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Theme B: Day 2 Plan

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THEME B

Becoming a Spacewalker: My Journey to the Stars by Astronaut Jerry L. Ross

DAY TWO STEM EXTENSION TO ACCOMPANY DAY TWO INTERACTIVE READ ALOUD

To Ponder: *Sputnik 1* changed the world forever on October 4, 1957. What do *Sputnik 1* and a beach ball have in common? (Teacher holds up an inflated beach ball.)

SCIENCE/TECHNOLOGY/ENGINEERING/MATHEMATICS (STEM) ACTIVITIES:

Science Investigation: *Gravity and the inflated beach ball.* Yesterday we investigated a bouncing basketball. Today we will investigate another sphere—an inflated beach ball. This particular sphere is comparable to *Sputnik 1*. I wonder what the force is that pulls an inflated beach ball and a bouncing basketball down to Earth. Let's investigate how and why.

Vocabulary: sound, sight, force, gravity, weight

Goal: To explore gravity and an inflated beach ball and their connection to *Sputnik 1*

Purpose of Science Activity: The purpose of the inflated beach ball activity is to compare and contrast the basketball from day one and the beach ball from day two. Then, apply observations about the beach ball and how it relates to *Sputnik 1*.

Materials: basketball, beach ball, *Sputnik 1* information, scale, chart paper, marker, student science journal/notebook/iPad, pencil

Sputnik 1 Facts:

The course of history was changed forever on October 4, 1957, when the Soviet Union launched the first man-made orbiting satellite, *Sputnik 1*. This was the beginning of the “great space race” between the Soviet Union and the United States of America. The satellite was about the size of a beach ball, weighed about 184 pounds, and took approximately 98 minutes to orbit the earth.

Before Activity:

- **Activate prior knowledge:** Review day one's data chart(s). A beach ball is also a sphere. What do we know about a beach ball? List three facts.
- **Prompts to encourage prediction:** Using our sense of hearing and sight, what do you think the beach ball will sound like and look like when bounced? (Predicting) Using your sense of sight, what do the beach ball and *Sputnik 1* have in common? (Inferring, logical reasoning)
- You can listen to *Sputnik 1*'s telemetry in orbit through the following website:
<http://history.nasa.gov/sputnik/sputnik.wav>
- **Draw on personal experience:** From your experience playing with a beach ball, what happens when applying a push to the beach ball? Is the push always the same? Is the same amount of push applied each time? What happens when a beach ball is dropped from a certain height?
- **Set a purpose for experiment:** To explore a force (push or drop) on a beach ball
- **Draw or write prediction for each object in science notebook or use graph:** After discussing with students, model note-taking strategies for your students by making a list of student

observations on chart paper in word and/or picture form. List at least three student observations. Display chart paper in classroom for future reference.

During Activity:

1. Educator holds beach ball in hand(s) and expresses science objective is to develop an understanding of what happens in making a beach ball bounce (force-drop or push).
2. Students refer to day one's chart and think about today's objective. Students compose or illustrate what they predict will happen in their science notebook/journal/iPad. "When dropped, I predict the beach ball will . . ." (written in words or illustrated picture form).
3. Students share prediction with partner (partner share).
4. Discuss student prior knowledge and predictions in whole group.
5. Educator holding beach ball represents potential energy.
6. Educator drops (force) beach ball and encourages student observations (kinetic energy).
7. Discuss what happened. Students record what happened. "When the beach ball was dropped . . ." (written in words or illustrated picture form).
8. Educator encourages student predictions for pushing the beach ball. Students write or illustrate their predictions. Student shares with partner.
9. Educator demonstrates and applies force (push) to the beach ball and again encourages student observations. Emphasizing senses of hearing and sight, the students record what happened.
10. Teacher asks what direction(s) the ball is bouncing and investigates what happens when beach ball is inactive.
11. On chart paper, compose three facts that the beach ball and basketball have in common.
12. Educator further investigates beach ball by asking students how much they think the beach ball weighs. Students listen and record student predictions in science notebook/journal/iPad. Utilizing scale, weigh beach ball and record weight on chart paper and in student science notebook/journal/iPad. Keep data on display for students.

After Activity: What does your evidence show? Complete together and record student responses.

- *The inflated beach ball evidence showed that* _____.
- *My conclusions about the inflated beach ball are* _____.
- *Reflections:* The basketball, the beach ball, and *Sputnik 1* are all spheres. *Sputnik 1* was about the size of a beach ball. The basketball, beach ball, and *Sputnik 1* were the same shape, but very different in weight. The basketball weighed _____ lb/_____ kg; the beach ball weighed _____ lb/_____ kg; *Sputnik 1* weighed about 184 lb/about 84 kg.

Extensions: To discover additional facts about *Sputnik 1* and to, listen to the telemetry from *Sputnik 1* as it passed overhead on October 4, 1957.

Resources:

Sputnik and the Dawn of the Space Age (NASA):

<http://www.hq.nasa.gov/office/pao/History/sputnik/>

Telemetry from *Sputnik 1* as it passed overhead:

<http://history.nasa.gov/sputnik/sputnik.wav>