

Maps, Part 1:

Reading a Road Map: Understanding Rate, Time, and Distance

(2 hours)

Lesson at a Glance

SUMMARY

Whether they drive a road-worn jalopy, a new sports car, or a tractor-trailer, Americans pride themselves on their mobility. In our car-centered society, being able to decode the symbols and abstractions of a road map is a key literacy skill.

Not only does map-reading help adults get from here to there easily, it also enables them to conceptualize the geography of their region and country. And embedded among the highways and byways of any map are rich opportunities for basic math lessons.

GOALS

- To be able to read road maps
- To understand the mathematical relationship of rate, time, and distance
- To understand the concept of “ratio”

LEARNER OUTCOMES

Students will...

- Learn the meaning of various symbols on a U.S. or state road map.
- Learn the function of an index, a legend, and a compass on a U.S. or state road map.
- Understand how to plot out a road trip and compute mileage between various points.
- Understand how to set up and use a formula that calculates the number of hours it will take to drive from starting point to destination.
- Be able to calculate the ratio of miles to inches using a map scale.

MATERIALS

VIDEO:

Sports Smarts: Reading a Map
Episode 14: Length: 5:11, Start Time: 19:59

PRINT:

Planning a Trip
Issue 14, pp. 6–7

Reading a Road Map
Issue 11, pp. 2–3

ROAD MAPS OF THE UNITED STATES AND/OR YOUR HOME STATE

(featuring indexes, legends, scales, and clearly marked highways and roads)

RULERS

CALCULATORS

ACTIVITIES

- View and discuss one [TV411](#) video segment.
- Read two *In Print* articles related to the video.
- Review eight vocabulary words or terms.

“How do you get to
the Basketball
Hall of Fame?
Use a roadmap!”

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Step by Step

1. INTRODUCING THE CONTENT

Pre-Viewing Activities

Discuss

How many people in the class drive a car? How many know how to read a road map? Can anyone explain how road maps work?

[They represent roads in different colors and/or thicknesses so you can tell what's a highway and what's an unpaved road; they have symbols that represent towns, and sometimes bridges, parks or points of interest; they are laid out according to a scale of so many inches to so many miles; etc.]

Keep track of participants' explanations on the board.

Teacher Talk

If your city has few public transportation outlets, some of your learners may already be able to read a road map. In that case, they probably understand the practical value of this skill. However, some of your learners may rely only on buses and/or subways for travel.

You can explain that, no matter what experience or need your learners have of road maps, reading them uses important thinking and comprehension skills. How? It teaches learners how to interpret symbols, and how to use math and measurement for navigating space and time in the real world. (Bus and subway maps have some symbols, but they don't require the same mathematical skills as a road map).

VOCABULARY REVIEW

- road
- highway
- legend
- compass
- symbol
- scale
- average speed
- ratio (optional)

READING AND MATH

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Step by Step (cont.)

2. MODELING THE STRATEGY

View Video

Sports Smarts: Reading a Map
Episode 14: Length: 5:11
Start Time: 19:59

Two players for the NBA Atlanta Hawks, setting off for the Baseball Hall of Fame in Massachusetts, explain the vocabulary and key components (legend, compass, scale, symbols) of a road map and show how to figure out distance and time when planning a trip.



3. MINING THE STRATEGY

Post-Viewing Activities

Discuss

In light of the pre-viewing discussion, was there any information about map reading in the video that learners didn't know? What was it?

[Answers will vary.]

4. EXTENDING AND PRACTICING THE STRATEGY

Navigating the Map

Divide the class into small groups or pairs. Distribute copies of a U.S. map, a state map, or the *Planning a Trip* article from *In Print* Issue 14, pp. 6–7.

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Step by Step (cont.)

Discuss

- According to the video, what is the index? Find it on your map.
[An alphabetical list of places, such as towns and cities, shown on the map.]
- Can you explain how the locators work?
[A grid, usually labeled with letters along the top and bottom and numbers down the sides (or vice versa), helps to locate a particular point—for example, a town or a state park—on the map.]
- What is a symbol? Find some on your map.
[A picture or drawing that represents something; a common symbol is the "no-smoking" icon.]
- What is the legend? Find it on your map.
[A key to map symbols that represent cities and towns, airports, types of roads, etc.]
- What are the main points of the compass? Find the compass on your map or draw one on the board, with the main points—N, S, E, W—displayed. Note: you may want to explore N, S, E, & W in more depth, illustrating how to give directions using them (for example, "Go south on 95"). Is there anything in particular your students notice about the numbers assigned to highways?
[Highways running primarily E-W are even-numbered, and those running primarily N-S are odd-numbered.]
- What is a scale? Find it on your map.
[The scale is part of the legend. Each inch on the scale equals a certain number of miles on the map.]

If you haven't already, distribute *Planning a Trip (In Print Issue 14, pp. 6–7)* to pairs or small groups of students. Ask them to answer the questions and compare answers with the class.

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Step by Step (cont.)

Writing Directions

Ask learners to interview each other about places on the map they would like to visit. Have them pick a Point A (the starting point) and a Point B (the destination). If you're using your own state map, Point A can be the city or town you're in; if you're using another map, they can pick any point of departure.

Students should help each other plot the route from A to B and put it in writing. Make sure they include compass directions (for instance, "Take 95 North to [or "Go north on 95 to..."] Trenton and then take 76 West to..."). To make matters a little harder, use a map that indicates mileage and have students include the number of miles to travel in their directions (for instance, "Take 95 North 50 miles to Trenton, then go 30 miles on 76 West to...").

Map Math

Distribute rulers to learners. Model how to use the scale to determine the number of miles from one place to another. If you wish, explain that a scale is a ratio, showing the relationship of one number (inches) to another number (miles).

Ask learners to take turns naming departure/destination cities on the map. Write these points on the board and give the class time to locate them and determine the distance between them. Compare what different groups or individuals come up with and ask them to explain how they arrived at the mileage figure.

Hands On

If there's time, prompt learners to collaborate on drawing a map of the classroom. If there's no measuring tape available, they can make rough measurements using their stride or counting floor tiles, if any. Tell them to represent objects or areas of the room (doors, desks, aisles) through symbols and then to draw a legend, or symbol key, next to the drawing.

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Step by Step (cont.)

More Map Math

Ask learners if they remember how, in the video, the two basketball players figured out the time it would take them to drive from the Hawks' headquarters in Atlanta, Georgia, to the Basketball Hall of Fame in Springfield, Massachusetts.

Learners should recall that the two players:

- 1) determined the distance between the starting point (Atlanta, GA) and the destination (Springfield, MA) by using the ruler and the scale
- 2) determined the average speed (or miles per hour) they would drive (staying within the speed limit!)
- 3) divided the total distance (D) by the average speed (R for rate) to get a "ballpark" total of the time (T) it would take to complete the trip

In other words, they used a formula:

$$D/R = T \text{ (time)}$$

This is a handy formula students can use, on the GED or on the road, whenever they need to calculate the time it takes to go a certain distance, given a certain speed.

Ask students to plot trips on their maps and, using the formula, to figure out the approximate amount of time it will take them to get to their destination.

Optional

You might want to mention that the rate "mph" (miles per hour) is also a kind of ratio, because it compares one number (distance in miles) to another (amount of time, or one hour). However, in a rate, one of the numbers is always a single unit, such as an hour in ___ miles per hour, a customer in ___ tickets per customer. If you have more time, you can ask students to come up with other examples of rates and their single units.

[A kilowatt in 40 cents per kilowatt, a basket in 15 apples per basket, and so on.]

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Step by Step (cont.)

5. PORTFOLIO

Students save their work in their portfolio. If class time runs out, they can pick up where they left off the next time you meet.

6. HOMEWORK

Distribute copies of *Reading a Road Map* (*In Print* Issue 11, pp. 2–3) for learners to do as homework.

7. WEB CONNECTION

For a Web lesson on map reading, go to www.tv411.org, click on **Reading**, then on **Reading Maps**.

RELATED VIDEO AND PRINT MATERIALS

For follow-up lessons on rate, time, and distance, see *Sports Smarts: Rate* (Episode 21: Length: 4:05, Start Time: 1:41) and *Rate, Distance and Time* (*In Print* Issue 21, pp. 4–5).

For even more **TV411** lessons on this topic, check out our online index at www.tv411.org. Students can also get more practice with maps and directions on www.mapquest.com.