



# **SCIENCE**

**Monday 3.13.17**

**You will have a test this week! You'll have a study guide going out tonight that will be due tomorrow.**



# **SCIENCE**

**Tuesday 3.14.17**

Today we will be going  
over your study guide.

In your notebook, title the next available page  
"Seasons"

**Write at least a paragraph answering the following:**

**"What causes the Seasons in North America?"**



# **SCIENCE**

**Wednesday 3.15.17**

Title the next page in your notebook

"Investigation 3 Part 1: Summer Heat"

In a moment, you'll receive sheets 8 and 9 that you will need to glue (or staple) into your notebook.

**Flip back to your quick write from yesterday.**

**What did you write about?**



**Lets look at this another way:**

**How do you know when it is summer?**

**Heat and more hours of daylight are not just signs that summer is here; they also can help us understand the reasons why we have seasons on Earth.**

**We'll start by looking at the issue of heat.**

**(Copy this down in your notebook)**

**Focus Question:**

**Why is it hotter in the Summer?**

**Write down what you think right now, but leave plenty of space to add new ideas later.**

**Spend 1 minute talking with your table partner to come up with at least 2 reasons why Summer is hotter.**

**I am going to use this flashlight beam to represent a beam of light from the Sun. Observe the spot of light where the beam hits the floor.**

**Lets do this again.**

**This time, I need a volunteer to trace  
around the circle of light.**

**Light is a form of energy. This flashlight and the Sun are both sources of light energy. I used this flashlight to shine light energy on this floor. This paper shows the area that the energy beam covered at two different times.**

**Flip to sheet 8**

**Discuss the demonstration in your groups. Work together to write answers to the first three questions on your notebook note sheets.**

- How do you explain the different shapes in the light spots?**
- When is the area of the spot largest?**
- Which spot delivers the greatest amount of energy on the floor?**



**Lets take a moment to discuss your answers.**

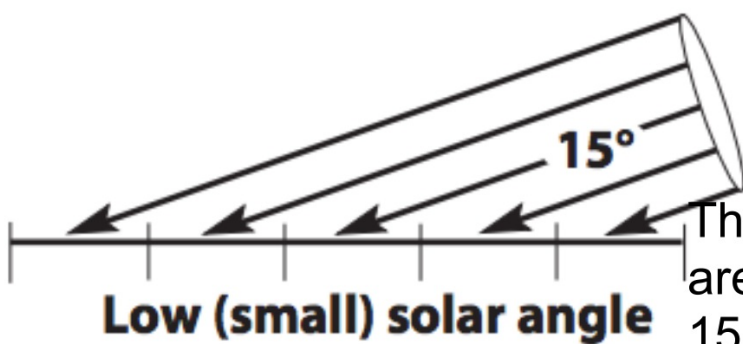
**Energy travels from the Sun to Earth as radiation. Radiant energy travels in rays. The number of rays hitting a given area is the energy concentration. When lots of rays hit an area, energy concentration is high. When few rays hit an area, energy concentration is low.**

**Lets look at the demo again:**

**The Flashlight puts out a steady beam of light rays that is about 5cm across. When the light beam falls on a surface from directly above, the area it covers is a circle about 20cm.**

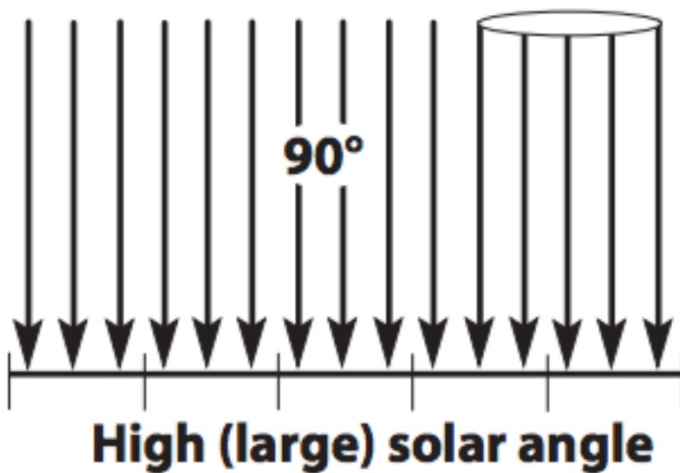
**When the angle that the light is coming from changes from 90 degrees to 15 degrees, what happens to the size of the area the beam falls on?**





The angle at which light strikes a surface is called **solar angle**.

These low solar-angle rays are hitting Earth's surface at 15 degrees.



These light rays shining from directly overhead have a high solar angle. They are hitting the Earth at a 90 degree angle.

The way a light beam covers a larger area when it hits a surface at an angle is called **beam spreading**.

Think about this. When you take a spoonful of jam and put it on a piece of toast, its all concentrated in one area. If you took a bite of that area, you'd get a lot of jam! When you spread the jam around evenly, it is still the same total amount of jam. If you took one bite of the bread, the jam would be a lot less concentrated.

**Make sure that you have these vocabulary terms in your notebook:**

**Solar Angle**

**Beam Spreading**

**Turn to Notebook sheet 8.**

**You have 6 minutes to answer questions 4-6.**





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**Thursday 3.16.17**

This globe is a model of Earth. Sunlight travels about 150 million km to reach Earth. Since the Sun is so far away, the beams that hit Earth are in straight lines and equally concentrated.

We can look at how light spreads when it hits Earth's surface by masking all the light except one column of rays. We'll put a barrier with a hole between Earth and Sun.

Can anyone describe the shapes of the light beams?

(In a moment, your group will be able to come up and try this out)

[REDACTED]

[REDACTED]

[REDACTED]

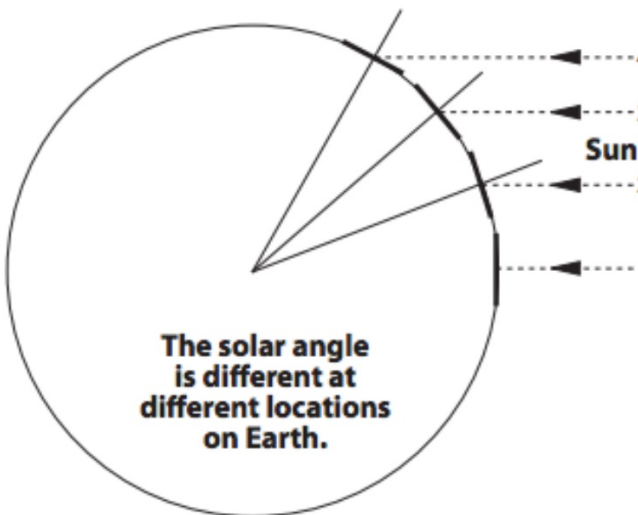
[REDACTED]

What time of day is the solar energy most concentrated?





**Earth viewed as many flat surfaces**

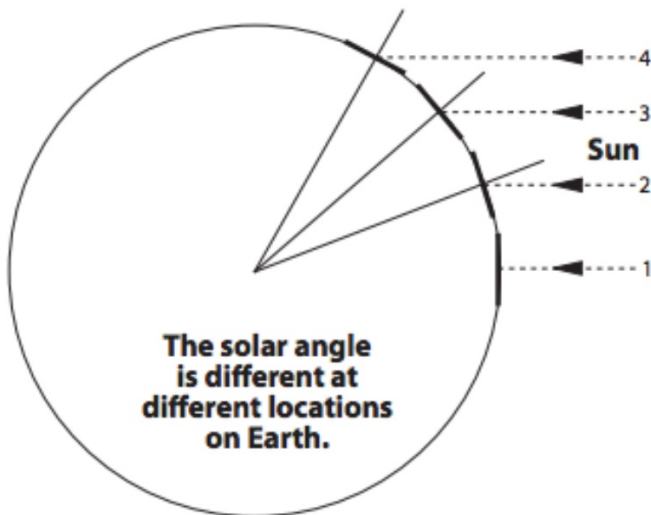


Since Earth is round, the angle at which light hits Earth is different from place to place. Light does not come to Earth from different angles. Remember, the angle between the incoming rays of light and the surface of the land is the solar angle. We can see this if we think of Earth's surface as made of lots of little flat areas.

In this illustration, we see four rays of light coming to Earth. Ray 1 happens to strike Earth at exactly at 90 degrees.



**Earth viewed as many flat surfaces**



Light ray 2, however, does not strike perpendicular to the surface because the surface is farther north. The solar angle, when compared to Earth's surface, is about 60 degrees. Light rays 3 and 4 strike the surface at even smaller angles, perhaps 45 and 30 degrees.



light energy from the Sun is distributed over a larger area when it hits Earth's surface at an angle.

Beam spreading does the same thing as you move east and west. In the morning and evening, the solar angle is low, so the beam spreading large. In the middle of the day, the Sun's energy is most concentrated because the Sun is overhead at a high solar angle.



The greater the solar angle, the greater the concentration of radiant energy. Light shining from directly above is most intense; light coming at an angle is less concentrated.

Almost all the energy coming to Earth is solar energy. Light absorbed by the land, water, and air is converted to heat.

Take a moment to reflect back on the focus question. We'll discuss this in a moment.

Take a minute to record your final answer to the focus question.

Then, take the remaining class time to complete Notebook sheet 9, Response sheet for Investigation 3.



# **SCIENCE**

**Friday 3.17.17**

Clear your desk for your test!