

Lesson and Exercises on How to Write an Hypothesis

From: <http://www.angelfire.com/scifi/ricks/hypothesis.html>

How To Correctly Write An Hypothesis

One of the most important skills a scientist has is his/her ability to write a good hypothesis. For today's homework you will be practicing how to write an hypothesis correctly.

Here a few of the basic steps. There are three basic types of hypotheses: the *general hypothesis*, a *specific hypothesis*, and a *measurable hypothesis*. The *general hypothesis* states the general relationship between the major variables. The *specific hypothesis* fills in important details about the variables given in the hypothesis. The *measurable hypothesis* refines the specific hypothesis by stating the direction of the difference or nature of the relationship.

Consider the following example: Anne has observed that Hopkins 8th grade girls seem to get better grades on organization skills tests such as notebook quizzes than 8th grade boys. She wants to scientifically determine whether or not this is true. Anne writes a general hypothesis which states: "Boys and girls receive different grades on organizational skills tests." Do you notice how general this hypothesis is? Do you see that it does not state the direction of the difference? Anne later writes a specific hypothesis which states: "Hopkins 8th grade girls receive different grades on notebook quizzes than 8th grade boys." Do you see that she has now given some specific details about the variables involved in the hypothesis? However, this hypothesis does not predict the nature of the difference. Do the girls get better grades than the boys or do the boys get better grades than the girls? Anne finally writes a measurable hypothesis. The measurable hypothesis states: "Eighth grades girls will earn significantly higher grades on notebook quizzes than eighth grade boys." Do you see that Anne has now stated a direction of the hypothesis? Anne is predicting girls will receive higher grades. What difference will you measure? The difference in scores on notebook quizzes between the girls and boys. Anne has also added the word "significantly". This suggests that she will be testing her hypothesis statistically.

So how should you write an hypothesis? First, identify what the problem is. If you fail to identify the problem, you most certainly will have difficulty writing the hypothesis. Second, make an educated guess as to what direction of the relationship or difference is. Third, identify the major variables. Now you are ready to write an hypothesis. Start by stating the general hypothesis in a simple declarative statement. Do not use the terms "I think" to start the hypothesis. Now that you have given written the general hypothesis, write the specific hypothesis. With the specific hypothesis behind you, finish with the measurable hypothesis. You will get a chance to practice this skill in the problems below.

Exercises on Writing Hypotheses

1. What is the difference between a general and a measurable hypothesis?
2. Which of the three types of hypotheses described do you think a scientist is likely to use in his/her research?
3. Why is it important to state a direction of the difference or relationship when writing a specific hypothesis?
4. Why is it inappropriate to begin an hypothesis with the words "I think"?
5. Mark believes that groceries at Costco will be less expensive than groceries at Safeway. Write a general, specific, and measurable hypothesis related to Mark's observation.

General Hypothesis _____

Specific Hypothesis _____

Measurable Hypothesis _____

6. Leslie has observed that more small dogs are adopted at animal shelters than large dogs. Write a general, specific, and measurable hypothesis related to Leslie's observation. The specific and measurable hypothesis must define in the hypothesis what is meant by a small and large dog. These categories should not overlap. (Small dogs are "<" some amount and large dogs are "≥" some amount).

General Hypothesis _____

Specific Hypothesis _____

Measurable Hypothesis _____

7. Amy believes the younger the driver the more speeding tickets a driver will receive. Write a general and measurable hypothesis related to Amy's observation. This one should be written as a relationship. An example of this type of hypothesis might be, "There is a significant positive relationship between the income a person receives each year and the square footage of his/her home." That suggests that as a person's income increases the size of his/her home increases. If a relationship was in the opposite direction (as one element increases the other decreases), then it would be written as a significant negative relationship.

General Hypothesis _____

Measurable Hypothesis _____

8. Roger has observed that the dropout rate for freshman students who take honors classes is less than students who do not take honors classes. Write a general, specific, and measurable hypothesis related to Roger's observation.

General Hypothesis _____

Specific Hypothesis _____

Measurable Hypothesis _____

9. Sometimes a general observation may lead to several different hypotheses. For example if you notices that seniors received better grades than freshman, sophomores, or juniors you might hypothesize: "Seniors receive significantly higher grades than freshman, sophomores, or juniors. In that case seniors would be compared to all other students. A more specific approach would break this comparison up. In that case the seniors would be compared to the freshmen, then the sophomores, and finally the juniors. In some cases this might provide more useful information. Read the scenario which follows and write three *measurable hypotheses* based upon the different groups being compared.

Frank notices that when the seventh grade girls are able to do better on the "bend and reach test" flexibility test than seventh grade boys, eighth grade boys, or eighth grade girls.

Hypothesis #1 _____
Hypothesis #2 _____
Hypothesis #3 _____

10. Read the scenario which follows and write three *measurable hypotheses* based upon the three different variables being considered. In some cases new researchers combine variables to make a very complex hypothesis that may be difficult or impossible to test. It is often best to simplify variables where possible so that only two variables are being compared, one independent and one dependent variable.

Scientists from the Department of Fish and Game have noticed that trout are more likely to get parasites when they are living in shallower, warmer, and muddy waters.

Hypothesis #1 _____
Hypothesis #2 _____
Hypothesis #3 _____