

Angle of the Sun Grades 1 to 3

<b>Post-activity – Seasons: Will it Rain or Snow</b>	Cross Curricular	Math - Measurement
	Safety Notes	Do not shine light in eyes.

<p><b>Big Ideas</b>          Changes occur in daily and seasonal cycles. (Grade 1)           Changes in daily and seasonal cycles affect living things. (Grade 1)</p>	<p><b>Specific Expectations</b>          Identify the sun as the Earth’s principal source of heat and light.           Describe changes in the amount of heat and light from the sun that occur throughout the day and the seasons.</p>
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**Description**  
 After participating in our school program, “Seasons: Will it Rain or Will it Snow?”, students can experiment with how changing the angle of the light changes the amount of surface area that is exposed to the light.

<p><b>Materials</b>          2 pieces of 1 cm graph paper          Flashlight          Ruler or metre stick          Optional: protractor</p>	<p><b>Accommodations/Modifications</b></p>
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## Introduction

The reason why it is colder in the winter in Canada, and warmer in the summer has to do with the angle at which the rays of the sun hit the Earth. When the sun hits the Earth more directly, the energy from the sunlight is more concentration. It lands in a smaller area. The energy from the sunlight is more intense, and it heats up the Earth.

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## Action

1. Students should work in pairs or groups of three. One student can hold the flashlight, and one student can be in charge of measurement and drawing. If you have three students, the third student can be in charge of drawing.
2. Place the 1 cm graph paper flat on a table or on the ground.
3. Turn on the flashlight and point it at the graph paper. Use a ruler to ensure the bottom of the flashlight stays 10 cm above the graph paper.
4. The flashlight should be vertical. You can use a protractor to ensure the flashlight is at  $90^\circ$
5. The student in charge of drawing will trace the outline of the circle created by the flashlight on a piece of 1 cm graph paper.
6. Next, tilt the top of the flashlight towards the ground to change the angle of the beam of light. Switch your graph paper to the second page.
7. Keep the bottom of the flashlight 10 cm above the paper. Shine the light beam shape onto the paper.
8. If using a protractor, angle the flashlight to  $45^\circ$ .
9. Trace the outline of the new shape created by the flashlight.
10. Count the number of squares in each of the shapes.

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## Consolidation/Extension

Questions:

1. What happened to the shape of the beam when the angle is decreased? (The shape gets longer. The edges are blurry.)
2. How many squares did the beam cover when the light is vertical? (Less squares than when flashlight is at an angle.)
3. How many squares did the beam cover when the light was at an angle? (More squares than when the flashlight is vertical.)
4. Do you know what day of the year the sun is at its most vertical in Canada? (June 21/22) This is the start of which season? (Summer)
5. Where on Earth do you think the sunlight is most vertical? (Equator) What time of day is the sun at its most direct? (noon or 1pm if Daylight Savings Time)