Who Shares My Function? - Linear with All Representations

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Summary	Students will work in groups after finding other students who have the same linear function represented by a story, a table, a graph, or an equation. They will attempt to explain and discuss why the different representations refer to the same function.
Goals	1. Understand the meaning of the term "function". 2. Understand how different representations can show the same function.
Materials	Handouts, Poster Markers, Large Graph Paper
Duration	50 minutes
Keywords	Contextualized Situations Full Class Discussion Function Representations Interpretation of Equations Interpretation of Graphs Interpretation of Stories Interpretation of Tables Linear Functions Small Group Work

Activity Plan:

Part I :

1. Tell the whole class: We will be working with functions today. Has anyone heard the term "function" before? What is a function in mathematics?

2. Solicit responses and write them on the whiteboard.

3. Solicit examples of relationships that could be functions. If none come up, provide some.

Part II :

4. Give each student a piece of paper containing *either* a story, a table, a graph, or an equation regarding the distance traveled by a toy car (Handout pages 4 – 23). When you distribute the handouts, make sure that the number of different representations (i.e., story, table, graph, equation) is distributed as evenly as possible among the students in the class. This will happen automatically if you distribute them in the order they appear below.

5. Ask the students to "find the other students who share your function."

6. Students will eventually place themselves into groups of three to four students each. Each group should have three to four of the following representations in total: a story, a table, a graph, and an equation, all of which represent the same toy car trip.

Part III:

7. Give a large piece of paper to each small group and ask students to (a) analyze and discuss the representations they have received; (b) tape the handouts on the large sheet of paper, and (c) write, on the large piece of paper, three to four reasons why they think the handouts represent the same function.

Part IV:

8. Each small group presents their rationale to the class for why the handouts they have represent the same function. While one group presents, ask the other students:

a. Do you agree? Why?

b. Do you disagree? Why?

c. How does this impact your definition of a function?

d. Are you convinced by the reasons provided?

e. Do you have questions for the group?

9. Ideas for the instructor in case of remaining time:

Continue discussion with the class raising the following questions:

What kinds of functions did we work with today?

How many different functions did we work with?

How are these functions similar? How are they different?

How are these similarities and differences reflected in: the equation, the table, the graph, and the story?

Bring up questions on slope, y-intercept, x-intercept, and ratio. Where are these "seen" across the different representations?

Handout: Who Shares My Function? – Linear functions represented in graphs, tables, stories, and equations

Name: _____ Date:_____

Names of students who share my function: _____

_____

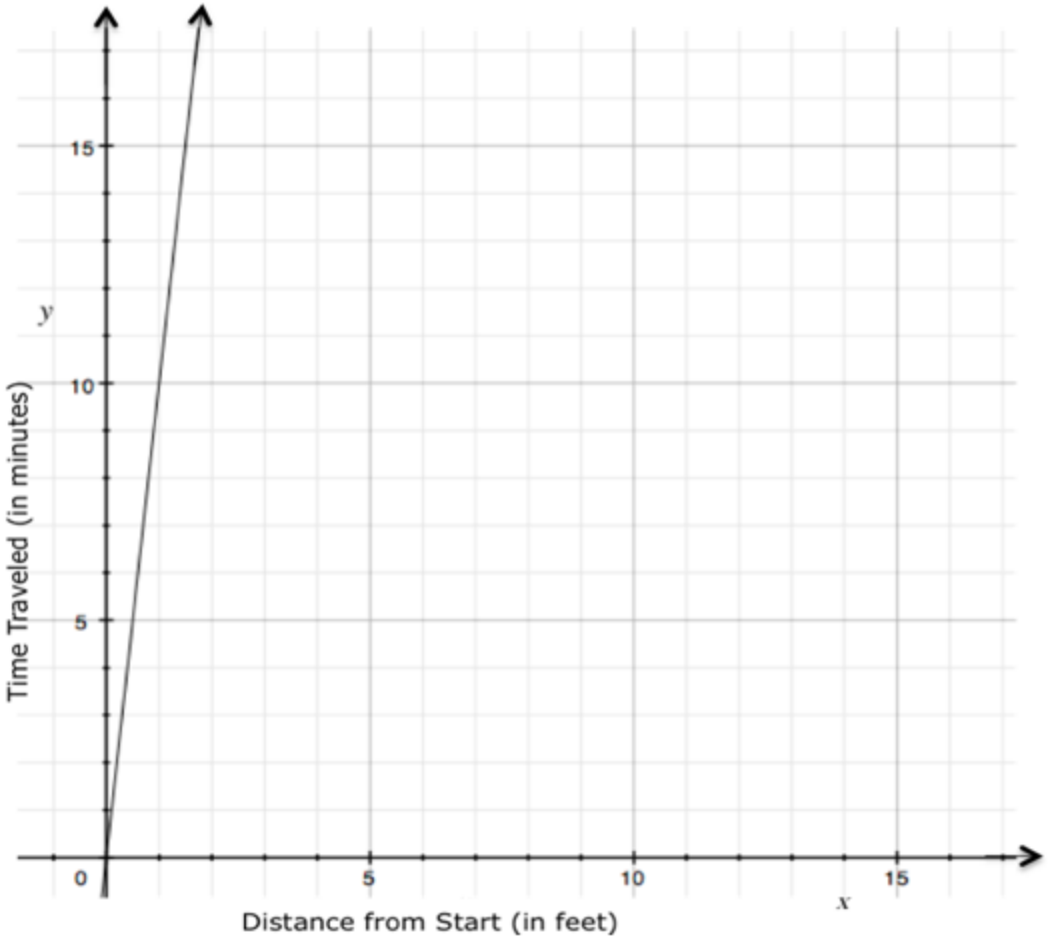
You built a car in your class. Your car travels at a rate of 10 feet per minute. You start at the beginning of the track.

Handout: Who Shares My Function? – Linear functions represented in graphs, tables, stories, and equations

Name: _____ Date:_____

Names of students who share my function: _____

_____



Handout: Who Shares My Function? – Linear functions represented in graphs, tables, stories, and equations

Name: _____ Date:_____

Names of students who share my function: _____

_____

$$y = 10x$$

Handout: Who Shares My Function? – Linear functions represented in graphs, tables, stories, and equations

Name: _____ Date:_____

Names of students who share my function: _____

_____

Time Traveled (in minutes)	Distance from Start (in feet)
0	**0**
5	**50**
7	**70**
13	**130**
27	**270**
50	**500**
75	**750**
100	**1000**

Handout: Who Shares My Function? – Linear functions represented in graphs, tables, stories, and equations

Name: _____ Date:_____

Names of students who share my function: _____

_____

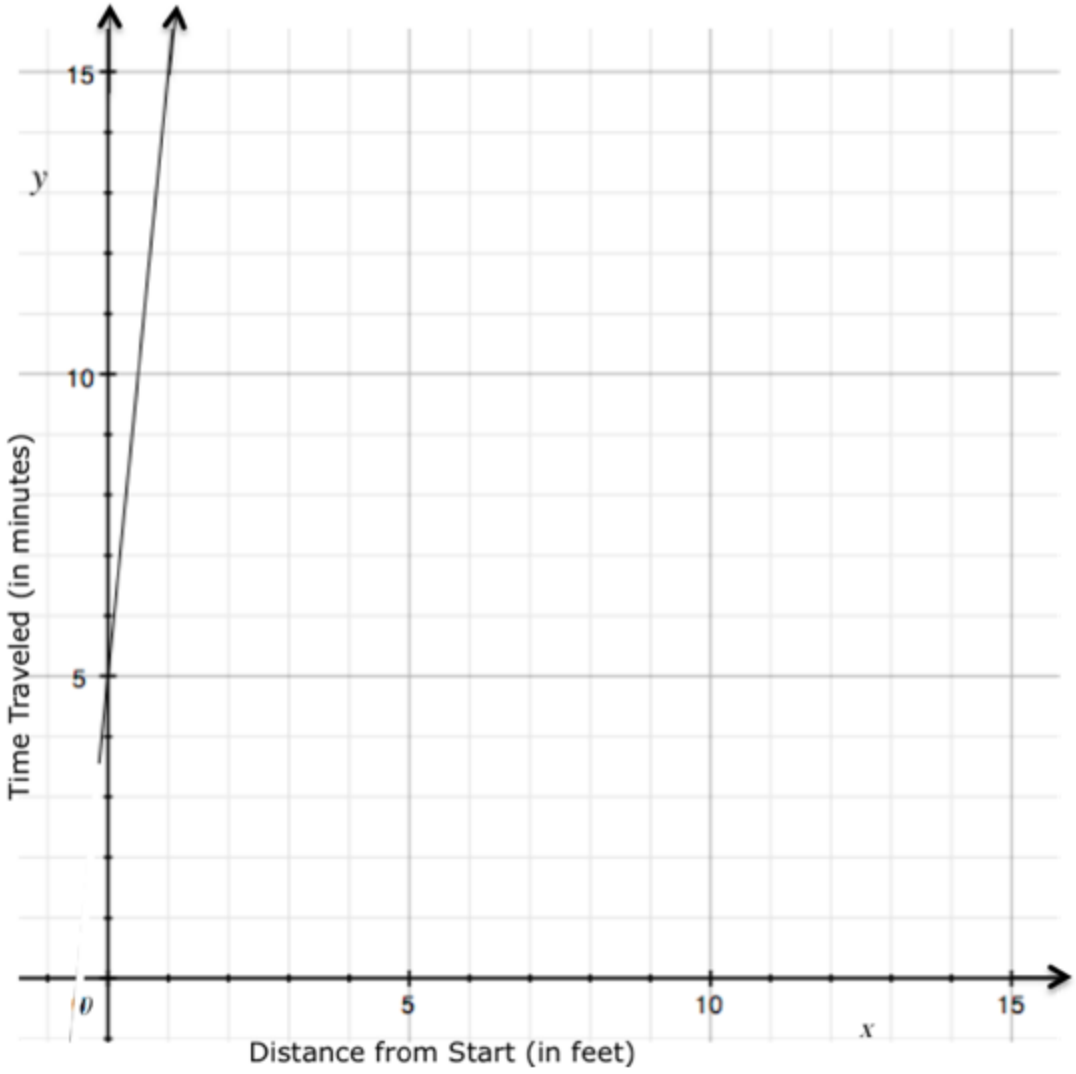
You built a car in your class. Your car travels at a rate of 10 feet per minute and you start at the 5-foot mark on the track.

Handout: Who Shares My Function? – Linear functions represented in graphs, tables, stories, and equations

Name: _____ Date:_____

Names of students who share my function: _____

_____



Handout: Who Shares My Function? – Linear functions represented in graphs, tables, stories, and equations

Name: _____ Date:_____

Names of students who share my function: _____

_____

$$y = 10x + 5$$

Handout: Who Shares My Function? – Linear functions represented in graphs, tables, stories, and equations

Name: _____ Date:_____

Names of students who share my function: _____

_____

Time Traveled (in minutes)	Distance from Start (in feet)
0	**5**
5	**55**
7	**75**
13	**135**
27	**275**
50	**505**
75	**755**
100	**1005**

Handout: Who Shares My Function? – Linear functions represented in graphs, tables, stories, and equations

Name: _____ Date:_____

Names of students who share my function: _____

_____

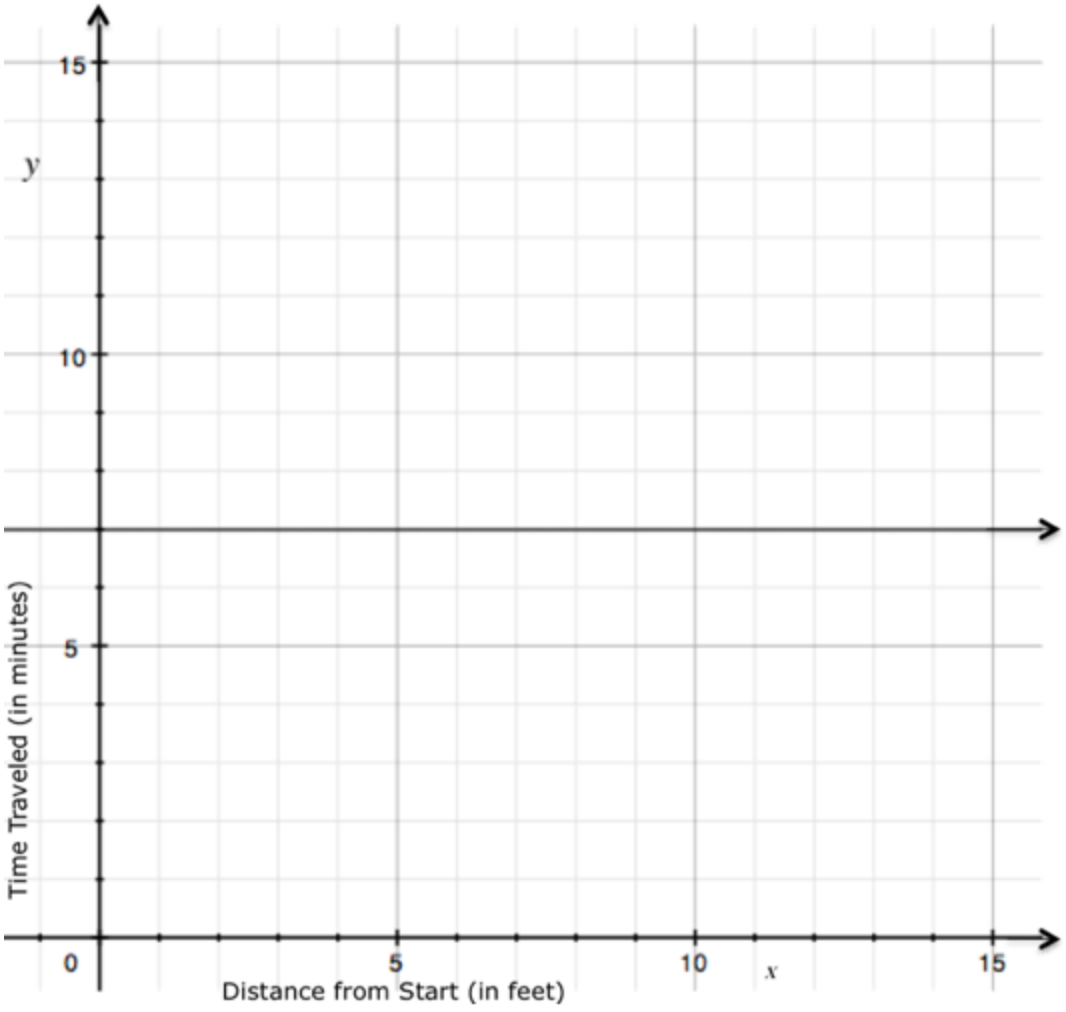
You built a car in your class. Your car does not move but starts at the 7-foot mark on the track.

Handout: Who Shares My Function? – Linear functions represented in graphs, tables, stories, and equations

Name: _____ Date:_____

Names of students who share my function: _____

_____



Handout: Who Shares My Function? – Linear functions represented in graphs, tables, stories, and equations

Name: _____ Date:_____

Names of students who share my function: _____

_____

$$y = 7$$

Handout: Who Shares My Function? – Linear functions represented in graphs, tables, stories, and equations

Name: _____ Date:_____

Names of students who share my function: _____

_____

Time Traveled (in minutes)	Distance from Start (in feet)
0	**7**
5	**7**
7	**7**
13	**7**
27	**7**
50	**7**
75	**7**
100	**7**

Handout: Who Shares My Function? – Linear functions represented in graphs, tables, stories, and equations

Name: _____ Date:_____

Names of students who share my function: _____

_____

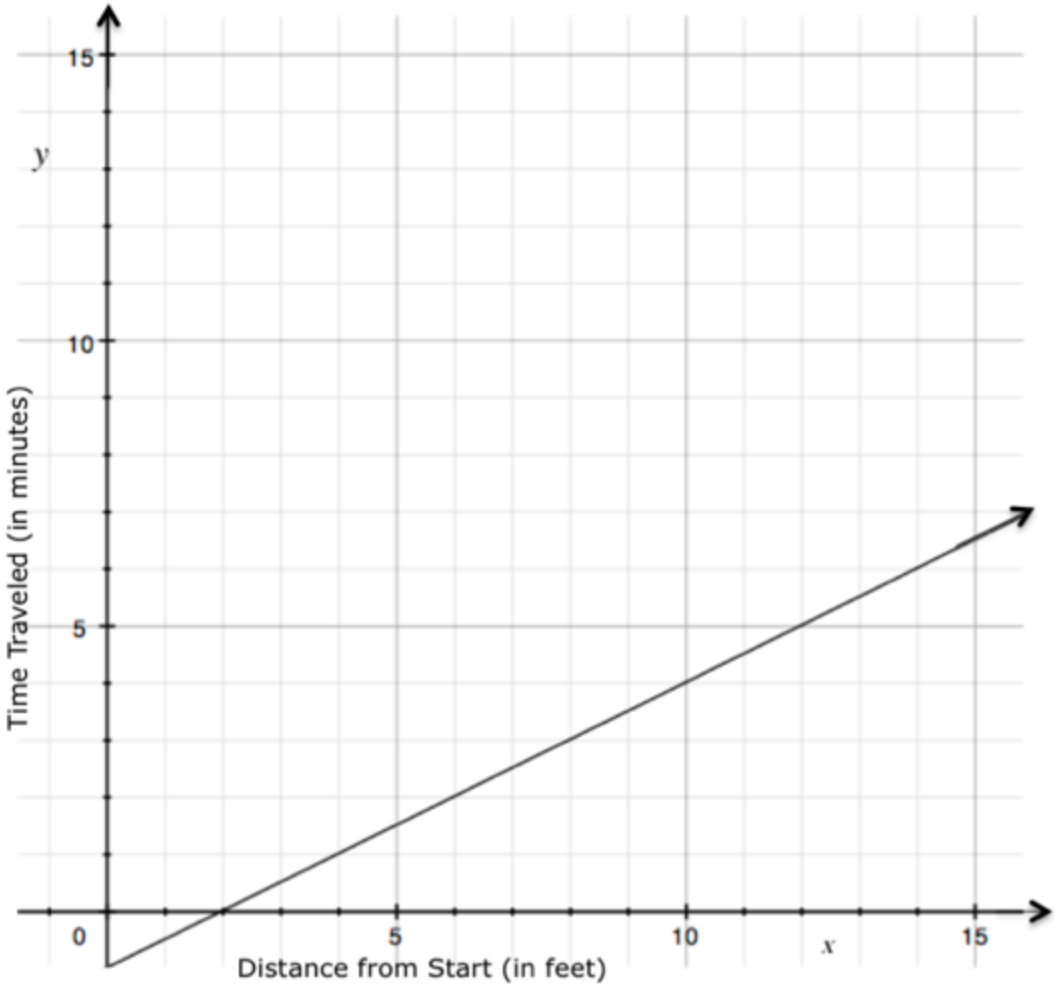
You built a car in your class. Your car travels a half a foot per minute. You start a foot behind the starting line.

Handout: Who Shares My Function? – Linear functions represented in graphs, tables, stories, and equations

Name: _____ Date:_____

Names of students who share my function: _____

_____



Handout: Who Shares My Function? – Linear functions represented in graphs, tables, stories, and equations

Name: _____ Date:_____

Names of students who share my function: _____

_____

$$y = \frac{1}{2}x - 1$$

Handout: Who Shares My Function? – Linear functions represented in graphs, tables, stories, and equations

Name: _____ Date:_____

Names of students who share my function: _____

_____

Time Traveled (in minutes)	Distance from Start (in feet)
4	**1**
8	**3**
10	**4**
13	**5.5**
24	**11**
50	**24**
75	**36.5**
100	**49**

Handout: Who Shares My Function? – Linear functions represented in graphs, tables, stories, and equations

Name: _____ Date:_____

Names of students who share my function: _____

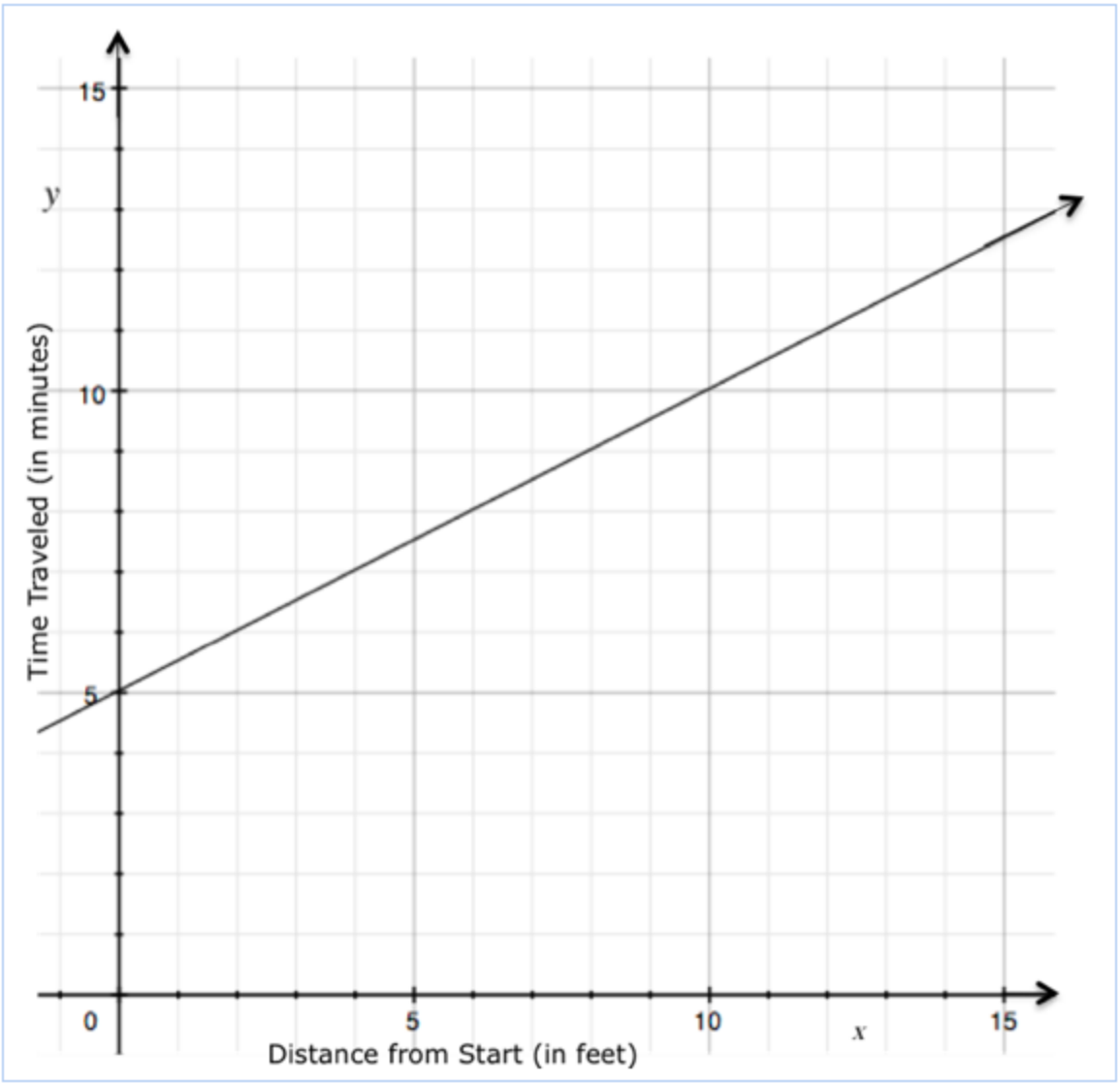
_____

You built a car in your class. Your car travels a half of a foot per minute. You start at the five-foot mark.

Handout: Who Shares My Function? – Linear functions represented in graphs, tables, stories, and equations

Name: _____ Date:_____

Name(s) of student(s) who share my function: _____



Handout: Who Shares My Function? – Linear functions represented in graphs, tables, stories, and equations

Name: _____ Date:_____

Names of students who share my function: _____

_____

$$y = \frac{1}{2}x + 5$$

Handout: Who Shares My Function? – Linear functions represented in graphs, tables, stories, and equations

Name: _____ Date:_____

Names of students who share my function: _____

_____

Time Traveled (in minutes)	Distance from Start (in feet)
0	**5**
4	**7**
8	**9**
13	**11.5**
28	**19**
50	**30**
75	**42.5**
100	**55**