Grade level: 3rd grade

The sun's energy – Data collection & Graphing

GOALS

Content Area: Science

Common Curriculum Goal: Collecting and Presenting Data: Conduct procedures to collect, organize, and display scientific data. (01)

Science Standard/Benchmark: SC.03.SI.03 Collect data from an investigation.

Language Arts Standards: EL.03.RE.21 Interpret information from diagrams, charts, and graphs.

Math Standards: 3.2.7 Analyze frequency tables, bar graphs, picture graphs, and line plots: and use them to solve problems involving addition, subtraction, multiplication, and division.

ESOL Goal (Function): Hypothesizing and Speculating

OBJECTIVES

Science objective 4a: After participating in a simulation of the sun's energy and distance, students will be able to demonstrate an understanding of gathering and graphing data by producing one completed data table and a graph of two lines.

Objectives (Forms):

B& EI: Respond to questions in single word responses or simple sentences.

I: Auxiliary verbs that indicate futurity: Will and Shall. "The Earth model will get hottest."

PRIOR KNOWLEDGE

- Students should have some experience reading or working with graphs.

MATERIALS

- Graphing worksheet
- Journal for data collection
- Large easel-sized graph paper for modeling
- Large easel-sized sheet for data
- 2 cans – one labeled "Earth" and one labeled "Distant Planet"
- Lamp
- 2 thermometers
- Stop watch or clock with second hand

PROCEDURE

Anticipatory set

- "Today we are going to continue to study the sun and its energy. Remember that the sun's energy reaches the earth differently during different seasons. Today we will examine how the sun's heat energy can affect the objects that receive it."
- Students should choral read pg. 226.
- Students should write a hypothesis for the question provided on this page.
- I will put vocabulary (star, planet, satellite)on the Word Wall (Peregoy & Boyle, 2008).

Teaching

- Show students the lamp, labeled "sun", and the two cans, one labeled "Earth" and one labeled "outer planet". Students should observe as they are set up (as described on page 227 of the text book).
- Explain that while students are doing other things the experiment will be running. Every two minutes I will ask everyone to record the temperature of the cans on their data chart. They will record the time and the temperature.
- Tell students that later we are going to be very scientific when we make a graph that shows the temperature of each can.
- Ask students to predict which model will get hotter, "Earth" or the "distant planet", and why they think so.
- Model for students how to build a table in their science journal for writing data in. Supply students who need scaffolding a pre-made data table (I will create the table in their journal).
- When it is time to graph, show students how to use the data and start the first graphed line for them.
- While we wait for the cans to warm up, students read the first 5 sentences on pg 228. Fill in the GLAD chart.

Guided practice

- Give students a graph paper that is most appropriate for the individual's level (Tomlinson, 2003), either pre-labeled or blank.
- Demonstrate how to find the dependant and independent values on the graph. Have students label each axis. Give instructions like "Touch the left side of the graph" and "Show me where you think the title will go" to assess and guide students.
- Explain about how to make and use a key. Remind them that they will be drawing the line in pencil first and then going over it in a colored pen for the key.
- Ask students to read the first data point as I plot it.
- Then ask students to come up and demonstrate their understanding.
- Ask students to do the next one without help. Have them hold it up when you are done.

- Pull the students that still need support and send them with the Teachers Assistant for further work.
- Finish the rest of this line with the students.

Independent practice

- Students should finish the second line by them selves or in groups as support is needed.

Closure

- "Today we learned about simulations as one way to study the sun. We also learned how to record scientific data and how to show the data in a graph. Tomorrow we are going to learn how to read and explain the graph."

DIFFERENTIATION

- realia
- Further differentiation is highlighted.

ASSESSMENT

Informal: observations during data collection and graphing

Formal: After participating in a simulation of the sun's energy and distance, students will be able to demonstrate an understanding of gathering and graphing data by producing one completed data table and a graph of two lines.

Targeted Language Skills:

Reading: Students read the data on our Celsius data chart.
Writing: students wrote the data on their data table and the labels for their graph.
Listening: Students listened to each other as we conversed about the ordered pair placement
Speaking: Students spoke to explain their thinking.