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Lesson: Earth Science  
Grade: 4<sup>th</sup> Grade  
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### **The Big Picture**

E.ST.E.2 – Patterns of objects in the sky have predictable patterns and movements.

### **Learning Outcomes**

E.St.04.24 – Explain how the visible shape of the moon follows a predictable cycle, which takes approximately a month.

### **Key Resources**

1 sun model	paper/pencil
1 Earth model	observation chart
1 moon model	
25x hand held balls – painted black/white	
50 Oreo cookies	
30 toothpicks	
1 light source	

### **Key Words**

Earth  
sun  
moon  
reflect  
phases of the moon  
cycle  
natural satellite  
predictable cycle

### **Possible Misconceptions**

1. The moon gets bigger and smaller.
2. The phases of the moon are caused by shadows cast on its surface by other objects in the solar system.
3. The phases of the moon are caused by the shadow of the Earth on the moon.
4. The moon moving into the sun's shadow causes the phases of the moon.
5. Clouds cause the phases of the moon.
6. The same side of the moon is always dark.

### **Key Q's**

1. What does "explain" mean?
2. How does the moon shine?
3. What are the phases of the moon and how does it cycle through them?
4. Why does the moon change shape from day to day?

### **Differentiation**

Direct questioning

### **Safety**

Do not touch bulb that represents the sun – it is hot. Leave that on the chair.

## **The 7 E'S OF PLANNING**

### **Elicit**

**Post-its** on Key Q's. Students use post-it notes and post their thoughts, questions, and ideas about each Key Q.

### **Engage**

\*Long-term engage – Students will create an observation chart and keep track of the shape of the moon for a month by diagramming the shape of the moon, keeping track of time they observed the moon, and the relative position in the sky.

\*Immediate engage – Using the black and white balls (model moon), have the students go outside and see how the light hits the moon as they move the ball around them. Discuss.

### **Explore**

Using sun/Earth/moon models, demonstrate the phases of the moon. Have the students participate by becoming the sun/Earth/moon models and moving around with the models to see how the phases of the moon are created.

View:

Phases of the moon time lapse:

[http://aa.usno.navy.mil/faq/docs/moon\\_phases.php](http://aa.usno.navy.mil/faq/docs/moon_phases.php)

Large Lunation movie:

[http://www.usno.navy.mil/USNO/astronomical-applications/images\\_aa/Moon\\_movie.gif/view](http://www.usno.navy.mil/USNO/astronomical-applications/images_aa/Moon_movie.gif/view)

### **Explain**

Discuss the phase of the moon. The students will draw each phase of the moon and label them: new moon, full moon, first quarter, third quarter, waning gibbous, waxing gibbous, waning crescent, or waxing crescent. Students will also make connections to prior knowledge, explain concepts and definitions.

### **Elaborate and Extend**

Students will model the phases of the moon and how it works to the other 4<sup>th</sup> grade classroom using moon/sun/Earth models and appropriate vocabulary.

Also, the students can create the different phases of the moon using Oreo cookies. Students will take the top off the Oreo and then use a toothpick to remove some cream and create each phase of the moon. They will then place them around an Earth model to show the different phases. Label.

JPS phases of the moon assessment.

**Evaluate**

Learning Journal (writing across curriculum) – Explain the phase of the moon. Use the all Key Words. Prior to this journal entry discuss what “explain” means, since it is used in many standardized tests.