Lesson Maker Pro

Reading and Sketching Distance-Time Graphs

Describe how distance from a location changes, then sketch a matching journey graph.

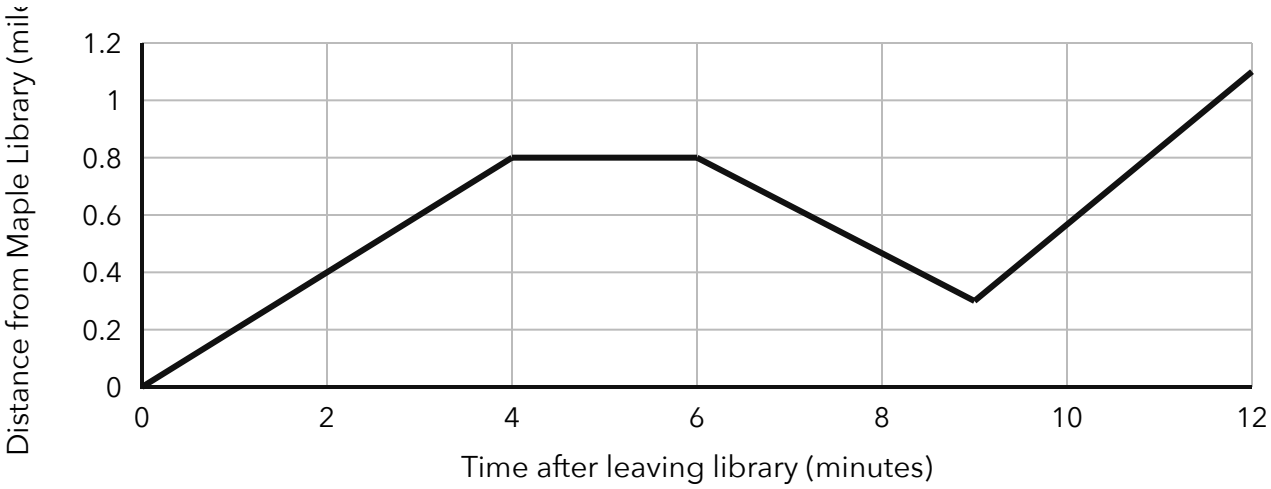
NY-8.F.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph. Sketch a graph that exhibits the qualitative features of a function that has been described in a real-world context.

NAME _____ **DATE** _____

Part 1 - Read a Distance-Time Journey

Distance from Maple Library means how far the traveler is from the library. It is not the same as total distance traveled.

The graph shows Jordan's distance from Maple Library during a bicycle ride. Jordan travels only directly toward or directly away from the library. When the graph is flat, Jordan does not move. Read the horizontal axis first: it shows time in minutes. The vertical axis shows distance from the library in miles.



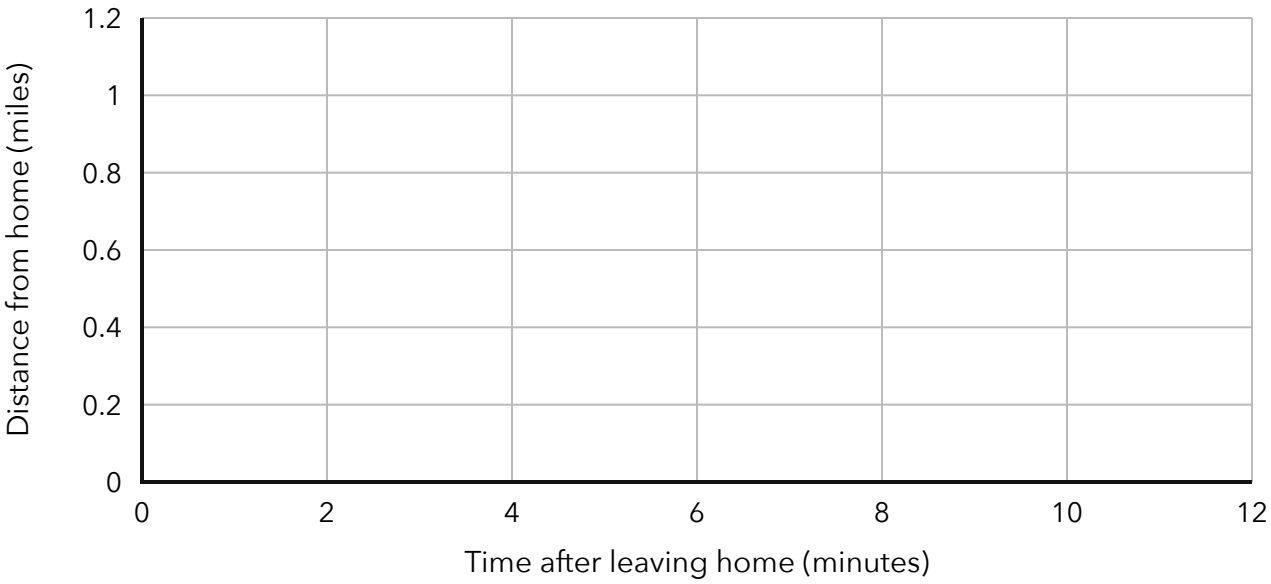
1. Describe Jordan's journey in order. Include when Jordan moved away from the library, when Jordan's distance from the library stayed constant, and when Jordan moved toward the library.

2. Using the direct-travel and no-movement rules above, calculate total distance traveled. Show your work. Explain why final distance from the library is different.

Part 2 - Sketch a New Journey

Graph Maya's distance from home. Maya starts at home. In 3 minutes, she cycles 0.6 mile to a bakery. She waits there from minute 3 to minute 5. Then she cycles farther from home and is 1.0 mile from home at minute 7. Maya cycles back home by minute 11 and stays home until minute 12.

Draw connected line segments. A flat segment shows that Maya is waiting or staying in one place.



3. Which part of your graph shows Maya returning home? Explain how you know.

Answer Key and Teaching Notes

Materials and setup: Print and supply all student pages, keeping teacher-key pages separate. Students need pencils and straightedges. Display no additional graph. Have students complete Part 1 independently or with a partner before Part 2.

Teaching script: Say: "On these graphs, the vertical axis tells distance from one fixed place. A line rising means the traveler is farther from that place. A line falling means the traveler is getting closer. A flat line means the distance does not change." Say: "A flat distance graph alone does not always mean that a person stopped; the person could move in a path that keeps the same distance from the location. For Jordan, the written travel rules tell us that a flat segment means no movement." Say: "Trace the graph from left to right before you write or draw."

1. Sample correct description: Jordan starts at Maple Library. From 0 to 4 minutes, Jordan moves away from the library until 0.8 mile away. From 4 to 6 minutes, Jordan's distance from the library stays constant at 0.8 mile; the stated rule says Jordan does not move during this interval. From 6 to 9 minutes, Jordan moves toward the library and is 0.3 mile away. From 9 to 12 minutes, Jordan moves away again and ends 1.1 miles from the library. Accept equivalent descriptions that correctly identify the direction and constant-distance interval.

2. Total distance: 2.1 miles, using the stated rules that Jordan moves directly toward or away from the library and does not move during flat intervals. Jordan travels 0.8 mile away, then 0.5 mile back toward the library (0.8 - 0.3), then 0.8 mile away again (1.1 - 0.3). Calculation: 0.8 + 0.5 + 0.8 = 2.1. Do not accept 1.1 miles; that is Jordan's final distance from the library.

3. Expected sketch and explanation: Connected segments should pass through (0, 0), (3, 0.6), (5, 0.6), (7, 1.0), (11, 0), and (12, 0). The return-home segment goes downward from (7, 1.0) to (11, 0), because Maya's distance from home decreases to zero. The final flat segment at zero shows that she stays home.

Observation method: As students work, ask them to point to one rising, falling, and flat segment. Record whether each student explains: rising = farther away; falling = closer; flat = same distance. Ask: "What extra information tells us that Jordan did not move during the flat segment?" Expected response: the stated travel rule. For Part 2, check that the sketch begins at zero, includes the wait from minutes 3-5, returns to zero at minute 11, and remains at zero through minute 12. Prompt with "distance from where?" rather than correcting the graph for the student.

Source credit: Skill aligned to NY-8.F.5, "Use functions to model relationships between quantities," supplied standard reference: https://lessonmakerpro.com/standards/ny-nextgen-math/ny-8-f-5