

### III. Hypothesis: The Educated Guess (Day 3)

#### A. Introduction:

1. The physicist will first review everything already known for a guide.
  - a. After this review, a reasonable guess about the unknown is made.
  - b. Physicists base their guesses on experience and study.

#### B. Guesses, Predictions and Hypotheses:

1. A Hypothesis is : a possible solution, a prediction, a suggested explanation, a tentative answer, a game plan, a trial answer, and educated guess.
2. You can form hypotheses for many different kinds of problems, not just scientific ones.
  - a. Forming a hypothesis can help you to solve problems by giving you a direction in which to work.
  - b. Even if it is not the final answer, the hypothesis starts you thinking about all the possible solutions to your problem.
3. A hypothesis may be complicated.
  - a. When Physicists don't know how something really works, they put together as much as they do know.
  - b. Then they create a MODEL.
4. The model is not the real thing. It is often a mental picture of how something would work.
  - a. For example the solar system model of the atom. (abandoned after more was known)
5. A model is a kind of hypothesis.
  - a. An early model of the solar system had the earth at the center. When new facts did not fit with the earth-centered model of the solar system, a new model was developed. But the old model was not wasted effort. It had done its job of paving the way for a model that was closer to reality.
  - b. By testing each hypothesis, you can arrive at the answer to your problem.
  - c. The hypothesis does not have to be correct to be useful in solving problems.
6. The mark of a good physicist is the ability to accept the changes that come with new facts.
  - a. There is no hypothesis in science that is one hundred percent certain.
  - b. Physicists must be prepared to rethink their ideas periodically. The physicist who cannot adapt will be left behind in the search for knowledge.
7. The organized and scientific way to attack a problem is to:  
THINK: Stop, observe, and think about past solutions.  
CONSULT: Check books and ask other people for more information.

HYPOTHESIS: Make a list of possible solutions.

CHOOSE: Make a choice from the list.

C. PREDICTORS:

1. The world depends upon predictions. Many people work as predictors.
2. Predictors gather all facts and put them together to make predictions.
3. Weather forecasters and economists.

D. Questions:

1. What do scientists do when they explore the unknown?
2. What do scientists do to make sure that their guesses are not just wild guesses?
3. What is a hypothesis?
4. How can forming a hypothesis help you solve problems?
5. How is a model used as a hypothesis?
6. Why doesn't a hypothesis have to be right to be useful?
7. What is the next step after gathering information about a problem?

E. ACTIVITY: Predicting How Balls Bounce (Materials: Balls of different sizes)

1. Your group will be given a bag that contains different balls. Look at each ball. Predict which ball will bounce the highest.
2. Which ball did you predict would bounce the highest?
3. Drop the balls two at a time until you can pick out the ball that bounces highest.
4. What was the result of bouncing them?
5. Pick out the largest and smallest ball. Predict which will hit the ground first.
6. Which ball did you predict would hit the ground first?
7. Drop the two balls at exactly the same time from the same height.
8. What happened when you dropped the two balls at the same time from the same height?
9. What did you learn from this activity about how balls bounce?
10. How did your prediction affect what you learned?