Movement of Sun/Shadows: 4.E.3B.3

- **Characters**: Seth, Seth’s Shadow, and the Fifth Graders
- **Plot**:

  - Seth is walking to school, like he does every day. He hears a whisper saying, “Hey kid over here!”
  - Seth turns around and doesn’t see anything, he just thinks it’s his imagination.
  - Seth hears the voice again, he turns around and this time he thinks it is one of the fifth grader and starts running.
  - Seth hears the voice again. The voice says, “Stop, I can help you!” Seth turns around and says, “Who are you? I can’t see you!!”
  - The voice says, “Hey I’m down here!” Seth looks at the pavement, and Seth’s shadow waves at him.
  - Seth’s shadow explains to him he is tired of seeing Seth get picked on and that he is going to help him today stand up the Fifth Graders.
  - Seth’s shadow says, “Today, at recess, you might not be able to see me, because the sun controls how tall or short I am!” Right now, I am tall because it is morning, and the sun is low in the sky. But, at 12PM, I will be invisible because the sun is directly overhead!”
  - Seth’s shadow says, “You’ll see me again in the evening, but you won’t see me when it is dark out. But remember, those times when you don’t see me, I’m invisible but I’m still here.”
  - Seth thinks to himself—Okay… I am tired of being bullied. We’ll see if this works!
  - He sits through classes but he can’t really pay attention because he can’t help but thinking about what will happen at recess.
  - Recess comes at 12PM, Seth hides behind the monkey bars but the Fifth Graders see him anyways and turn him upside down and start shaking him for his lunch money.
  - All of a sudden, a voice shouts out, “STOP THAT!!! WHO DO YOU THINK YOU ARE?”
  - The Fifth Graders look around, and turn back to Seth and say, “YOU BETTER NOT BE TALKIN BACK BOY!”
• The voice then says, “I’m talkin’ to you boys!! Leave Seth alone!!”

• The Fifth Graders drop Seth on the ground and say “Let’s get out of here, Seth is talking to himself!!”

• Seth is on the ground, and a little scared. But then he starts to grin and he says to himself, “I bet they won’t mess with me again!”
ACTIVITY - Movement of Sun and Shadows

4.E.3B.3 Construct explanations of how the Sun appears to move throughout the day using observations of shadows.

It is essential for students to know that objects on Earth cast shadows that help show Earth’s rotation. The angle of the Sun, low in the sky to higher in the sky, changes the length of the shadow cast behind an object.

- In the morning, the Sun appears low in the sky; objects cast long shadows.
- As Earth rotates, the Sun’s appears higher in the sky, and the shadows get shorter.
- At noon, with the Sun overhead, objects cast short shadows or no shadow at all.
- As Earth continues to rotate and the Sun appears lower in the sky toward evening, the shadows get longer again.

Activity:
Flashlight and object tracing
http://www.schoolsobservatory.org.uk/astro/esm/shadows

Supplies:
Flashlights
Styrofoam balls with objects glued to them
Pencils for tracing
Assessment:

Have 4 cutouts marked morning, noon, afternoon, and night
Have the students color the location of the sun (there will be 3 positions)
Put their 3-D object on the circle in the center of the cut-out
Draw the shadow of the object paying attention to direction and size
Ask them – does the sun move?

Shadows

What time is it?

Below are 4 boxes – one for morning, one for noon, one for afternoon, and one for night. There are three positions of the sun. Your tasks are:

1. Color only the sun that represents where the sun is at that point in the day.
2. Place your object in the center of the circle for that part of the day.
3. Draw the shadow (paying close attention to direction and size) for that part of the day. You can use a flashlight to help in your drawing.

Morning:
Noon:

Afternoon:
Night:

Does the sun move?

YES       NO