Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Binder Section:** Labs and Activities

Today, you will be filling out and submitting this packet. READ CAREFULLY AND THOROUGHLY for all directions.

**I. DO NOW (5 minutes):**

1. What is the scientific definition of a day?
2. What is the scientific definition of a year?
3. Why are there seasons? (If you don’t know, guess!)
4. Today we’re going to measure the sun’s angle of incidence once at the beginning of class and once at the end of class. HYPOTHESIZE: When will the sun’s angle be smaller: at the end of class, or at the beginning of class?

**II. LET’S MEASURE (10 minutes):**

You will be in a group of three. One person will be the “stander,” one the “measurer,” and one the “recorder.” The stander will stand in the middle of the field. The measurer will measure that person’s shadow length with the measuring stick. The recorder will write down the exact time of measurement, the length of the shadow, and the height, in inches, of the stander.

Time of measurement: \_\_\_\_\_\_\_\_\_:\_\_\_\_\_\_\_\_\_\_am

Length (inches) of shadow: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Height (inches) of stander: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

When we’re back in the classroom, calculate the angle of incidence of the sun. **Angle of incidence = length of shadow / height of student.**

The angle of incidence at \_\_\_\_\_\_\_\_\_:\_\_\_\_\_\_\_\_\_am is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**III. WEB EXPLORATION OF THE SEASONS (15 minutes)**

Go to: <http://www.pbslearningmedia.org/resource/npls13.sci.ess.seasons/why-seasons/>

Click “launch.”

As you explore the website, fill in the definitions of the following words. Then, answer the follow-up questions below the chart.

|  |  |
| --- | --- |
| Northern  Hemisphere |  |
| Southern Hemisphere |  |
| Equator |  |
| North Pole |  |
| South Pole |  |
| Axis |  |
| Day |  |
| Night |  |
| Orbit |  |
| Year |  |
| Summer |  |
| Winter |  |
| Autumn |  |
| Spring |  |
| Equinox |  |

**IV. FOLLOW-UP QUESTIONS: (15 minutes) must be in AECR format!**

1. Why is how close we are to the sun NOT the factor that determines the season?
2. Why is the equator warmer than areas in either the Northern or Southern hemisphere?
3. Why are there no seasons in the equatorial regions?
4. In the box below, draw where Earth is during *summer* in the Northern Hemisphere and what direction its axis points.



**VIII. HOMEWORK QUESTIONS:**

1. How did the angle of incidence change throughout the class period? Did it increase? Decrease?
2. Why did the angle of incidence change?
3. HYPOTHESIZE: How will the angle of incidence change throughout the year as the seasons change?
4. Why is it winter in Australia when it is summer in the United States?
5. Which is more important in determining climate changes: Earth's orbit or Earth's tilt on its axis? Why?