into.
8. You are almost done. Take the base sheet, and note the apex where the hour-lines all meet (that is where the bottom corner of the fin will go). Carefully cut the sheet from this point along its middle line, up to the small cross-line marked on it. Do not cut any further!
9. Slide the fin into the cut you made, so that all horizontal parts of the first sheet are below the base sheet; only the fin sticks out. Its bottom corner should be at the apex.
10. The sundial is now ready, but you might use tape on the bottom of the base-sheet to hold the two pieces together firmly. For further stability, and to prevent the sundial from being blown away, you may attach its base with thumbtacks to a section of a wooden board or a piece of plywood.
11. Finally, orient the fin to point north. You may use a magnetic compass; before pocket watches were available, folding pocket sundials were used in Europe, with small magnetic compasses embedded in their bases. If clear sunlight is available, the shadow of the tip of the fin now tells the time.

TIME: 30 Minutes

GRADE LEVEL: 3-5

OBJECTIVE:
Campers will use natural sunlight to make a sundial.

MATERIALS:
- Pre-printed Sundial Picture (found on pg. 57)
- Scissors

PRIOR TO ACTIVITY:
Make predictions with the campers on what they think will happen.

This activity was taken directly from: http://www-istp.gsfc.nasa.gov/stargaze/Lsundial.htm

PAPER SUNDIAL CONTINUED...

Aggie Adventures for Kids (11:15 - 11:45)

Reflect:

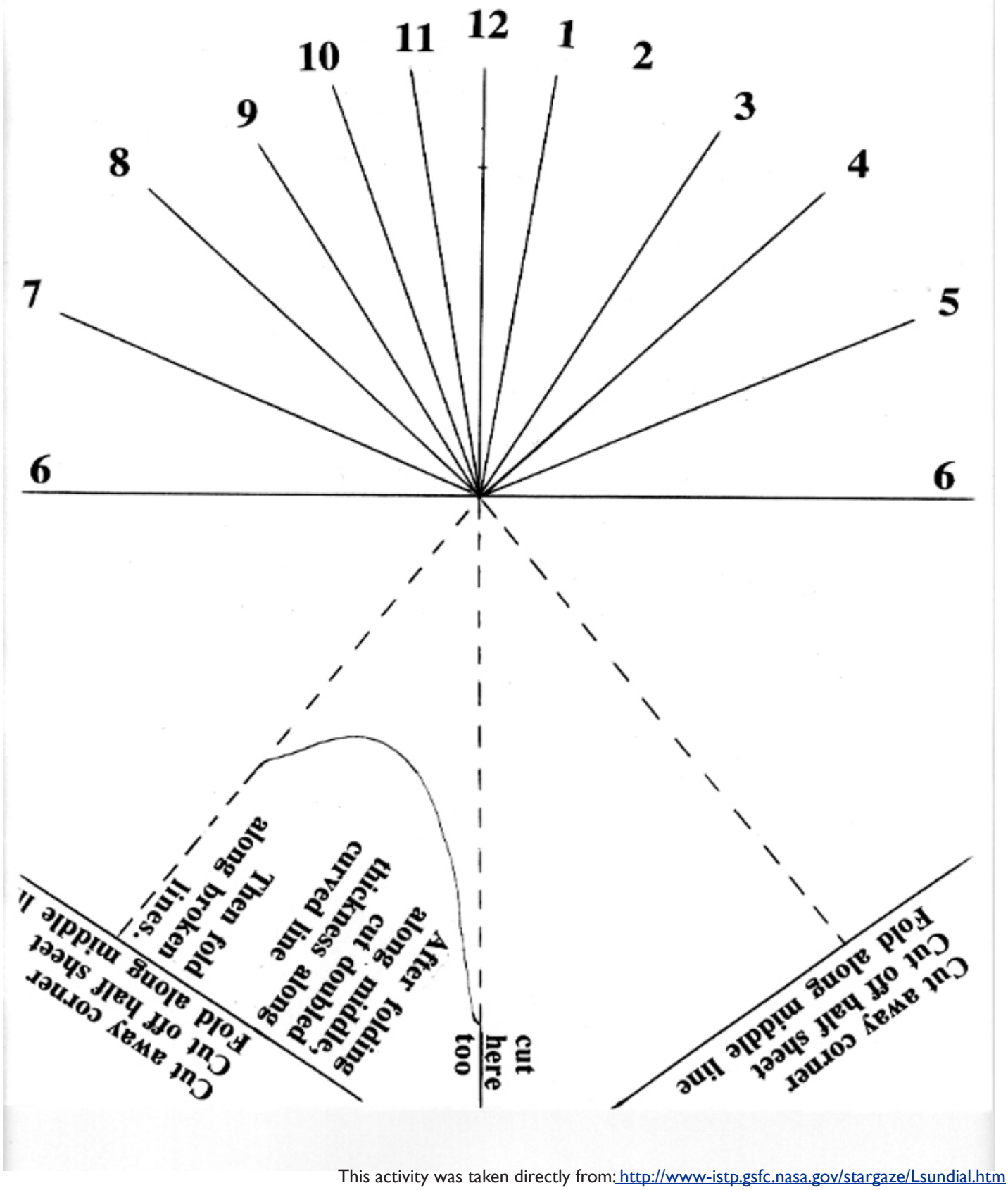
- Would it be a good idea to make all clocks like this?
- Why would it be difficult to tell time at night? Is it possible?
- What are the good things about sundials?

Apply:

- Ornamental sundials are often found in parks and gardens, with the pointer widened into a triangular fin, which must point northwards.
- A sundial of this type can be constructed from folded cardboard or stiff paper: look below to see the basic design, which can be printed and then photocopied onto suitable sheets of stiff paper or cardboard.
- It is meant to be used at a latitude of 38 degrees and should work adequately in most of the continental US.

This activity was taken directly from: http://www-istp.gsfc.nasa.gov/stargaze/Lsundial.htm

I Tell the Sunny Hours



This activity was taken directly from: http://www-istp.gsfc.nasa.gov/stargaze/Lsundial.htm

GAME IDEAS

Aggie Adventures for Kids

(Try and keep games to the theme of the camps by switching the names of the games and switching the characters to fit the themes)

Balloon Catch

OBJECTIVE: to catch the balloon	DESCRIPTION: All players form a circle around one player in the center. Each person on the circle is given a number. The center player stands with the balloon, holding it with one hand. Without warning, he/ she calls out a number. The person assigned that number rushes forward and tries to grab the balloon before it hits the floor. If he catches it, he becomes the center player. If he fails to catch it, he returns to the circle.
REQUIREMENTS: Number of Players: 10 and up Ages: any age Activity Level: high Equipment: balloon filled with air	

Freeze Tag

OBJECTIVE: To be the last person standing	DESCRIPTION: It is a normal game of tag with one person it. That person then tags people and if they are tagged, they are frozen. The only way to get unfrozen is to have a person who is not it crawl under your legs.
REQUIREMENTS: Number of Players: 10 and up Ages: 8 and up Activity Level: high Equipment: None	

Hospital Tag

OBJECTIVE: to be last one	DESCRIPTION: The basic rules are the same as tag. One person is "Mr. Yuck" and the others run. When you get tagged you may cover your "wound" with one of your hands. When you get tagged a second time, you may cover your "wound" with your other hand. The third time you get tagged, you are out.
REQUIREMENTS: Number of Players: 10 and up Ages: 8 and up Activity Level: high Equipment: none	

GAME IDEAS

Aggie Adventures for Kids

(Try and keep games to the theme of the camps by switching the names of the games and switching the characters to fit the themes)

GIANTS, ELVES, WIZARDS

OBJECTIVE: to win	DESCRIPTION: This is like paper, rocks and scissors but with actions. The way it works is this: the giants stomp the elves, the elves chase the wizards, and the wizards zap the giants. You will have two teams on opposite sides of a line. Each team will decide on an action to take. Every team member must agree on what action they want. Then on the count of three each team performs their actions. Whomever wins will then chase the other team and tag as many people as they can. The object is to get everybody on one side.
REQUIREMENTS: Number of Players: 10 and up Ages: 8 and up Activity Level: high Equipment: None	

MULTIPLE SPONGE RELAY

OBJECTIVE: fastest team	DESCRIPTION: At one end of the line there is a bucket full of water, and at the other end, an empty bucket. Each is being manned by a counselor. • Team members sit one behind the other in line between the two buckets • To start, the counselor dips the sponge in the water, then the campers pass the sponge back over their heads to the empty bucket at the end. • The counselor at the empty bucket wrings out the sponge, then passes it back to the front of the line. • All sponges may be passed back and forth at the same time. You do not have to wait for one to return to pass the next one • The team to fill their empty bucket first wins.
REQUIREMENTS: Number of Players: any Ages: any Activity Level: high Equipment: lots of sponges, water buckets, empty buckets	

OCTOPUS

OBJECTIVE: to be the last one	DESCRIPTION: Two people are chosen to be the octopuses. The stand in the middle of the field. All the campers are one one side. The counselor in charge calls octopus and the campers all run from one side to the other trying not to get caught by the octopus. If they are caught they must sit down and become seaweed, meaning they can tag someone if they run by them, but they cannot move from where they are sitting, they can tag by using their hands. The last person who isn't caught is the winner.
REQUIREMENTS: Number of Players: medium and large groups Ages: 8 and up Activity Level: high Equipment: none	

GAME IDEAS

Aggie Adventures for Kids

(Try and keep games to the theme of the camps by switching the names of the games and switching the characters to fit the themes)

SMURFS AND GARGAMELS

OBJECTIVE: not to get tagged	DESCRIPTION: You have two teams standing on opposite sides of the area. The smurfs are one team and gargamels are the other. The smurfs try to tiptoe to the gargamels. A neutral person will yell, "smurfs are here". The gargamels then turn around and have to try to tag the smurfs. The smurfs need to run back to their side. The last smurf standing wins. Variation - Red Light Green Light
REQUIREMENTS: Number of Players: 10 and up Ages: 8 and up Activity Level: high Equipment: None	

TYPHOON

OBJECTIVE: fastest team	DESCRIPTION: • One team member sits on the ground at one end of the field while the rest of the team lines up behind the bucket of water. • First runner dips cup into bucket and runs to team member sitting at other end of field • When runner reaches the other team member, he/she throws the water onto him/her and yells "Typhoon" • The runner then takes the place of the sitting member who runs the cup back to the next person in line. • The first team to get all of their members through the relay wins.
REQUIREMENTS: Number of Players: any Ages: any Activity Level: high Equipment: water buckets, plastic cups	

USU STORAGE SHED MATERIALS

Aggie Adventures for Kids

MATERIALS: These are the materials for this camp that Aggie Adventures has available for Camps held in Cache County. Double check on consumable items to see if they are available as well. Always check the shed first!

- pizza box
- transparency
- rubbing alcohol
- plastic scoop
- thermometer
- black paint
- wading pool
- several rubber bands
- pitchers
- Geyser Tubes
- wooden spoon
- Green Science Enviro Battery Kit
- solar racers

PLANET ENERGY

4-H AGGIE ADVENTURES FOR KIDS

UtahStateUniversity
COOPERATIVE EXTENSION

PLANET ENERGY NOTEBOOK

Aggie Adventures for Kids

WHICH COLOR ABSORBS THE SUN'S ENERGY BEST?	
Prediction:	
Estimated time to melt:	
Actual time to melt:	
Which color melted the ice faster?	
PIZZA SOLAR OVEN:	
Predicted temperature:	
Hottest temperature:	
How much time did it take to get that hot?	
THE VOLCANO:	
Why did it work?	
UV BEAD SUN SCREEN TEST	
Prediction:	
Which sunscreen is best?	

PLANET ENERGY NOTEBOOK

Aggie Adventures for Kids

COLLECTING ENERGY:

Which color absorbs the sun's energy best?

	TEMPERATURE C or F	
	BEFORE:	AFTER:
Large Collector:		
Small Collector:		

EXPLODING DIET COKE

Prediction:	
How many feet?	
Which soda went higher?	

SOLAR RACE CARS

Prediction:	
Which car won the most times?	
How are the cars moving?	

SUN PAPER

Prediction:	
What color is the paper after it's been in the sun?	

Do you think the sunscreen test will be different on the paper? Why or why not?	
What was your favorite thing at camp?	