



## 6-8 / Science: Creating a Sun Map

### Overview:

*(Time Needed: 45 minutes - in increments throughout at day)*

### Georgia Performance Science Standards:

- 6th Grade:
  - S6E1d. Explain the motion of objects in the day/night sky in terms of relative position.
  - S6E2a. Demonstrate the phases of the moon by showing the alignment of the earth, moon, and sun.
  - S6E2c. Relate the tilt of the earth to the distribution of sunlight throughout the year and its effect on climate.

### Objectives:

- Students should be able to explain and model the motion of objects in the day/night sky.
- Students should be able to identify the phases of the moon and demonstrate the corresponding alignment of the earth, moon, and sun.
- Students should be able to relate the tilt of the earth to the distribution of sunlight throughout the year and its effect on climate.
- Students should be able to collect data on the sun exposure in their garden and use that information to make decisions about their planting.

### Materials:

- Variety of seed packets (including spinach seeds)
- Black, yellow, and green colored pencils (1 set for each small group of students)
- White paper (4 pieces for each small group of students)

### Outline:

- Engage: Model the movements in the solar system
- Explore: Create a sun map of your garden
- Explain: Examine seed packets for sun requirements
- Extend: Learn to plant by the moon phases
- Evaluate: Create garden plan based on discoveries

## Lesson Plan:

- Engage (whole group) - 10 minutes
  - Model the motion of objects in the day/night sky.
    - Sun – Choose one student to stand in the middle of the learning space to serve as the sun.
    - Earth's Revolutions – Choose another student to serve as the Earth and model the revolutions around the sun. How long does it take the Earth to revolve around the sun?
    - Earth's Tilt – Have the same student carefully attempt to tilt in one specific direction while revolving around the sun. How does the tilt of the Earth affect us? (Seasons) Discuss what seasons are occurring at different times throughout the revolution around the sun (year). How does this affect our garden? How would this affect people growing food in other parts of the world?
    - Earth's Rotations – Have that same student carefully attempt to model Earth's rotations. How long does it take the Earth to revolve around the sun? Discuss what time of day is occurring at different times throughout the rotation. How does this affect our garden?
    - Moon – Choose another student to serve as the moon and carefully model revolutions around the Earth. Discuss the moon phases that occur based on the alignment of the sun, earth, and moon. How does this affect our garden?
- Explore (independent / in seats) - 15 minutes
  - Draw a map of your outdoor space (with sharpie on white paper).
    - Individually – Each student can create a map of their outdoor space at school.
    - Small Group – Small groups can work together to create a map of their outdoor space at school.
    - Whole Group – The teacher can create a map of the outdoor space at school.
  - Make four copies of each map and label them as follows:
    - Morning
    - Noon
    - Afternoon
    - Final Sun Map
  - Visit outdoor space during each of the given times (morning, noon, afternoon) and color in the areas where you see shade.
  - Analyze and color-code your three maps to determine the sun exposure in different areas of the outdoor space.
    - Full Sun (Yellow) – Areas that were not colored in on any of your maps throughout the day.
    - Partial Sun (Green) – Areas that were sometimes colored in on your maps throughout the day.
    - Shade (Black) – Areas that were always colored in on your maps throughout the day.
- Explain (whole group / in classroom) - 5 minutes

Explain that different plants need different amounts of sun daily and it is listed on the seed packets. Give students a chance to explore a variety of seed packets to determine how much sun they need. Allow students to discover that spinach needs full sun (at least 6 hours each day) and allow students to determine where to plant spinach in their garden.

- Extend (whole group / in classroom) - 5 minutes  
 Plant by the Moon Phases: It has been said that planting by the moon phases results in a larger, tastier harvest. Plant flowers or vegetables that bear crops above ground during the light, or waxing, of the moon. Plant flowering bulbs and vegetables that bear crops below ground during the dark, or waning, of the Moon.  
 Students can plant a bed of spinach while the moon is waxing and a bed of spinach while the moon is waning to determine if planting by moon is a reasonable strategy to grow a larger, tastier harvest. (Remember to discuss all of the other factors that could have contributed to altering the growth of each bed as well).
- Evaluate

*Example Evaluation*

Engage S6E1d. S6E2a.	Student participated in modeling the motion of the objects in the day/night sky.	___/ 25
Explore	Student created a sun map showing the shadows that were cast on the outdoor space throughout the day.	___/ 25
Explain	Student participated in determining where to plant spinach in the garden.	___/ 25
Extend S6E2a.	Student participated in exploring ideas of planting by the moon cycles.	___/ 25
TOTAL		___/ 100