

MS SEP Review

Zach is seeking to perfect his bottle-flipping skills. He has noticed that the amount of water in the bottle seems to have an effect on whether or not the bottle lands upright. He decides to conduct a scientific investigation.



1. Write 3 questions he might ask to guide his scientific investigation? SEP 1
 - a.
 - b.
 - c.
2. Write a hypothesis for this investigation. Be sure to include a quantitative reference in the hypothesis statement. SEP 3

Zach plans to use four 12oz soda bottles and fill 3 of them with different amounts of water. One bottle will be flipped empty, the others will contain 25mL, 50mL, and 100mL of water. He will flip each bottle 5 times (5 trials) and record his data.

3. Which of the following are the necessary controlled variables for this experiment? Mark all that apply. SEP 3
 - All bottles must be the same size and have previously contained the same drink.
 - Each flip must land on the same surface.
 - Each bottle must contain the same amount of water.
 - The same person must execute each flip in the same manner.
4. Use a straightedge to design a data chart for Zach to collect his data. SEP 2, SEP 3

5. His data are below. Fill in your chart with ✓ or X, then calculate the success percentage for each amount of water. SEP 5

0mL landed 0 of 5 times upright _____

25mL landed 2 of 5 times upright. _____

50mL landed 4 of 5 times upright. _____

100mL landed 4 of 5 times upright. _____

6. Zach's teacher looked at his data and questioned the design of his experiment. This is what she said, "Zach, I like your experiment, but I am wondering about your control. I see that you flipped an bottle empty, and you flipped with different amounts of water. The bottle is a 12oz bottle which would be 355mL. Can you think of another test you should perform that would also be a control?" Help Zach answer this question. SEP 3

7. Zach wants to make a YouTube video about how to be a great bottle-flipper. What are 3 pieces of advice should he offer to viewers based on his data? SEP 6, SEP 7

a.

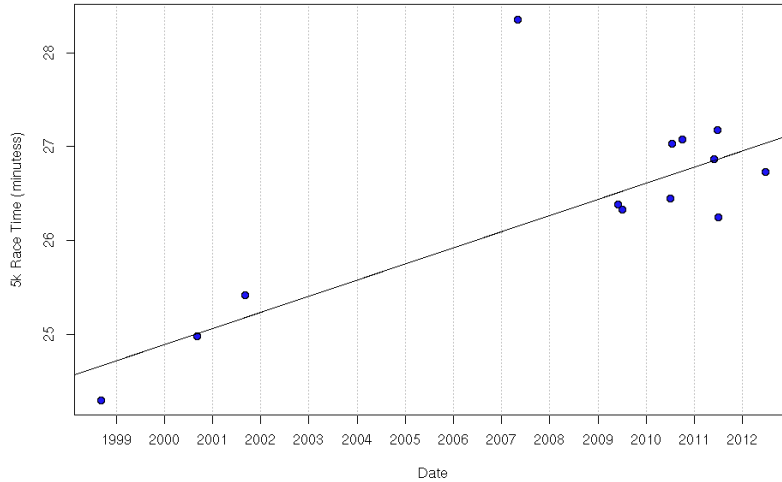
b.

c.

8. Bottle-flipping isn't as easy as it seems. Think of an activity you could design for beginners to help them get started. SEP 9



Morgan’s mom is her school’s coach for the Girls’ running group. The girls are not focussed on competition, their coach is competitive. She has been running 5K races since 1998 and has charted average race times and her personal time since she began. The line on the graph is the average finishing time each year for all of the participants, and the blue dots are Morgan’s mother’s times when they were beyond the average range.



8. According to the graph people are running 5K races _____ than in past years. SEP 4
9. In what year was the average 5K finishing time 25min? SEP 4 _____
10. In what year was the average 5K finishing time 26min? SEP 4 _____
11. In what year was Morgan’s mom much slower than average? SEP 4 _____
12. How many times in 2010 did Morgan’s mom run faster than the average? SEP 4 _____
13. If 1 mile is equal to 1.609 kilometers, which is a greater distance, a mile or a kilometer? SEP 5
14. What distance, in miles, is equal to 5 kilometers? SEP 5

