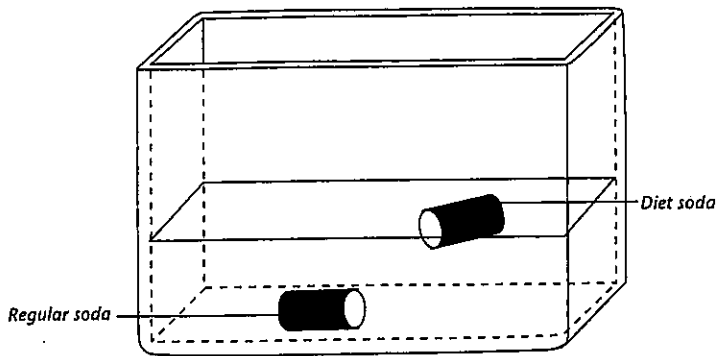
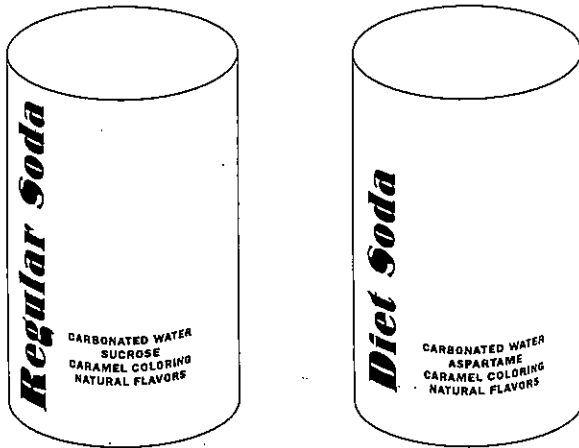


## Developing a Hypothesis

The day after a picnic, you look into the cooler. All of yesterday's ice has turned to water. Only two beverages are left. A can of diet soda is floating at the surface. A can of regular soda is resting at the bottom.



You pick up the two cans. You see that both drinks are made by the same company. Then you read the labels.



1. You think that something about the regular drink must have made it sink, while something about the diet drink made it float. Write down at least two possible explanations for the events.
2. Suppose that the type of drink did *not* affect which can floated or sank. Maybe the cans themselves were different in some way. Maybe something besides soda got into one of the cans by mistake. Write down at least two possible explanations for the events.
3. Write down any other possible explanations you can think of.
4. Review your answers to Question 1. Use one of your ideas to write a hypothesis explaining why one can floated and the other sank?
5. Review your answers to Questions 2 and 3. Choose one of your statements describing something besides the type of drink that caused the floating or sinking. Write a hypothesis based on that idea.
6. Are both of your hypotheses testable? Explain how you can test each one.

Based on your reading, answer following questions:

7. A Gallup Poll report revealed that 72% of teens said they seldom or never argue with their friends. Yvonne wonders whether this results holds true in her large high school. So she surveys a random sample of 150 students at her school to run a significant test. Define the parameter of interest and state the null and alternative hypotheses.
8. After Yvonne got the survey, 96 students in the sample said they rarely or never argue with their friends. A significant test yields a p-value of 0.0291. First interpret the p-value in context. What conclusion would you make if the alpha level was 0.05? 0.01? Justify your answers.

Read the 2-page document "The War Against Terrorism". Questions to answer:

9. When President Bush decided to attack Iraq expecting to find Weapons of Mass Destruction (WMD) and finding none, what type of error (I or II) did he make? What have been the consequences of attacking Iraq?
10. When Toyota knew that there was a problem in the many types of cars (in the braking mechanisms that would stick and therefore a driver would be unable to stop the vehicle) but chose to do nothing resulting in over 32 deaths caused by those problems, did they make a Type I or Type II error? What could they have done to prevent it? What if they made the other error, what could have been the consequences then?
11. Is there Global Warming? What if there is and we stand around and do nothing. What type of error would we be making? What would the consequences be? What if we make many many changes but find out there was never global warming? What type of error would then be made? What would be the consequences of that error? Which error, Type I or Type II is worse?

When finished with the 11 questions, write a null hypothesis and an alternative hypothesis on something you would like to determine whether a significant test would hold the claim to be true.

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