

## Skateboarder Activity

Watch the video showing the skateboarder performance on the half-pipe. You will probably need to watch it several times as you work to develop a graph of the skateboarder’s *horizontal distance* from start (the left edge of the half-pipe) as a function of time. The following questions are designed to promote your thinking about your thinking concerning this situation.

1. On your whiteboard, create a graph of the skateboarder’s horizontal distance from start (the left edge of the half-pipe) as a function of time since the video began.

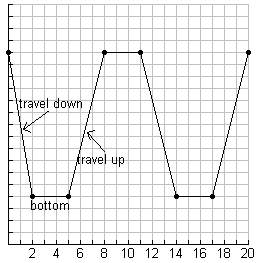
2. This graph is to appear as part of an article or report and you are given the task of writing the caption for this graph. Write a concise caption that communicates the information that the graph provides.

3. Choose a particular point on the graph. Describe the meaning of this point.

4. What aspect of the graph do you hope your audience envisions as you describe the meaning of the point in #3 by pointing to it?

5. Students are asked to create the graph as you were asked to do. A student creates the graph shown in . The student explains that the graph shows how the skateboarder first “goes down”, then travels across the bottom of the half-pipe, then goes “back up”, etc.

* Discuss how the student might be thinking as they create such a graph.
* What aspects of the situation might the student NOT be thinking about?
* What would you first say to or ask this student?
* Why?



Elapsed time (seconds)

Horizontal Distance from Start

Figure 1

The Skateboarder Situation – Teacher Notes

**Materials**

We use a [video of a skateboarder traveling back and forth on a half-pipe.](http://www.youtube.com/watch?v=mCqBSHEzryk)

**Item Analysis**

1. On your whiteboard, create a graph of the skateboarder’s horizontal distance from start (the left edge of the half-pipe) versus time since the video began.

*As this is the second opportunity for participants to reason covariationally, we use a more complex situation. The graph in this situation should both increase and decrease. Again, we recommend using the different graphs produced by groups as objects of discussion. As a result of the discussion, we hope that issues of covariational reasoning, making sense of quantities, and meanings of points on the graph are made clear.*

2. This graph is to appear as part of an article or report and you are given the task of writing the caption for this graph. Write a concise caption that communicates the information that the graph provides.

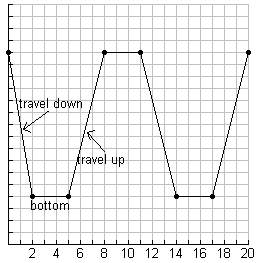
*Participants will be forced to describe the quantities and how they covary. They may tend to features of the graph such as how the graph increases, concavity, rate of change. They may also choose specific points on the graph and explain what they mean in the context of the situation.*

3. Choose a particular point on the graph. Describe the meaning of this point.

*If this hasn’t come up naturally in #2, the issue is explicitly brought up here.*

4. It is possible that, while explaining the meaning of the particular point chosen in #3, you pointed to the graph you created. If not, suppose that you did. When pointing to the graph, what might be the purpose? Specifically, what aspect of the graph do you hope your audience envision as you describe the meaning of the point in #3 by pointing to it?

*This presents another opportunity to deal with the following issues: Do the participants see a point on the graph as just a blip on the paper? Or, do they see the point as representing a horizontal distance and vertical distance from the origin? Here, we begin to push the idea of how to envision the graph that will be helpful for later work.*

5. Students are asked to create the graph as you were asked to do. Suppose that in one case, students create a graph shown. The students explain how the graph shows how the skateboarder first “goes down”, then travels across the bottom of the half-pipe, then goes “back up”, etc. Discuss how the students might be thinking as they create such a graph.

Elapsed time (seconds)

Horizontal Distance from Start

*Students may create a graph that looks like the motion of the skateboarder rather than truly tracking the quantities we are considering in this situation. Participants will have to think about how to address student thinking and consider ways in which they can assist students in thinking appropriately about the situation.*