

Mathematics: The Language of STEM
So You Think You Can Map It?
(Probably 2-3 days to complete this activity)
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CONTENT AND TASK DECISIONS

Grade Level(s): 3-4 - (Meant for 3rd. Can be used in 4th also)

Description of the Task:

First, the students will use google maps to find one route from their house to their school. Next, the students will see how many miles each road is on their way to school(still using google maps). Then, students will read each direction and round the mileage to the nearest quarter inch. Lastly, students will draw their route to school using a teacher created scale to accurately draw the map.

Indiana Mathematics Content Standards:

3.M.2 - Choose and use appropriate tools to estimate and measure length, weight, and temperature.

Estimate and measure length to a quarter-inch, weight in pounds, and temperature in degrees celsius and fahrenheit.

3.NS.9 - Use place value understanding to round 2-and 3-digit whole numbers to the nearest 10 and 100 (this standard is being expanded)

Indiana Mathematics Process Standards: PS.2: Reason abstractly and quantitatively. PS.5: Use appropriate tools strategically.

Mathematics Content Goals:

The students will use google maps to find the route to school. The students will round lengths of 0 to 1 to the nearest quarter-inch. The students will use a scale to draw a route to the nearest quarter-inch.

Language Objectives:

The students will create/draw lines the nearest quarter-inch using a ruler and a scale.

Materials:

Class set of ipads or laptops

Grid paper

Paper with the scale (provided)

Recording road lengths page (provided)

Ruler

Assessment measuring page (provided)

THE LESSON

Before:

Student Actions-

1. Login to a device and go to google maps. Select the earth feature.
2. Listen to the teacher's directions.
3. Find the route from their home to school.

Teacher Actions-

1. Provide a class set of ipads, laptops, or use a computer lab.
2. Have yourself and students login to his/her own device. Students need to go to Google Maps and select the earth feature. Once all students are at this point have them put his/her device down and pay attention to the teacher (Students who finish early can assist neighbors or brainstorm the way they get to school).
3. Say, **Today we are going to see how many miles you live from school and all the roads you take to school. You will eventually draw a map to school from your house. This is called your "route".** Have students turn to see your device.
4. Model for the students how to enter the starting point and the ending point on google maps. The starting point is your house and the ending point is the school (Typically this option on google maps is located at the top left and click the blue arrow).
5. Once the route is shown, click on your desired route to model. It is located on the left side of the screen. **Point out the total amount of miles. Show the details where it breaks down each road (Make sure if the directions say to "continue", just add this into the previous mileage).**
6. Have a class discussion about how miles are shown in decimals. Have students think of the decimals as a number from 0 to 1. Have students round the miles to the nearest quarter mile (.3 miles = .25 miles) Using a ruler, show how an inch is split into four equal parts. Each part is a quarter-inch. You, the teacher, may need may need to have discussion of where to round if a number falls exactly halfway between two measurements.
7. Show the students a number line on the board that shows 0 to 1. Using fractions and decimals, label the line into four parts using the numbers 0, .25, .5, .75, and 1. Also, use the fractions $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{3}{4}$.
8. Going back to google maps and the mileage, invite students to help you round each mileage to a nearest quarter-inch. Have students use the decimals on the number line as a guide. Each road traveled needs to have the mileage rounded to the nearest quarter inch. Fill in the recording length page as students help you round.
9. Release students to complete this part with their own information.
10. Say to the students, **"You just found the mileage from your own house to school. The next step is to draw your route. However, you will need to make it accurate. To do this we will use the rounded numbers and follow a scale to draw it accurately."**
11. Show the scale to the class (attached to the lesson). Model using your map. Draw ,on grid paper, your own map using the scale. Be sure students see how you use a ruler to draw lines (roads) using the scale. Be sure to label your house, road names, and schools. Students can be as detailed as they want when they draw their maps (landmarks, stop signs, signal lights, etc...).
12. Release students to complete this part.

During:

Student Actions-

1. Round each road's mileage to the nearest quarter mile. The use the scale to turn the miles into the nearest quarter inch.
2. Students draw the route from their home to school. Students can use a ruler to make straight lines.
3. Students can add scenery :)
4. Students need to label the road names and rounded mileage on each road.
5. Students who finish early can map out and draw a longer route and/or shorter route. Student follow the same process.

Teacher Actions-

1. Circulate and help students who are stuck with the rounding mileage and using the scale.
2. Provide students who finish early a device to get back to google maps to find longer and/or shorter routes.
3. Make sure students are labeling their maps.

After:

Student Actions-

1. Present their map to the class and the route taken. Students need to explain how many miles each road is.
2. Share how measuring to the nearest quarter-inch went and drawing to the nearest quarter-inch went. What was challenging and what was easy?

Teacher Actions-

1. Keep student presentations on task.
2. Ask supporting questions:
 - a. What went well? What was challenging?
 - b. How many roads were less than a mile? More?
 - c. Any roads that measured to a quarter-inch? Half-inch? Three quarters-inch?

ASSESSMENT

1. Students complete the measuring page with a ruler. Students will measure lines to the nearest quarter-inch.

Observe:

Students accurately drawing roads(lines) to the nearest quarter-inch. Watch how students use the ruler and where they start the lines and where they finish.

Ask:

1. What went well?
2. What was challenging?
3. How many roads were less than a mile? More?
4. Any roads to measure to a quarter inch? Half inch? 3 quarters inch?

ASSESSMENT

Measure each line to the nearest quarter-inch

1.  _____ inches

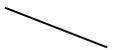
2.  _____ inches

3.  _____ inches

4.  _____ inches

5.  _____ inches

6.  _____ inches

7.  _____ inches

8.  _____ inches

Recording the Route

Write the road name and how long each road is before turning to the next road. You may not need all of the spots provided.

Starting point - Home

Road name - _____ Miles = _____ Rounded = _____

Road name - _____ Miles = _____ Rounded = _____

Road name - _____ Miles = _____ Rounded = _____

Road name - _____ Miles = _____ Rounded = _____

Road name - _____ Miles = _____ Rounded = _____

Road name - _____ Miles = _____ Rounded = _____

Road name - _____ Miles = _____ Rounded = _____

Road name - _____ Miles = _____ Rounded = _____

Road name - _____ Miles = _____ Rounded = _____

Road name - _____ Miles = _____ Rounded = _____

Final Destination - Harrison Elementary School

Scale

Measured Length - $\frac{1}{4}$ mile (.25) = Drawn length - $\frac{1}{2}$ inch

$\frac{1}{2}$ mile (.50) = 1 inch

$\frac{3}{4}$ miles (.75) = 1 and $\frac{1}{2}$ inches

1 mile = 2 inches