

### 4.1 Using Graphs to Relate Two Quantities

**Getting Ready!**

The graphs below relate the height of the water to the volume of the water in each container. Which graph goes with which container? Justify your reasoning.

C      A      B

Sep 26-9:52 AM

We are going to use graphs to help us visualize and describe the relationship between two variables.

**Analyzing Relationships:**

1. Read the axis - it will tell you what variables are related.
2. The y-axis variable ALWAYS depends on the x-axis variable. NOTE: y is ALWAYS dependent and x is ALWAYS independent

The graph shows the relationship between the amount of gasoline in Bobby's car after he fills up his tank.

What are the variables?  
gas depends on time

Describe how they relate.  
 The gas goes down every day he drives.

Feb 27-9:26 AM

**Problem 1: Analyzing a Graph**

The graph shows the volume of air in a balloon as you blow it up, until it pops. What are the variables? Describe how the variables are related at various points on the graph.

What are the variables?  
Volume depends on time

Describe how they relate.  
 Someone is blowing up a balloon until it pops.

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**Examples:** What are the variables in each graph? Describe how they are related.

a.

What are the variables?  
length depends on time

Describe how they relate.  
 The length of the board gets smaller because someone is cutting the board.

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b.

What are the variables?  
cost depends on minutes

Describe how they relate.  
 The cost stays the same until the person runs out of minutes. Then it goes up.

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**Problem 2: Matching a Table & a Graph**

A band allowed fans to download its new video from its Web site. The table shows the total # of downloads after 1, 2, 3, & 4 days. Which graph could represent it?

Day	Total Downloads
1	346
2	1011
3	3455
4	10,426

total downloads depends on days

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**Example:** The table shows the amount of sunscreen left in a can based on the number of times it has been used. Which graph could represent the data?

Sunscreen				
Number of Uses	0	1	2	3
Amount of Sunscreen (oz)	5	4.8	4.6	4.4

A. B. C.

*amt of sunscreen depends on number of uses*

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**Modeling Scenarios**  
 ☆ The most important thing is to **label the x- and y-axis**. Also, remember that the **y-axis variable depends on the x-axis variable**.

Time is **ALWAYS** an independent variable (x - axis).  
 Totals (or Amounts) are **ALWAYS** dependent variables (y - axis).

**Example:** The water drains out of the bathtub at a constant rate.

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**Example:** A model rocket rises quickly & then slows to a stop as its fuel burns out. It begins to fall quickly until the parachute opens, after which it falls slowly back to Earth. Make a graph that could represent the height of the rocket during its flight?

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**Example:** You jog around the track at a constant speed (rate). You then sprint for a few seconds before slowing down to walk.

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**Example:** When Mary jogs on the treadmill, she gradually increases her speed until she reaches a certain level. Then she jogs at this level for several minutes. Then she slows to a stop and stretches.

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**Classwork: p.237 #5 - 13 all**  
**Copy the question.**

**Final Five**

The graph at the right shows your distance from home as you walk to the bus stop, wait for the bus, and then ride the bus to school. Which point represents a time that you are waiting for the bus?

(A) A                      (C) C  
 (B) B                      (D) D

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