

Lesson Plan: Finding the Best Path to Freedom for Clara and Jack

by Christy Rhoades

*Based on the book of the month, Sweet Clara and the Freedom Quilt
Mathematics, grades 7, 8*

Measurement

Discrete mathematics is an area of mathematics that deals with finding the most efficient path that can be taken determined by established criteria such as distance, time, and cost.

Topic

Finding the best path to freedom for Clara and Jack, from the story *Sweet Clara and the Freedom Quilt*

Lesson Plan Synopsis

During this activity, students will determine the best path for Clara and Jack when given specific scenarios. They should conclude that the best path is the shortest one. Distance compared to time (rate of travel) is a factor when obstacles are presented.

Entry Competencies

Use appropriate measuring tools.

Add fractions and decimals.

Make conversions using calculators.

Objectives

1. Identify correctly which path is the best path, first by choosing and applying estimation strategies and then by using string and a centimeter ruler to measure accurately (to the nearest mm) and compare to estimate.
2. Depending on the focus, teacher chooses one or more of the following writing prompts to be used as objectives:
 - Explain how the best path might change if there is an obstacle in the way along the shortest path (emphasis on time).

OR

- Explain how to piece together parts of paths in order to measure efficiently (emphasis on distance).

OR

- Explain how many meters Clara and Jack traveled if 1 centimeter = 2.5 meters.

Aligned Ohio Indicators

Grade 7: Measurement

3. Estimate a measurement to a greater degree of precision than the tool provides.
5. Analyze problem situations involving measurement concepts, select appropriate strategies, and use an organized approach to solve narrative and increasingly complex problems.

Grade 8: Measurement

3. Use appropriate levels of precision when calculating with measurements.
7. Apply proportional reasoning to solve problems involving indirect measurements or rates.

Mathematical Processes

Students use mathematical processes and knowledge to solve problems. Students apply problem-solving and decision-making techniques and communicate mathematical ideas.

Materials

- Benchmark/indicator strips

- Math word wall vocabulary: *measure, length, unit, distance, direction, estimate, standard unit, centimeter, millimeter, metric unit, U.S. customary unit, precision*
- Marker
- Tape
- Blank transparencies and overhead marker (used to model writing when students are given journal prompts)
- String
- Safety scissors
- Quilt maps drawn with marker on poster board (one for each small group and a teacher map for display). All the maps should be the same. I suggest you use the endpapers of the book for your pattern, modifying it as you see fit. In order to to be sure the students could measure the paths, I drew them so they could be easily found.
- Ruled paper
- Centimeter rulers
- *Sweet Clara and the Freedom Quilt*, written by Deborah Hopkinson with paintings by James Ransome
- Writing prompts, as listed in the Objectives section

Technology Infusion

[Funbrain: Measure It!](#) includes games that help students practice linear measurement in centimeters or inches. The easy centimeter game appears to be actual size. *Just a note of caution,*

though: Please remember that websites may contain advertisements, and so you always need to check content prior to student use.

Safety Issues

Remind students how to carefully handle scissors. Advise students that scissors must stay at the table; no walking around with scissors.

Procedure

Prior to class: Display the benchmark/indicator strips and the objectives; get materials ready.

1. Verbalize the specific objectives for this special activity.
2. Take a few minutes to discuss *Sweet Clara and the Freedom Quilt*. Ask, “Why did Clara make the freedom quilt?” *A sample answer:* “Clara made the freedom quilt to keep track of landmarks told to her by others so that she and other slaves might one day find freedom.” Encourage students to engage in culturally relevant discussion as it occurs naturally, providing guidelines for etiquette (such as waiting one’s turn, listening respectfully).
3. Tell students: “I want you to work in groups to **find out which path is the best path to take if you were Clara and Jack.**”
4. Divide students into groups, giving each group a poster of the freedom quilt with marked paths. Facilitate as students work to discover the shortest path. Students will use estimation strategies to eliminate some paths. Students will discover which path is the

best path. Facilitate to guide students to find a shortcut to measuring paths: Measure portions of path and add together. *Eighth grade:* In addition, use the scale 2 cm = 1.5 mi to find the “actual” distance measured. For an extension, change the scale and repeat.

5. Ask students to return to their seats. Discuss briefly the correct path Clara and Jack would have taken to get to freedom as fast as they could.
6. Provide one or more writing prompts as listed in the Objectives section. Model by writing an example answer, and make it clear to students they are not permitted to use the example in their writing. Collect the writings, and then ask students to share their responses. As students share, write a few of the responses to provide an additional model of good writing. (This last suggestion is proof that we are all always learning—it is a recommended way to engage students in writing that I learned from my collaboration with the literacy coach!)

Assessments

Use informal assessment such as a checklist and the prompted writing; a variation that may be used is closure assessment: Provide a scenario where the shortest path is blocked, and require students to find and measure the best path in this special case. *Suggestion:* The applets in [Funbrain: Measure It!](#) may be used as a preassessment tool.

Extension

Ask students if there might be an instance when the shortest path is NOT the BEST path? A

sample answer: “The shortest path wouldn’t be best if there is something in the path that would slow down Clara and Jack such as an overflowing river or broken bridge.”

Some Things to Think About

Use benchmark fractions to assist when measuring to greater accuracy than the tool provides.

Discussion may lead to distance, d , compared to time, t , or d/t . This is the rate of travel.

Discussion may lead to the difference between speed and velocity. Speed is the rate traveled without direction. Velocity is the rate of travel that includes direction (forward, reverse). For example, the velocity of a falling object is a negative rate. The velocity of a ball being tossed up (but not coming down) has a positive velocity.

Suggested Modifications

- A. Use a clear ruler with a raised handle (e.g., overhead ruler), and place the ruler over a length of string that has been taped down in a straight line segment so that the string can be seen through the clear ruler. This will allow students with dexterity limitations to manipulate the ruler with greater ease without string movement.
- B. For each path, cut a length of string that is about the length of the path. Students will use estimation skills (a possible alternative assessment for estimation) to choose the length to use. Students can mark the path distance on the string with a marker, using a different

color of marker for each segment of path. Measure using Suggestion A. This will eliminate the need for the use of scissors.

- C. The applets in [Funbrain: Measure It!](http://www.funbrain.com/measure) allow students to practice linear measurement. The easy centimeter game appears to be actual size.

References

Funbrain: Measure it! (2008). Retrieved February 4, 2009,

from <http://www.funbrain.com/measure>.

Hopkinson, D. (1993). *Sweet Clara and the freedom quilt*. New York: Alfred A. Knopf.

Lesson Reflection