

Lesson Plan

Reach:

Ask the students if they ever popped a bag of microwave popcorn and noticed how many kernels were unpopped at the bottom of the bag which made you wonder if other brands pop better than the one you are eating. In just that short time you have done two steps of the scientific method. Today you are going to learn how you could solve your problem using the other steps of the scientific method.

Lesson:

We will take guided notes about the steps of the scientific method. I use powerpoint pictures to go along with the notes and as we go through the notes I will relate the steps and terms to our popcorn problem.

Reflect:

At the end of the lesson, they will write in the journal section of the notebook. They will reflect on the following questions:

What did I already know?

What did I learn?

What do I not understand?

After, they fill in their journals, then they will share with their lab groups. Hopefully during that time, they might be able to explain to each other the things that they might not have understood. During that time, I will be walking around the room listening and providing reinforcement and some further explanation if needed.

Recode:

They will do a graphic organizer to sequence the steps of scientific method.

Rehearse:

We will perform a lab to rehearse the steps of the scientific method. During the lab they students will need to identify which step of the scientific method they are performing. They will also practice analyzing their data and forming a conclusion that they will communicate with the class.

Another way we will rehearse, is they will have a homework assignment where they will be reading an example experiment. They will identify the steps of the scientific method in the example and they will also identify the parts of the experiment.

Review:

The lab groups will construct a mind map poster of the steps of the scientific method and share their posters with the class.

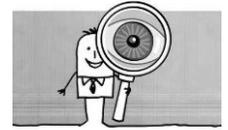
Retrieve:

The students will have a written assessment on the scientific method.

The Methods of Biology

Scientific methods -

Steps of the scientific method



1. _____

2. Identify the _____ or _____ a



3. _____



4. Form a _____ -



5. _____ your hypothesis

- Experiment -
- Control -
- Independent variable -
- Dependent variable -



6. _____ your

- Usually the _____ from the experiment is organized into _____ or _____



7. _____ your data



8. _____ your results



9. _____ your results

- Theory -
- Law -



Egg Hatching

Objective: To conduct an investigation to determine what causes toy eggs to "hatch."

Materials:

- Two eggs
- Two beakers
- Hot water
- Cold water

Procedure:

1. Gather materials.
2. Observe the eggs and record your observations in the data table below.
3. Place one egg in each beaker.
4. Form a hypothesis as to which water temperature will cause the eggs to hatch the fastest and write it in the space below.
5. Pour 100 ml of hot water into one beaker, and 100 ml of cold water into the other beaker at the same time.
6. Stir the water in each beaker for one minute.
7. Record your observations in the table below.

Hypothesis:

Data Table:

	Appearance of the Egg
Eggs Before Treatment	
Egg in Hot Water	
Egg in Cold water	

Analyze - Answer the following questions in complete sentences:

1. Did the results support your hypothesis? If no, how would you revise your hypothesis knowing this new information?

2. What is the independent variable in this experiment?

3. What is the dependent variable in this experiment?

Biology
Independent and Dependent Variable Practice¹

Name and # _____
Date _____

Directions: Please identify the independent and dependent variables in the following descriptions of experiments:

1. Students watched a cartoon either alone or with others and then rated how funny they found the cartoon to be.
 - Independent Variable:

 - Dependent Variable:

2. A comprehension test was given to students after they had studied textbook material either in silence or with the television turned on.
 - Independent Variable:

 - Dependent Variable:

3. Some elementary school teachers were told that a child's parents were college graduates, and other teachers were told that the child's parents had not finished high school; they then rated the child's academic potential.
 - Independent Variable:

 - Dependent Variable:

4. Workers at a company were assigned to one of two conditions: One group completed a stress management training program; another group of workers did not participate in the training. The number of sick days taken by these workers was examined for the two subsequent months.
 - Independent Variable:

 - Dependent Variable:

5. Students at a University were split into two groups and each received a different text for a philosophy course. One group received a traditional text book, while the other received an interactive textbook on a tablet computer. After the course, the final exam marks between the two groups of students was compared.
 - Independent Variable:

 - Dependent Variable:

¹ <https://www.amal.k12.nf.ca/amal/pluginfile.php?file=/14847/.../variable+worksheet..>

Directions - read the following information about a student's experiment and then answer the questions that follow in complete sentences.

A student noticed that when a dog is cut, the dog periodically licks its wounds. Usually after a few days, the wound begins to heal without ever showing signs of infection.

The following steps outline the student's line of reasoning:

- A. I wonder why the dog's wound doesn't become infected.
- B. The dog's saliva must prevent the growth of infected-causing bacteria.
- C. I'll obtain a bacterial culture and grow the same kind of bacteria in two identical culture dishes. Once the bacteria start growing, I'll add dog saliva to only one of the dishes and leave the other alone. I'll cover both dishes. Then I'll observe what happens each day for a week.
- D. Even after adding the dog saliva to one of the dishes, the bacteria continued to grow in both dishes over the course of the week. However, the bacteria in the treated dish grew more slowly than the bacteria in the untreated dish.
- E. I think I'll try something else. I'll start with two identical culture dishes, as before, and use the same kind of bacteria in each dish, but this time I'll treat one dish with dog saliva before I add the bacteria. I'll observe what happens each day for a week.

1. What part of the scientific method is illustrated in step A?

2. What part of the scientific method is illustrated in step B?

3. What is the independent variable in the student's experimental design?

4. What is the dependent variable?

5. What is the control?

6. Why were both dishes covered?

THE SCIENTIFIC METHOD

