Varying Speed

Varying Speed

Click here to download lesson.

Summary	Children are asked to tell a story about a trip depicted through a graph that has varying slopes/speeds.
Goals	1. Explore how speed is conventionally represented through graphs according to slope. 2. Deal with the fact that a horizontal segment connotes absence of movement.
Materials	Overheads, Handouts
Keywords	Compare/Contrast Functions Contextualized Situations Coordinate Pairs Full Class Discussion Interpretation of Graphs Interpretation of Stories Non-Linear Functions Production of Stories Ratios Slope Small Group Work

Activity Plan:

1. Writing a story about a graph [Group Work]

   Show the overhead on Page 1 and distribute the corresponding handout (also Page 1).

   Ask the children to work in pairs and write a story about what is shown on the graph on the handout (Page 2).

   Ask children what is being shown in the graph. In the previous lessons we have been working on earnings as a function of time. This is the first time, in this set of lessons, where they encounter a situation given by the graph where the variables are distance (i.e.: from Charlene to her house) as a function of the elapsed time (i.e.: seconds she has been walking).

   One of the interpretations that might appear is that the dependent variable (indicated in the vertical *y*-axis) is total walked distance. Another interpretation that might arise is that the person is going uphill. Go back to the labels in the axis, and try to get them to think of what we are measuring and representing with the numbers in that axis. And a last interpretation that might appear is that they could conceptualize the graph as a map or a street grid. They might want to locate Charlene's house in the origin (one of the arguments can be that she leaves from her house and that corresponds to 0 meters and 0 hours).

   Discuss with the students a possible interpretation of the first part of the trip. She starts at (0,0), which means Charlene is at 0 meters from her house and 0 seconds have gone by, therefore, where is she? Can we say where she is located if she is 0 meters from her house?

   Regarding point **B**=(4,6), what can we say about Charlene's position? Can we say how far she is from her house? How much time did she take to get there?

2. Discussing children's stories [Whole Class]

   Select a few stories to discuss.

   Explore the meaning that they attribute to the points as well as the segments determined by those points. Explore comparisons between the slopes of the segments (i.e.: slope of segment AB is 6/4 and the slope of segment BC is 2/4). You can ask when she went faster between 0 and 4 sec or, between 4 and 8 sec? Ask them for explanations. Focus on ratios and the writing of ordered pairs.

It might be helpful to write a table on the whiteboard like the one below:

Name of the point in the graph	**Coordinate pair**	***x*-component** **time walking in hours**	***y*-component** **distance from Charlene to her house while walking in meters**
A	(0,0)	0 seconds	0 meters
B	(4,6)	4 seconds	6 meters
C	(8, 8)	8 seconds	8 meters
D	(11,8)	11 seconds	8 meters
E	(13,12)	13 seconds	12 meters

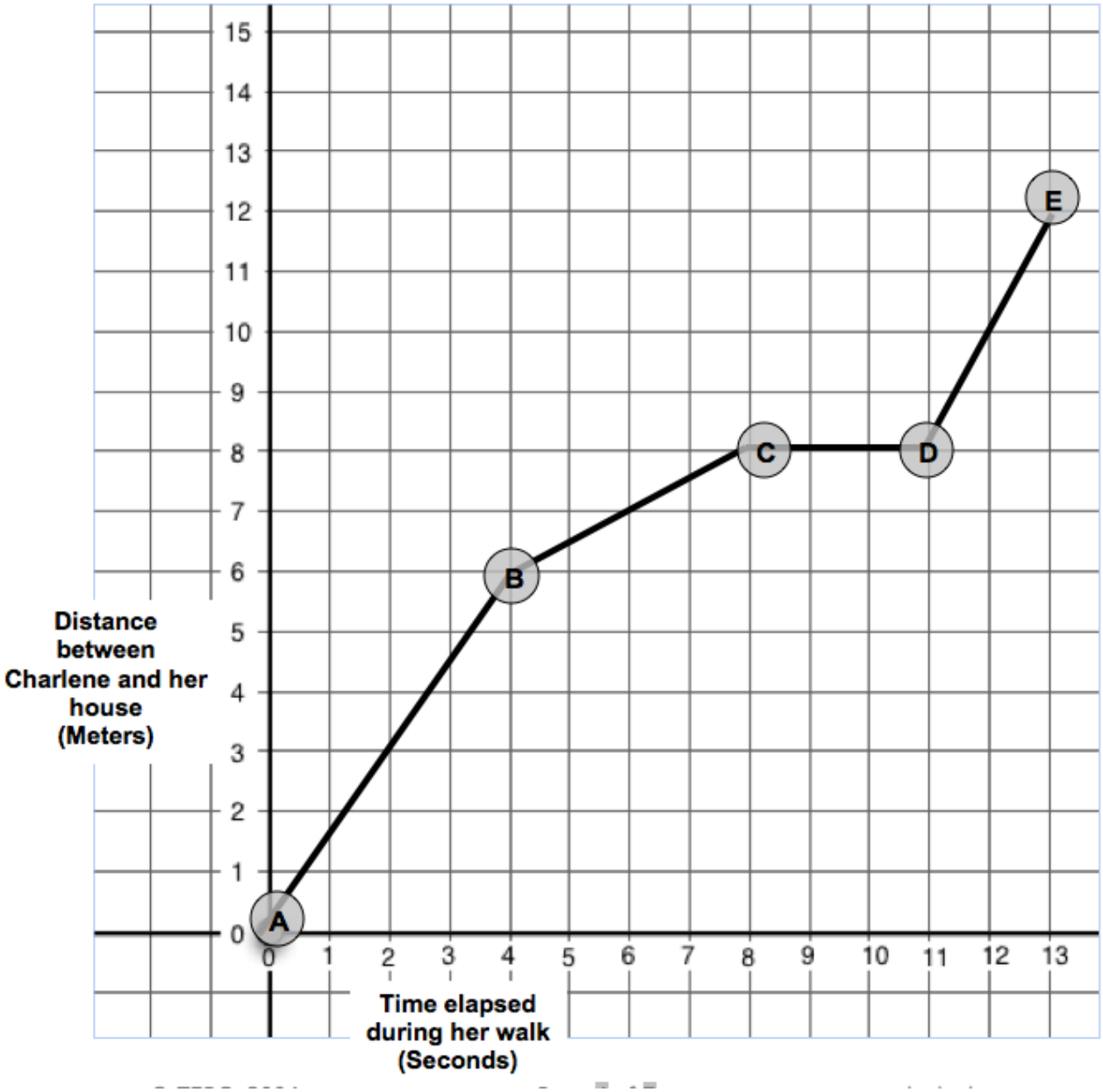
3. Homework (Pages 3 & 4)

The homework will be similar to the classroom activity.

Overhead and Handout: The Graph **(Page 1)**

Name: _____ Date: _____

Charlene took a short walk yesterday. The graph below shows how far Charlene was from her house (distance from Charlene to her house) at various moments.



Overhead and Handout: The Story **(Page 2)**

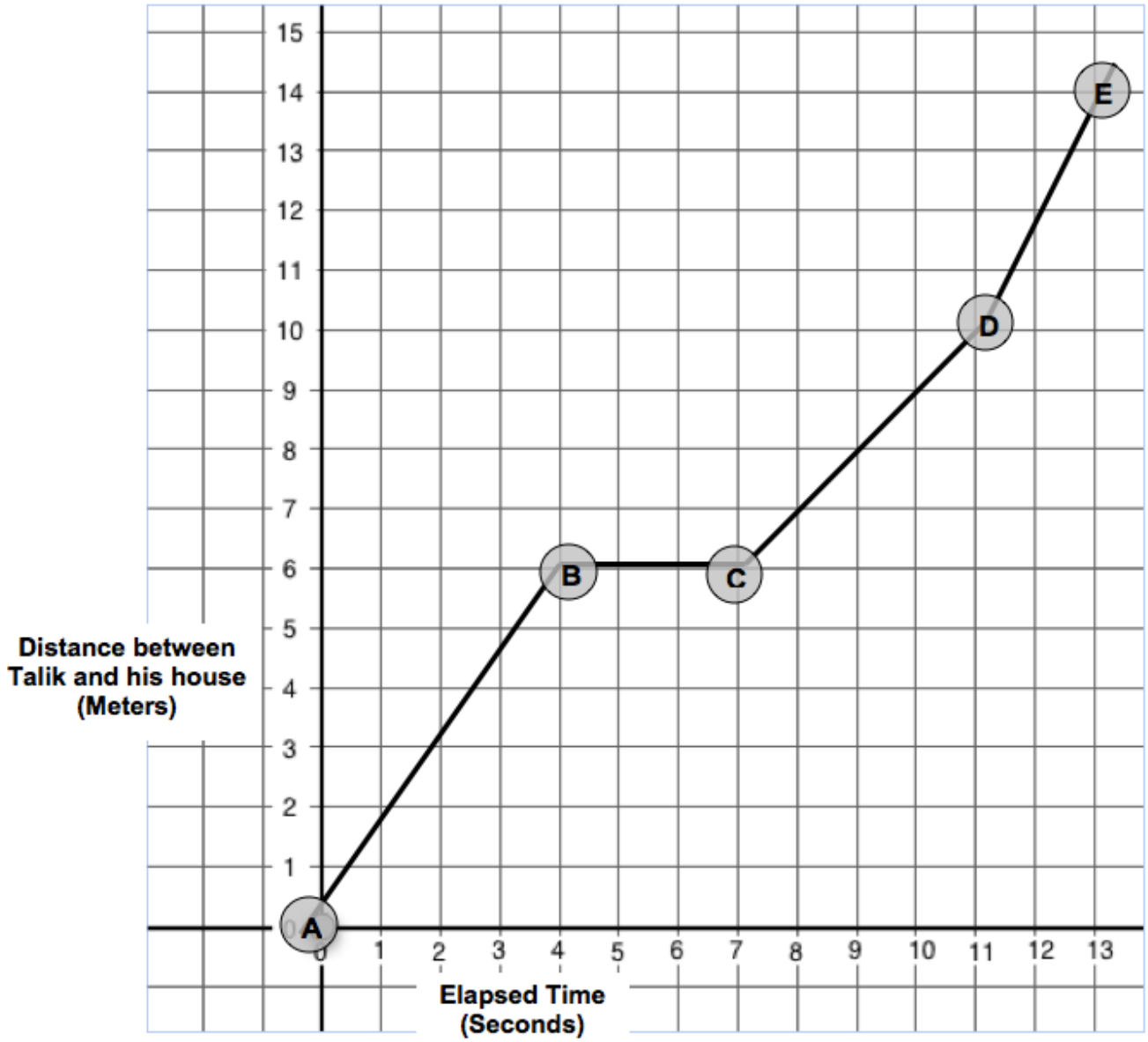
Name: _____ Date: _____

Below, write a story about Charlene's walk. Be as precise as you can be about each part of her walk.

Homework: The Graph **(Page 3)**

Name: _____ Date: _____

Yesterday Talik took a short walk. The graph below shows how far Talik was from his house (distance from Talik to his house) at various moments.



Overhead and Handout: The Story **(Page 4)**

Name: _____ Date: _____

Below, write a story about Talik's trip. Be as precise as you can be about each part of his walk.