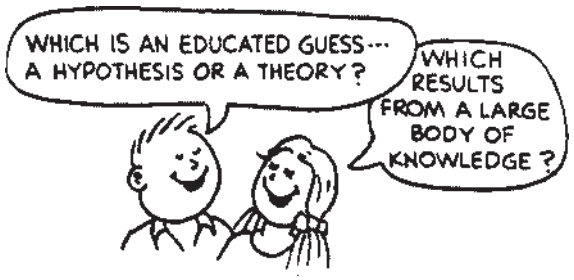
Name _____ Class _____ Date _____

Concept-Development Practice Page 1-1

Making Hypotheses

The word *science* comes from Latin, meaning "to know." The word *hypothesis* comes from Greek, "under an idea." A hypothesis (an educated guess) often leads to new knowledge and may help to establish a theory.



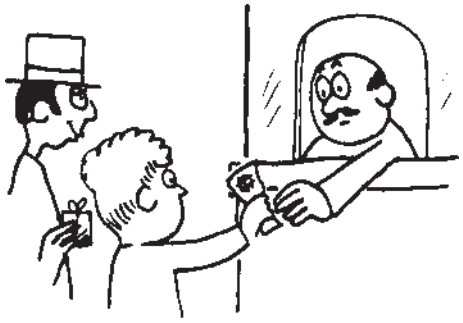
Examples:

1. We see items in a store priced at $2.98, $3.98, or $4.98 etc. Why not $3, $4, or $5, etc? Make a hypothesis for this by finishing the following:

   Items in a store are usually priced one or two cents lower than the nearest dollar because
   (Likely hypothesis) The price seems much smaller than it really is, and people will be more encouraged to buy.

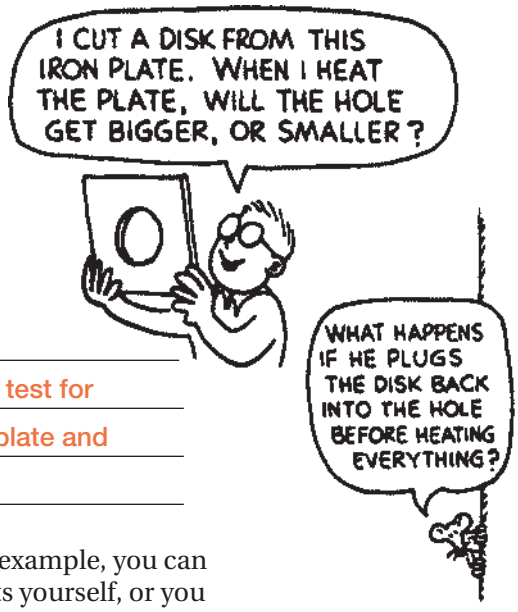
   Suggest a way to test this hypothesis. (*Hint:* Imagine you own a chain of stores.)
   The hypothesis can be tested by selling the same item at half the stores at an even dollar, and the other half at 2 cents off. Then compare sales.

   Another hypothesis is based on distrust of sales clerks before the use of cash registers. In those days, money was handled only by store owners. A customer buying a $5 item would give a $5 bill to the clerk who might "forget" to give it to the store owner at the cashier's window. At $4.98 the customer wants the change (2 cents), and so the clerk must go to the store owner to get it. Thus tradition and a custom started. How could you support the hypothesis that store owners established pricing policies to protect themselves against sales clerks? (*Hint:* Imagine you have a librarian friend who has information on F.W. Woolworth.)



   Library research: Read books about the life of F.W. Woolworth, or read about the founders of various commercial retailing stores.

2. It is well known that things generally expand when heated. An iron plate gets slightly bigger, for example, when put in a hot oven. But what of a hole in the middle of the iron? Will the hole get bigger or smaller when expansion occurs? One friend says the size of the hole will increase, and another says it will decrease.



   a. What is your hypothesis about hole size, and if you are wrong, is there a test for finding out?
   Hypothesis 1: The hole gets bigger. Hypothesis 2: It gets smaller. Hypothesis 3: It remains the same. A test for wrongness of any of these hypotheses is heating a plate and measuring the hole. (Hypothesis 1 is correct.)

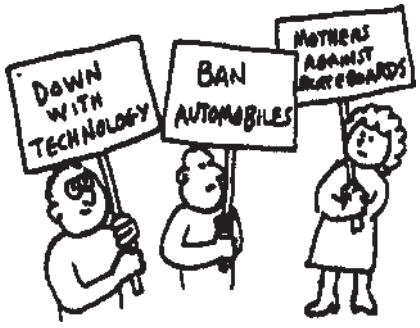
   b. There are often several ways to test a hypothesis. For example, you can perform a physical experiment and witness the results yourself, or you can use the library to find the reported results of other investigators. Which of these two methods do you favor, and why?
   (It depends on the situation — most research involves both.)

3. Before the time of the printing press, books were hand-copied by scribes, many of whom were monks in monasteries. There is the story of the scribe who was frustrated to find a smudge on an important page he was copying. The smudge blotted out part of the sentence that reported the number of teeth in the head of a donkey. The scribe was very upset and didn't know what to do. He consulted with other scribes to see if any of their books stated the number of teeth in the head of a donkey. After many hours of fruitless searching through the library, it was agreed that the best thing to do was to send a messenger by donkey to the next monastery and continue the search there. What would be your advice?

First look in the donkey's mouth. But watch out — it may have some missing teeth!

MAKING DISTINCTIONS

Many people don't seem to see the difference between a thing and the *abuse* of the thing. For example, a city council that bans skateboards may not distinguish between skateboarding and reckless skateboarding. A person who advocates that technology be banned may not distinguish between technology and the abuses of technology. There is a difference between a thing and the abuse of the thing. On a separate sheet of paper, list examples you can think of—then discuss your list and those of others with classmates.



This is to encourage your students to THINK.

CONCEPTUAL PHYSICS