Date: Tuesday November 25, 2014 **Subject:** Science
Grade: One and Two **Lesson Length:** 1 hour

Planning For Students: Lessons one
Content (Topic): How the position of the sun changes your shadow.

Outcome/Indicators:
DS 1.1 Compare and represent daily and seasonal changes of natural phenomena through observing, measuring, sequencing, and recording.

a) Observe daily and seasonal changes in the amount of heat and light from the sun, including the formation of shadows (e.g., length of day, temperature differences throughout the year, and changes in shadow length throughout a day and a year)
f) Document the visibility and position of objects (e.g., sun, moon, planets, and stars) in the sky at different times of the day and year.

Lesson Preparation: Equipment/Materials:

- 6 flashlights
- 6 pieces of black construction paper
- 6 pens
- 6 pieces of clay
- Students observation booklet

Presentation
Set:

- Once all students are in and seated from recess send students for bathroom and drink.
- Have students meet at the meeting area.
- Review with students if the sun looks like it is in the same place in the sky at all times (no). Is it the sun that moves or the earth that moves? (The sun does not move but the earth is constantly spinning so it looks like the sun is moving but it is actually the earth that is moving).
- Review with students what the sun appears to be doing in the early morning at noon and in the evening. Make sure students use the words rising and setting to describe what the sun appears to be doing in the early morning and in the evening.

Development:

- Ask students what two things we need to make a shadow? (light and an object)
- Remind students that in the video we watched bear saw is shadow when he was out fishing in the morning but then when it got closer to lunch time his shadow starts to disappeared. But then after his nap his shadow starts to appear again.
- Ask students what causes our shadow to change throughout the day (the position of the sun)
- Review what happened when we started our shadow experiment last week. What did you see when the sun was in the early morning position (a great big long shadow that was kind of thick)

- How did the shadow change when you held the sun (flashlight) in the mid morning position? (The shadow got shorter and thinner)
- We are going to get ready to finish our experiment to see how shadows change during the day based on the position of the sun.
- So the first thing we need to do is get into our lab groups. When you hear your name you need to go get your pencil and come to the table your group is working at
- Remind students that the position of the sun that is highlighted on your sheet is the position you are responsible for being the sun for. Have the students with noon highlighted come and get the flashlight.
- Call students up by other position of the sun to get the other supplies they will need. Each group will need a pencil, clay and a black piece of paper.
- Have student put the black peace of paper in the middle of their desk. Then have students put the clay in the middle of the black peace of paper. Finally have student stand the pencil up in the clay.
- Have students hold the flashlight in the position the sun would be in at noon. Walk around the classroom to make sure the sun is in the correct position for noon. Once all students have the sun in the correct position for noon turn off the lights so the students can see the shadow.
- Once students have had a chance to look at the shadow have them turn off the flashlights and turn the light back on. Talk about what they saw. Was there a shadow? Did the shadow get bigger or smaller? What direction did the shadow go?
- Turn the lights off so the students can have another look at the shadow before the draw their observations.
- Turn the lights back on and ask them to draw what they see. Remind students that they need to draw everything that they see. So that means they need to draw where the flashlight is, where the pencil is, how long the shadow is, how thick the shadow is, and what direction the shadow goes in.
- When students are done drawing re-gain the students attention when they are done drawing and have them switch the flashlight to the person who is in charge if the position the sun is in in the mid afternoon. Check to make sure the flashlight is in an accurate position for mid afternoon. (review what mid afternoon means.)
- Once it is confirmed that the flashlights are in the right spot turn off the lights to allow for the students to have a look at the shadow.
- Once the students have had some time turn the lights back on witch will be the students que to turn off the flashlights and listen. Ask students what they saw? (the shadow is starting to get bigger)
- Why do you think it is getting bigger?
- Is the shadow similar in size to any other time in the day.
- Turn the lights out so the students can have another look at the shadow. Then have the student draw their observations.
- Re-gain students attention one more time and set the flashlight in position for evening. Once all the students have the flashlight in the right spot turn off the lights and look at the shadow.
- Turn the lights back on and ask students to describe what they saw. If the shadow got bigger, small, thicker , thinner.

- If students need allow them to have one more look at the shadow before they draw their observation.
- When students are finished drawing the shadow from the last position have students return the materials. The person in charge of evening will return the flashlight and then other students in charge of other positions will be instructed to return other materials.

Closure:

- Re-group as a large class.
- Tell student that our first step in our experiment was to make a prediction, and then we made our observations now we have to make a conclusion. Have students answer the questions as to what positron gave them the smallest and biggest shadow.
- What should you do if you had more then one position that had the biggest or smallest shadow?
- As a whole class share results as to what position of the sun gave you the biggest shadow and what position gave you the smallest shadow. If any groups have results that do not align with the other groups talk about what could have caused this.