

ARE WE THERE YET?

ITV SERIES

MATH TALKS #114:
Sizing Things Up

GRADES 4-6

PREVIEWING ACTIVITIES

Map scale is only one part of the unit on map skills. It would be helpful if students have had lessons on using map keys, a compass rose, grids, and the different types of maps in order to plan their trip and do their research project.

Before starting this activity divide the students into 4 to 5 groups depending on the number of scale items you have collected. Ask students if they have ever traveled with their parents when a map was used. Survey the class to see how many have used a map themselves. Give each group one of the scale items. Have the group decide what it is and write it down and then each group passes their item to the next group until all groups have identified all items. Then ask the groups to decide what all the items have in common? The word “Scale” should be the answer. Give hints if needed; i.e. “Hmmm bathroom **SCALE**, music **SCALE**.” Open the map and ask students if they know where the scale is on a map. Call on several students to come up to the map until one points to the correct place. How many of you have said to your parents when traveling “When will we get there?” or “Are We There Yet?”

FOCUS FOR VIEWING

To give students a specific responsibility while viewing the video, the teacher distributes the activity sheet “Are We There Yet?” Have students read vocabulary words and brainstorm definitions. Pose a few questions: “How do you use a map scale? Do all maps have map scales? Who uses map scales and maps?” Ask students to watch for these answers and map scales in the video.

VIEWING ACTIVITIES

BEGIN THE VIDEO at start where Buster Parrot is exercising.

PAUSE THE VIDEO where Buster Parrot says, “I hate crawly little bugs the width of a child’s finger.” Vocabulary words: **map scale, centimeter**. Discuss and answer questions #1 and #2, then have students measure the width of their finger. *Note: Make sure all students understand width and NOT the length.*

OVERVIEW

Maps are an integral part of our lives and students should be able to analyze and use maps. In this lesson students will discover how to use map scales and why they are important when using a map. Students will calculate distance using a map scale and time using travel speed and a map scale. Students will locate the map scale on a road map and use the map to simulate a trip across their state. Students will develop a list of careers which would use maps. Students will collect and display information on the variety of uses for maps.

Through this experience students should gain an understanding of how marine biologists use sonar maps to study aquatic biomes (marine). Students will also discover that everyone uses maps in either their job or personal life.



ARE WE THERE YET?

LEARNING OBJECTIVES

Students should be able to:

- Locate the map scale on a map
- Calculate distance and time using the map scale and travel speed
- Demonstrate their ability to simulate a trip across their state
- Develop a list of careers which would use maps
- Collect and display information on the variety of uses for maps
- Define vocabulary terms related to this lesson
- Explain why maps are an integral part of all our lives

MATERIALS

Previewing Activities:

Per class:

- bathroom scale
- picture or model of a fish
- state map
- picture of a music scale
- small food scale

Per student:

- activity sheet "What do these have in common?" - one per student
- pencil

VIEWING ACTIVITIES

Instruct students to make a pencil line on either side of their finger on the space provided for question #3. **RESUME THE VIDEO.**

PAUSE THE VIDEO where the Captain says, "Excellent!" Discuss and answer questions #4 and #5. Vocabulary words: **knots, aquatic biomes.** Discussion: Marine biologists can either travel down to the ocean floor in these submersible vessels or send cameras down in the vessels to take pictures of the ocean bottom. This is one way they can study the plant and animal life in the ocean, the aquatic biome. They use a sonar map (which uses an Azimuthal equidistant projection). Show overhead transparency and explain. You need not go into a lot of detail, but point out the circles and relate it to the map on the submarine. "Watch to see what this map looks like." **RESUME THE VIDEO.**

PAUSE THE VIDEO where the Captain says, "Let me see this iceberg face to face." Discuss and answer questions #6 and #7. For #8 have students measure ten (10) finger widths for ten (10) centimeters. "Now, why are they panicking?" **RESUME THE VIDEO.**

PAUSE THE VIDEO where the sailor says, "I don't drive, thank you." Answer questions #9 and #10. Discuss and answer question #11. Discuss the difference between a sonar map and other maps. Refer back to the Azimuthal equidistant projection where you measure distance using straight lines. Explain sonar: Sonar is a detecting device that uses sound. Sonar sends out a sound wave into the water. When the wave meets an object, it reflects back. It is also a depth-sounding instrument. It beams short bursts of sonic energy toward the ocean bottom. As the sonic receiver picks up echoes, different kinds of flashes on the indicator tell if they are reflected from the ocean bottom, reefs or obstructions, a school of fish, or other objects. In this video the sonar has detected an iceberg which is the triangle on the map. **RESUME THE VIDEO.**

PAUSE THE VIDEO where the sailor says, "Which means when the meter stick measures ten (10) centimeters." Discuss and answer questions #12, #13, and #14. Vocabulary word: **kilometers.** "Let's look at the video to check our answers." **RESUME THE VIDEO.**

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VIEWING ACTIVITIES (continued)

FREEZE THE VIDEO on the math operation the captain uses. “How did he solve the problem? Did we get the correct answer?” **RESUME THE VIDEO.**

PAUSE THE VIDEO where Buster Parrot says, “One (1) centimeter equals twenty (20) kilometers in the real world.” Discuss and answer questions #15, #16, and #17. Check for understanding in the classroom before resuming video. **RESUME THE VIDEO.**

FREEZE THE VIDEO on map and where Porsche from Portland says, “On your map Sylvia is about five (5) centimeters from the country club.” Check answers. **RESUME THE VIDEO.**

PAUSE THE VIDEO where Porsche says, “The real distance is 5 x 20 or 100 kilometers.” Review the math calculations. “Now, let’s look at a familiar scene for some of you.” **RESUME THE VIDEO.**

PAUSE THE VIDEO where the little boy says, “About six (6) inches.” Discuss and answer questions #18, #19, and #20. Circulate around the room to check for understanding with students who may be still having a problem with the calculations. “Let’s look at the video to check our answers.” **RESUME THE VIDEO.**

PAUSE THE VIDEO where the older brother says, “How long does it take to go 150 miles at 50 miles per hour?” Discuss and answer questions #21, #22, and #23. “Let’s check our answers.” **RESUME THE VIDEO.**

STOP THE VIDEO where Buster Parrot says, “These scales are beginning to make sense to me.”

POST VIEWING ACTIVITIES

Activity #1

Distribute a state road map to each group of two students and the activity sheet “Moving Across Your State.” Caution students that this is a team effort and both must know how to find the answers. Students work as a team to answer questions. Activity sheet involves more than map scale questions, which is why lessons on map skills are needed.

MATERIALS (continued)

Focus for Viewing Activities and Viewing Activities:

Per student

- vocabulary words
- activity sheet “Are We There Yet?”
- pencil

Per class:

- overhead transparency: Azimuthal Equidistant Projection

Post Viewing Activity:

Per group of two students

- state map

Per student:

- activity sheet - “Moving Across Your State”
- colored pencils

Per class:

- sample of Yahoo-Maps Internet Activity
- pencil

Action plan:

Per class:

- bulletin board displaying different types of maps (optional)
- hotel guides, restaurant food costs, gas costs (optional)

Per student

- state maps

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ACTION PLAN

Students can research careers where maps are used using several sources (see Internet under Extensions) including the Internet.

Students can use Yahoo-Maps to search their address and then manipulate the map, i.e. day, night, zoom, driving directions, and locate businesses.

URL: maps.yahoo.com/yahoo/

Invite an AAA travel agent or travel agent to talk to students about traveling across the United States.

Invite a cartographer to explain to students how maps are made.

Invite the Fish & Game to speak to students about using maps for animal habitats, populations, and species.

VIDEO AVAILABLE FROM

ITV Overnight Blockfeed, which may be taped off-air. Consult your local PBS station for schedule.

POST VIEWING ACTIVITIES (continued)

Circulate among the students to help with questions and to be sure both students are working on the answers.

Activity #2

Each student will plan a trip from their hometown across their state. They must calculate the miles (distance), stops at tourist sites, gas fill-ups, meals and overnight accommodations. The trip must be a minimum 800 miles stopping in at least two cities.

EXTENSIONS

Interdisciplinary Unit on Maps:

Math: Calculate miles per hour, miles per inch, using a meter stick. Define kilometer and centimeter.

Social Studies: Study the different types of maps (climate, vegetation, road, world, country, state, city, county); practice maps skills using map keys, grids and analyzing data/information on a map.

Science: Learn how scientists use maps to identify animal habitats, populations and species. This unit fits in well with the 5th grade unit on biomes.

Language Arts: Define vocabulary terms from all content areas relating to maps. Students can write a travel guide about their trip and present it to class.

Internet: Students can collect and display information on the variety of uses for maps. By searching key words such as, maps, compass, mapping, political maps, landforms, etc. students will be able to find a wealth of information on maps. There are many sites showing how maps may be used, a few are Galactic Star Chart, U.S. Weather Map, Maps of Historical Battlefields, Maps of River Systems. Besides the Internet they can use the library, bus/train stations, leisure/theme parks, estate agents, travel agents, book shops, and newsagents.

Lesson plan developed by Master Teacher Paulette A. Blain, William Thomas Middle School, American Falls, Idaho.

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Name: _____ Date: _____

ITEM #1:

ITEM #2:

ITEM #3:

ITEM #4:

What do all four of these items have in common?



Name: _____



Map Skills

Vocabulary Words:

biologist

map scale

centimeter

kilometer

meter stick

aquatic

biome

marine

knots

sonar

submersible

iceberg

miles per hour (m.p.h.)

Challenge words:

Azimuthal equidistant projection

Name: _____

Are We There Yet?

Map Scales

1. What is the scale for this map? _____
2. What is a centimeter? _____
3. Measure your finger width _____

LOOK FOR A MAP SCALE IN THIS VIDEO

4. How far down is the submarine from the ocean floor? _____
5. What speed is the submarine traveling? _____
6. How close to the iceberg does the sailor tell the captain they are? _____
7. Why are they all panicking? _____
8. Measure approximately 10 centimeters with your fingers.

9. X represents what on the map? _____
10. \triangle represents what on the map? _____
11. Why is the captain NOT worried? _____

12. What is the scale for this map? _____
13. If the iceberg measures 10 cm away on the map, how many kilometers away is the iceberg from the submarine? _____
14. What operation did you use to solve this? _____

NOW BACK TO BUSTER'S PROBLEM

15. How many centimeters on the map is Sylvia's home to the Country Club? _____
16. Using the map scale, how far is Sylvia from BSCC? _____
17. What operation did you use to find the total kilometers? _____

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18. How many miles is an inch on this map scale? _____
19. How many miles to their destination to meet their parents? _____
20. What operation did you use to find the miles? _____
21. How many miles per hour are they traveling? _____
22. How many hours will it take them to arrive at their destination? _____
23. What operation did you use to find the hours? _____

Azimuthal Equidistant Projection



Using an **azimuthal equidistant** projection, the distance between two points on a straight line can be measured accurately.

Names: _____



Moving Across Your State

Use a road map of your state to answer the following questions. Write your answers in the blanks.

- _____ 1. How many miles are represented by one inch on the map?
- _____ 2. About how many miles is it from the eastern border to the western border of the state?
- _____ 3. What is the state capital?
- _____ 4. Name one interstate highway that is in your state.
- _____ 5. How far is your hometown from the nearest state border?
- _____ 6. In what direction would you travel from your hometown to reach the nearest state border?
- _____ 7. How far is your hometown from the state capital?
- _____ 8. In what cardinal direction would you travel?
- _____ 9. What are the letter and number coordinates of the state capital?
- _____ 10. What are the letter and number coordinates of your hometown?
- _____ 11. How many enlarged inset maps are on the road map?
- _____ 12. What state park is nearest your hometown?
- _____ 13. What highways would you take to get from the northeast corner of your state to the southwest corner?
- _____ 14. Traveling 50 m.p.h. how long would it take to get from your hometown to the state capital?
- _____ 15. Are there any famous or interesting sites to stop at if you would travel to the state capital?

In the boxes below, draw and color the map key symbol used for each item. (If no symbol is given, create your own.)

State Park

Rest Area

Airport

Railroad

Compass Rose

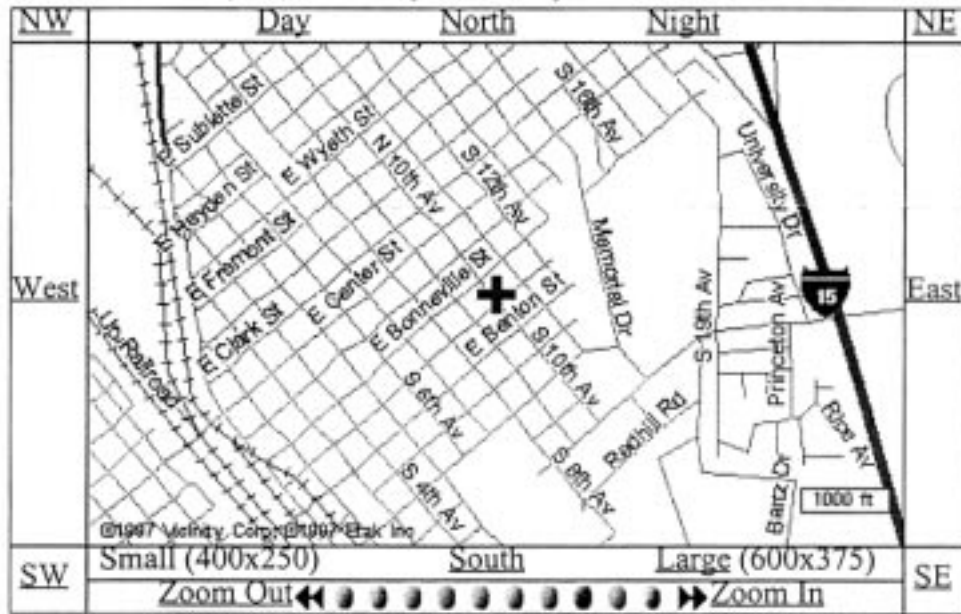
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