

## Counting Rays & Stuffing Suns with Energy!

<b>Grade Level:</b>	<b>Time Frame:</b>
Kindergarten <b>1st Grade</b>	50 Minutes
<b>Standards (ALCOS Mathematics):</b>	
<p><b>Operations &amp; Algebraic Thinking: K.8.</b> Represent addition and subtraction up to 10 with concrete objects, fingers, pennies, mental images, drawings, claps or other sounds, acting out situations, verbal explanations, expressions, or equations.</p> <p><b>Understand Simple Patterns: K.13.</b> Duplicate and extend simple patterns using concrete objects.</p> <p><b>Describe and Compare Measurable Attributes: K.16.</b> Identify and describe measurable attributes (length, weight, height) of a single object using vocabulary such as long/short, heavy/light, or tall/short.</p> <p><b>17.</b> Directly compare two objects with a measurable attribute in common to see which object has "more of" or "less of" the attribute and describe the difference.</p> <p><b>Analyze, compare, create, and compose shapes: K.22.</b> Model shapes in the world by building them from sticks, clay balls, or other components and by drawing them.</p> <p><b>Operations &amp; Algebraic Thinking: 1.1.</b> Use addition and subtraction to solve word problems within 20 by using concrete objects, drawings, and equations with a symbol for the unknown number to represent the problem.</p> <p><b>Add &amp; Subtract Within 20: 1.6.</b> Add and subtract within 20. Work with Addition and Subtraction Equations 9. Reproduce, extend, and create patterns and sequences of numbers using a variety of materials.</p>	

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### Objectives:

Students will use mathematical concepts such as addition, subtraction, and simple patterns to build a model of a sun.

Students will understand that the sun contains energy and discuss how **solar energy** supplies power for life on earth.

### Background Information:

**Solar Energy**-energy that comes from the sun in the form of light and heat from the sun's rays

The sun is the primary source of all energy on Earth. It radiates energy in the form of heat and light.

**Solar energy** drives the water cycle, it is used by plants to provide the world's food energy, and it was the primary force in the formation of fossil fuels including coal, oil, and natural gas. It also creates winds and ocean currents.

Humans need energy from burning calories from food (plants or animals that eat plants). Likewise, used by humans, vehicles need energy from burning gasoline for fuel.

We can collect and manage the sun's energy. We can use it to heat and cool buildings and water systems; to generate electricity in solar thermal electric power towers; and to power such items as watches, calculators, and weather stations that use photovoltaics or solar cells.

### Materials:

- FOR EACH PAIR OF STUDENTS:
  - 2 small paper plates
  - construction paper cut into 5 short sun rays and 5 long sun rays
    - (for first graders, 10 short sun rays and 10 long sun rays)
    - Make extra rays of various lengths to challenge students to select (add/subtract) the correct number- (see "Explore:" step, d.)
- Crayons, markers, or paint
- Staples and staplers
- Old newspaper or recycled shredded paper
- Single hole puncher
- String

### Engage (10 minutes):

1. **Make it active!** Have the students stand up and jog in place while they count out loud to 10 (first grade counts to 20).
2. **Discuss it!** Ask the students the following open-ended questions:
  - a. Where did you get the energy you needed to do the exercise?
  - b. What other types of things need fuel for energy?

3. Show the students images of the following to represent things that need fuel for energy:
  - a. A vehicle, a growing plant, a water wheel, campfire, cooking on a gas stove, a windmill, etc (all of these get energy directly or indirectly from the sun)
  - b. At last, show the image of a sun and discuss how all of the previous images may be traced back to the sun's energy

#### Explore (35 minutes):

1. **Create it!** Help the students make suns "stuffed with energy."
  - a. Divide students into partners.
  - b. Give each pair of partners 2 small paper plates.
  - c. Instruct the students to color or paint the bottom of each plate to match the color of the sun. Encourage creativity!
  - d. Give each pair of students a pile of mixed short/long sun rays.
  - e. Instruct students to choose 5 **long** and 5 **short** rays for their sun from the pile (for first graders, 10 **long** and 10 **short**). Ask them to **arrange** them **in an alternating** short/long **pattern**.
  - f. Fix the two plates together and use the staplers to staple on the short/long rays to create the sun model leaving a hole at the top to fit the paper for stuffing.
  - g. **STUFF THE SUNS WITH "ENERGY"** using old newspapers or shredded recycled paper.
  - h. Punch a holes through the top of both plates and tie up with string for hanging.
2. Decorate the room with the suns "stuffed with energy!"

#### Evaluate (5 minutes):

1. **See what we learned!** List 1-10 (for first graders, 1-20) numbered on the board or screen.
  - a. Ask students to recall or determine 10 (or 20) different things on earth that use the sun's rays for energy.