

Performance Assessment Task				
Vincent's Graphs Grade 8				
This task challenges a student to use understanding of functions to interpret and draw graphs. A student must be able to analyze a graph and understand the functional relationship. A student must be able to represent a mathematical situation and model using a graph. A student must be able to design or describe a real-life situation to fit a particular function.				
Common Core State Standards Math - Content Standards				
Functions				
Use functions to model relationships between quantities.				
8.F.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.				
8.F.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.				
Common Core State Standards Math – Standards of Mathematical Practice				
MP.2 Reason abstractly and quantitatively.				
Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.				
MP.4. Model with mathematics.				
Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts, and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.				
Assessment Results				
This task was developed by the Mathematics Assessment Resource Service and administered as part of a national, normed math assessment. For comparison purposes, teachers may be interested in the results of the national assessment, including the total points possible for the task, the number of core points, and the percent of students that scored at standard on the task. Related materials, including the scoring rubric, student work, and discussions of student understandings and misconceptions on the task, are included in the task packet.				
Grade Level	Year	Total Points	Core Points	% At Standard
8	2009	8	4	32%

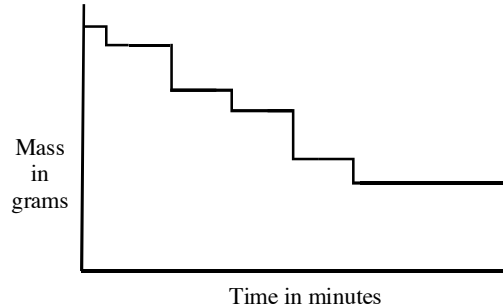
Vincent's Graphs

This problem gives you the chance to:

- interpret graphs
 - draw a graph
-

Vincent is eating a packet of raisins.

This graph shows the changes in the mass of raisins in the packet as time passes.



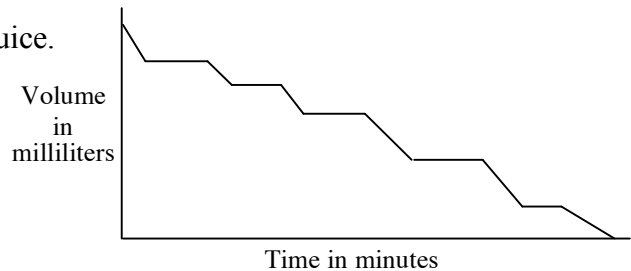
1.a. What is Vincent doing when there is a vertical line on the graph?

b. Why are the vertical lines of different lengths?

c. Did Vincent eat all the raisins? _____
Explain how you know.

2. Ellie is drinking with a straw from a box of fruit juice.

The graph shows the volume of juice in the box as time passes.

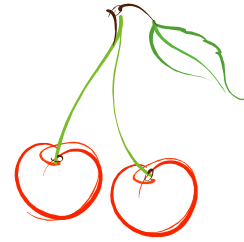


a. What is happening when the line on the graph is horizontal?

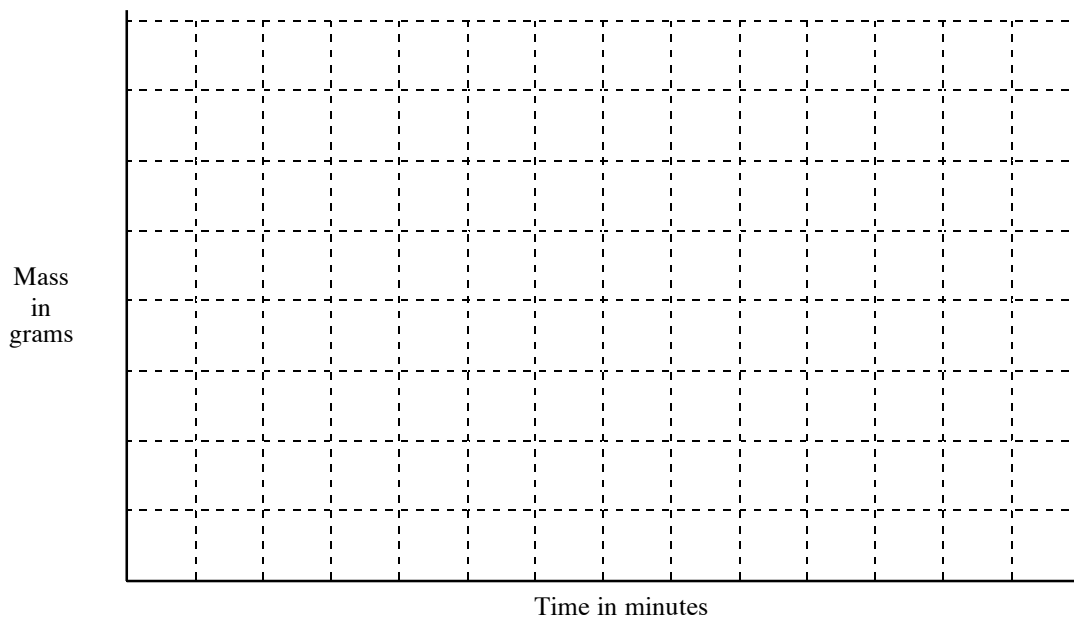
b. Why do the lines going downwards on this graph go at an angle?

3. Ralph is eating cherries from a bag.

After eating a cherry he puts the stone back into the bag before taking out the next cherry.



On the grid draw a graph to show the changes in the mass of the bag of cherries as time passes.



Vincent's Graphs	Rubric	
<p>The core elements of performance required by this task are:</p> <ul style="list-style-type: none"> • interpreting graphs • drawing graphs <p>Based on these, credit for specific aspects of performance should be assigned as follows</p>	points	section points
<p>1. a. Gives correct answer such as: he is taking raisins out of the packet.</p> <p>b. Gives correct answer such as: he takes different numbers of raisins from the packet.</p> <p>c. Gives correct answer: No and a correct explanation such as: the line does not reach the x axis.</p>	<p>1</p> <p>1</p> <p>1</p>	<p>3</p>
<p>2. a. Gives correct answer such as: Ellie is not drinking.</p> <p>b. Shows correct work such as: the volume decreases steadily as the juice is sucked out.</p>	<p>1</p> <p>1</p>	<p>2</p>
<p>3. Draws a correct graph: First a short horizontal line</p> <p style="padding-left: 40px;">Followed by a short line downwards.</p> <p style="padding-left: 40px;">A short horizontal line followed by a short line upwards.</p> <p style="padding-left: 40px;">The line upwards should be shorter than the first line downwards.</p>	<p>1</p> <p>1</p> <p>1</p>	<p>3</p>
Total Points		8