

CHARTING A SHIPPING LANE

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Target Grade/Subject

FOCUS QUESTION: Can an ore freighter successfully navigate the Rouge River to a newly constructed steel mill?

OVERVIEW: A newly constructed steel mill located on the Rouge River will be using the ore obtained from a new mine located north of Marquette, Mi. Over the last five years the water level of the Great Lakes and its tributaries has dropped in depth. The shipping lane has to be measured and new buoys need to be placed. The Army Corps of Engineers may need to dredge the river that will allow the freighters to safely reach the mill.

LEARNING OBJECTIVES What overall concepts do you want students to gain from the activity?

1. Measure the depth of the Rouge River.
2. Chart a shipping lane.

Michigan Grade Level Content Expectations

- Social Studies 7-E3.1.1 Diagram or map the movement of a consumer product from where it is manufactured to where it is sold to demonstrate the flow of materials, labor, and capital.
- Social Studies 7-E3.3.1 Explain and compare how economic systems answer four basic questions: What should be produced? How will it be produced? How will it be distributed? Who will receive the benefits of production?
- Science S.IP.07.13 Use tools and equipment appropriate to scientific investigations.
- Science S.IP.07.14 Use metric measurement devices in an investigation.
- Science S.IA.07.13. Communicate and defend findings of observations and investigations.

MATERIALS:

Rouge River “Shoe Box Kit” (see attached “**Advance Preparation**”)

30 *cm* skewer

Rouge River Chart

Buoys markers

Metric ruler

Masking tape

VOCABULARY:

Bathymetry

Buoys

Coordinates

Charts

Dredging

PROCEDURE (Is this a Student Page?)

1. Take the wooden skewer and place a mark every *cm*. Each cm represents 1 foot in water depth.
2. Place the grid sheet over the top of the “shoe box kit”.
3. Attach the grid sheet using masking tape.
4. Starting with the A-1 coordinate, insert the skewer into the “shoe box kit
5. This is the water’s depth. (Remember an ore freighter needs a depth of 28 feet to safely navigate the river)
6. Record the water’s depth of all the remaining coordinates.
7. Repeat steps 4, 5 and 6 until all the coordinates have been measured.
8. As you measure from left to right when depth of 28 feet or greater is found, place a buoy marker at that coordinate.
9. The loading dock will be between coordinates N-15 to N-22.
10. Plot the shipping channel.
11. Place a “buoy marker” at the edge where the river’s depth is 28 feet deep or greater.

Discussion Questions

1. Plot the freighter’s trip upstream to the mill.
2. Identify any areas where the water may not be deep enough for the passage of the freighter and dredging would be necessary.
3. Explain why a fully loaded freighter needs a minimum depth of 28 feet.
4. After the ore is unloaded, the freighter will take on a load of oil from the Marathon Refinery located downstream from the mill. Will the freighter need the same water depth to reach the Detroit River? Give the reason(s) for your answer.
5. Dearborn City Council is holding a special public meeting to discuss the proposed docking facility located by the Mill. Interested groups will be presenting their reports on the docking facility. You want to voice your opinion. What would you say? What would be your supporting evidence?

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DATA

Rubric Assessment

Gauging the skewer (metric measuring rod) 10 pts

Measuring the Rouge River (Data Table) 10 pts

- All measurements accurate (10 pts)
- 90 % accurate (9pts)
- 80% accurate (8pts)
- 70% accurate (7pts)
- 60% accurate (6pts)
- less than 60% (5pts)

Questions 20 pts

Question #1 (4pts)

Question #2 (4pts)

Question #3 (2pts)

Question #4 (4pts)

Question #5 (6pts)

Advance Preparation: River Shoe Box Kit

Steps to build a river “shoe box kit”

- Use an empty shoe box or any empty box approximately 30 *cm* long 10 *cm* wide and 10 *cm* high.
- Place several different Styrofoam objects in the box. This will create the river bed.
- Secure the Styrofoam objects with glue. This will create a permanent river bed. This river bed pattern can be used for many years.
- Instead of using glue, the Styrofoam can be secured with toothpicks. This method the river bed pattern can be changed when ever desired.
- The Styrofoam can be attached by using a can of insulation foam. This material expands quickly. Different patterns can be created very quickly. This river bed system can be used for many years. Word of caution, do this in a well ventilated area.