

Grade 1 Clarifying Lessons: More Land or Water?

OLD Resources. These resources have NOT yet been updated to align with the revised elementary mathematics TEKS. These revised TEKS were adopted by the Texas State Board of Education in 2005, with full implementation scheduled for 2006–07. These resources align with the original TEKS that were adopted in 1998 and should be used as a starting point only.

What is a Clarifying Lesson?

A model lesson teachers can implement in their classroom. Clarifying Lessons combine multiple TEKS statements and may use several Clarifying Activities in one lesson. Clarifying Lessons help to answer the question "What does a complete lesson look like that addresses a set of related TEKS statements, and how can these TEKS statements be connected to other parts of the TEKS?"

TEKS Addressed in This Lesson

Number, operation, and quantitative reasoning: 1.1B

Measurement: 1.7A

Probability and statistics: 1.9A, B; 1.10A

Underlying processes and mathematical tools: 1.13A

Materials

- inflatable globes (one per pair of students)
- small sticky dots (one per student)
- newsprint
- markers
- interlocking cubes and balance scales (or graduated cylinders, spoons, sand, and water)

Lesson Resources

Alexander and the Terrible, Horrible, No Good, Very Bad Day by Judith Viorst

Flat Stanley by Jeff Brown

Lesson Overview

Students collect a random sample by tossing an inflatable globe and recording whether they touch land or water each time they catch the globe in order to predict whether more of the surface of the earth is covered by land or by water.

Mathematics Overview

Students use sorting to organize the data, then use ideas of tens and ones to describe the data and compare the results in order to make predictions.

Set-up (to set the stage and motivate the students to participate)

1. Read a story like *Flat Stanley* by Jeff Brown or *Alexander and the Terrible, Horrible, No Good, Very Bad Day* by Judith Viorst that involves cross-continent traveling. (Remember, Alexander decides he'll just go to Australia!)
2. Locate on the globe the places named in the story and discuss what kind of route would need to be used to get there—travel across land vs. travel across water.
3. Ask students whether they think more of the surface of the earth is covered by land or water.
4. Ask them to explain their choices. (1.13A)
5. Brainstorm with students ways they could find out which covers more of the earth, land or water. Suggestions might include finding a puzzle of the globe, putting the "water" pieces in one pile and the "land" pieces in another, and comparing the two piles. (1.9A)
6. Demonstrate for the students one way to collect random samples of data by tossing the globe lightly, catching it, and looking to see whether your index finger is touching land or water. Discuss ways to make sure that the catch is as random as possible (e.g. toss or roll the globe between two people). (1.9A)
7. Have each student place a "sticky" dot on the nail of the right index finger to mark it as the one to look at after catching the globe. (1.9A)
8. Have each group identify a tosser, a catcher, a watcher, and a recorder. The tosser should toss (or roll) the globe to the catcher 5 times while the watcher and recorder collect and record the data. The jobs should then be rotated until every person in the group has performed every job and the group has 20 pieces of data recorded. (1.9A)
9. Have each group suggest ways to organize its own data to make comparisons and come to a conclusion (1.10A). Organization and comparison of the data could be done by representing the data with interlocking cubes (maybe blue for landing on water and green for land) and comparing the two sets by making groups of tens (1.1B), making a bar graph (1.9B), or weighing them on a balance scale (1.7A). The data could be represented also by placing a teaspoonful of sand in a graduated cylinder for each land tally and a teaspoonful of water in another graduated cylinder for each water tally; then comparisons of the volumes could be made (1.7A).

Teacher Notes (to personalize the lesson for your classroom)

Guiding Questions (to engage students in mathematical thinking during the lesson)

- How can you keep a record of where your finger lands on the globe each time? (1.9A)
- How are you going to record your result if your finger lands on both water and land at the same time? (1.9A)
- What are some different ways of recording the tosses? (1.9A)
- Do you think rolling the globe gives you different results than tossing it? (1.9A)
- How can you decide whether your finger landed more times on land or water? (1.9B, 1.1B, 1.7A)
- What kind of techniques can we use to compare the two sets of data? (1.9B, 1.1B, 1.7A)
- What conclusions can you make from your data? (1.10A, 1.13)
- Do you think your data is just like any other group's data? Why or why not? (1.13)
- Do you think if you did this experiment again that you would get exactly the same set of data? How do you think it might be the same? How do you think it might be different? (1.13)

Teacher Notes (to personalize the lesson for your classroom)

Summary Questions (to direct students' attention to the key mathematics in the lesson)

To make sure students connect the representation of the data (cubes, spoons of sand, etc.) back to the actual land and water on the earth, ask questions such as:

- How did your group decide to represent your data? Why do you think that is a good representation? (1.9A, B)
- What techniques did your group use to compare the land to the water? Which ones do you think worked the best? (1.9B, 1.1B, 1.7A)
- What conclusions did you make from your data? Why? (1.10A)

To help students begin to understand the idea of random sampling, ask questions such as:

- How is your group's data different from the data of another group? (1.13)
- How are the data from all the groups alike? (1.13)

- What if the globe were larger or smaller? Would the results change? Why or why not? (1.9A, 1.13)
- What if the experiment was done with adult hands? With a baby's hands? Would the results change? Why or why not? (1.9A, 1.13)

(Students of this age may not yet be able to reason proportionally and may not realize that different sizes of hands and different sizes of globes will give the same relationship between the data that represents land and the data that represents water--about three pieces of water data for every piece of land data.)

To get an idea of what level of understanding students have about the effects of taking larger samples, ask questions such as:

- What conclusions can you make from the combined data of the whole class? How are these conclusions alike or different from those made from your group's data? (1.10A, 1.13)
- Why do you think the combined results did/didn't match your group's results? (1.10A, 1.13)
- How would the results be affected if we tossed the globe fewer times? More times? (1.9A, 1.13)

Teacher Notes (to personalize the lesson for your classroom)

Assessment Task(s) (to identify the mathematics students have learned in the lesson)

- Give each student a set of red and blue cubes to represent data collected from another class. Have each student show how he or she would organize and display the data and how he or she would use numbers and ideas of tens and ones to describe the data.
- Have students suppose that after watching a scary movie their little brother or sister is really afraid of a meteor coming down and crashing on his or her head. How could they use this information to help them be less scared?

Teacher Notes (to personalize the lesson for your classroom)

Extension(s) (to lead students to connect the mathematics learned to other situations, both within and outside the classroom)

- Students can work as a large group to dictate a story about how this information might affect their future. (For example, what implications does it have for population growth? For food resources? What happens when the land is filled with people?) (See Social Studies TEKS (6) Geography.)
- Students can toss the globe 5 more times each to see if the additional data changes their conclusions.
- Students can use a piece of centimeter graph paper to estimate the area on the surface of the globe covered by water and the area covered by land and compare their results to their conclusion arrived at from the random sample of data.

Teacher Notes (to personalize the lesson for your classroom)