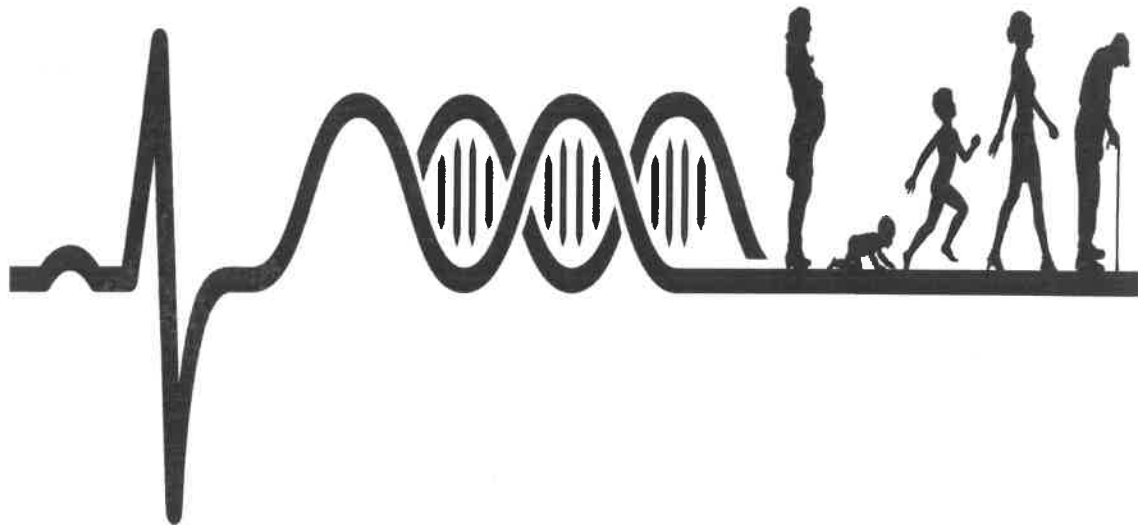


# INTRODUCTION TO HEALTH SCIENCE



## 1. What is Science?

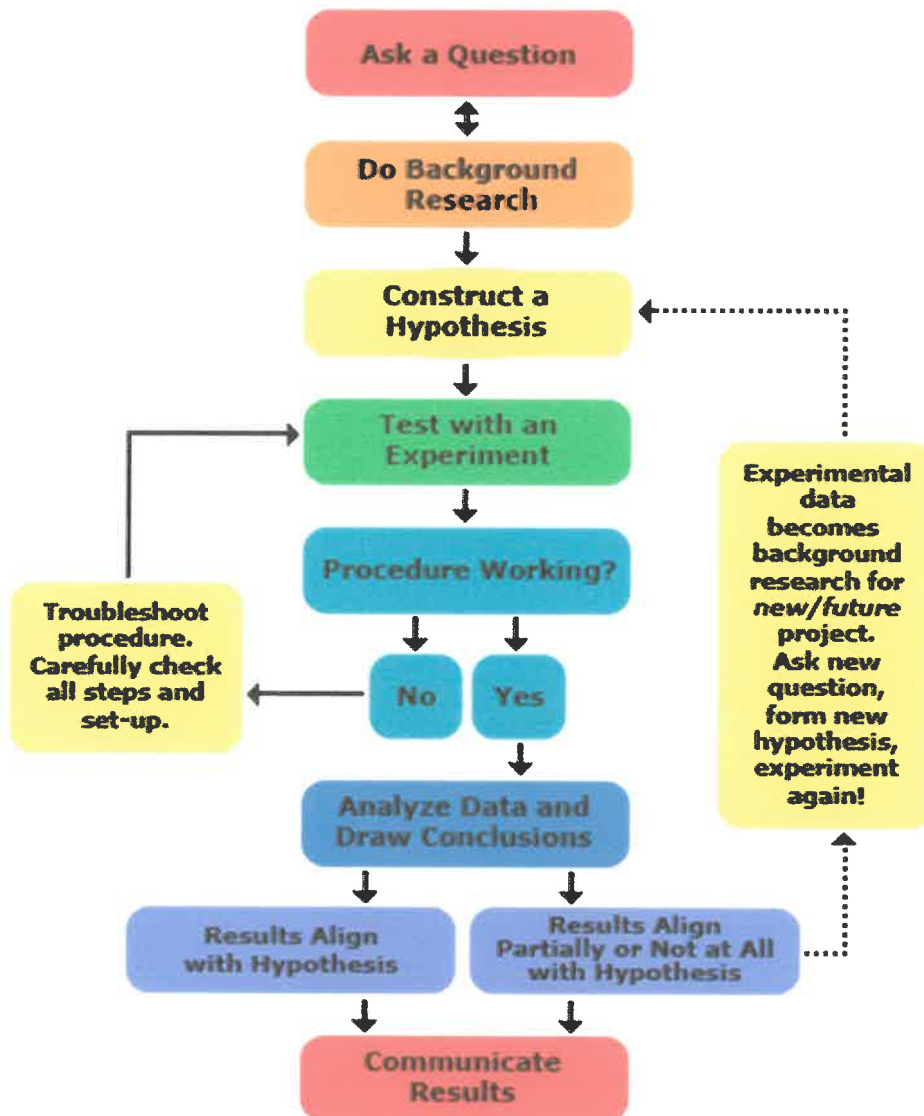
- Science is both a body of knowledge and a process
  - = information gained through observation and experimentation.
- The goals of science are to collect and organize information and to propose explanations that can be tested.

## 2. What is Health Science?

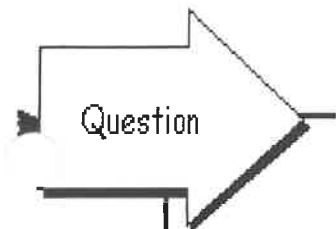
- our current knowledge of health & the application of that knowledge to:
  - improve health
  - prevent and cure diseases
  - understand how humans and animals function.
- Health Science is an applied science
  - = Health scientists make discoveries about factors which impact health, disease, diagnostics and then use those discoveries to give health professionals the tools required to deliver safe and effective health care
- There are many branches of Health Science including:
  - anatomy
  - physiology
  - microbiology
  - epidemiology
  - immunology
  - biotechnology
  - etc.
- All of these branches involve the use of both Scientific Language and the Scientific Method

# 1. The Scientific Method

- is a systematic and logical approach to discovering how things in the universe work
- The scientific method is the process followed to investigate **phenomena** and acquire new **knowledge**
- This new knowledge is then used to correct or integrate with previous knowledge allowing for further investigations  
= **an ongoing process**



Access and watch the You tube video "Scientific Method" on the Class Weebly before continuing on.



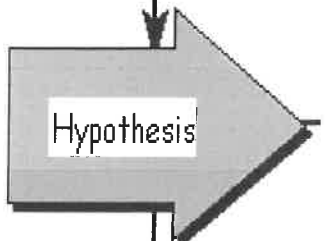
1. Define the **Problem (Purpose)** This could stated in the form of a question.

Then



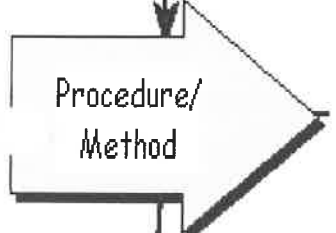
2. Do **Background Research** to find out what is already known about the topic.

Next



3. State a **Hypothesis**, an "educated guess" as to the answer to the problem based on reasoning (could be "If ...Then...")

Then



4. Design & carry out a **Controlled Experiment**

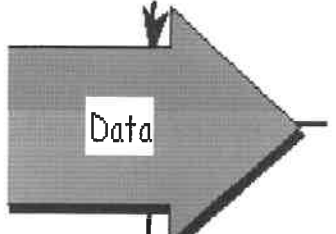
A. Independent Variable: variable you **change on purpose**

B. Dependent Variable: variable that responds to a change in the independent variable (**the 1 you are testing for**)

C. Constants: variables kept the **same** in all trials

D. Control: the **standard** for comparison

Next



5. **Data & Observations** are made and recorded as the experiment proceeds.

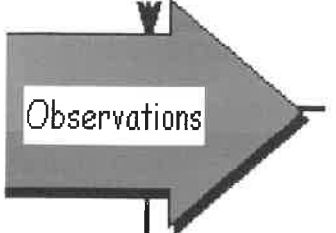
The 2 types of observations are:

A. Quantitative: **numerically measurable**

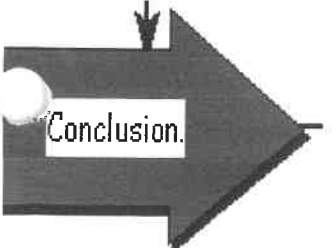
B. Qualitative: changes in **characteristics** of an object

This data is recorded the in the form of notes, drawings, tables, graphs, etc

And



Finally



6. Formulate a **Conclusion** . **Analyze and interpret** your data to **summarize** your findings which support or disproves the suggested hypothesis.

## CHOOSE THE RIGHT CAPTION

Below are six figures and six captions. Each caption matches one of the figures. Choose the caption that best describes each figure. Write the correct caption on the line provided.

Choose from these captions:

Identify the problem                      Make careful observations

Gather information                        Record the data

State a hypothesis                        Analyze the data

Test the hypothesis                        State a conclusion



Figure A

1. \_\_\_\_\_



Figure B

2. \_\_\_\_\_



Figure C

3. \_\_\_\_\_



Figure D

4. \_\_\_\_\_

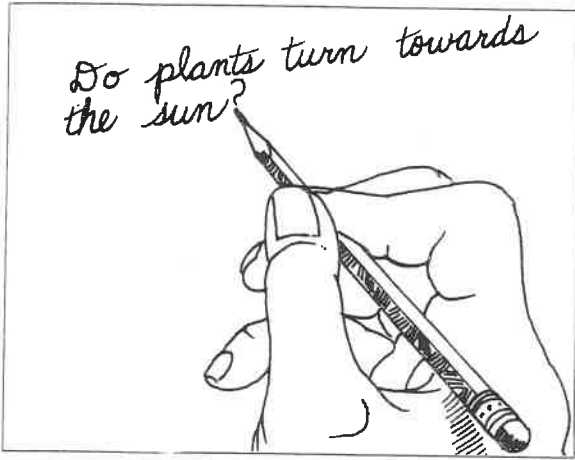


Figure E

5. \_\_\_\_\_

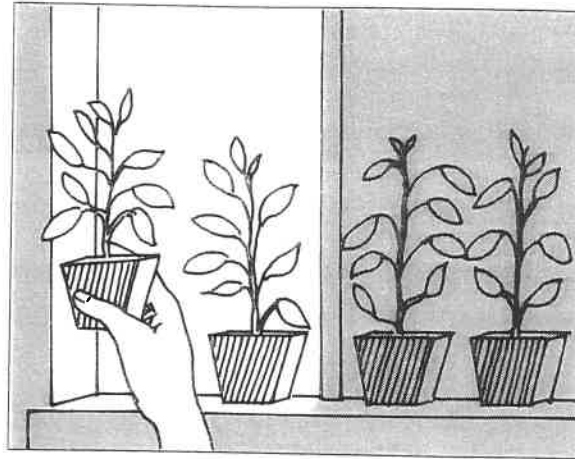


Figure F

6. \_\_\_\_\_

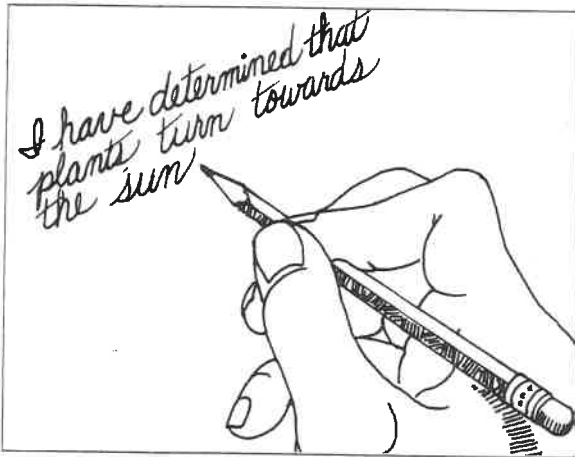


Figure G

7. \_\_\_\_\_

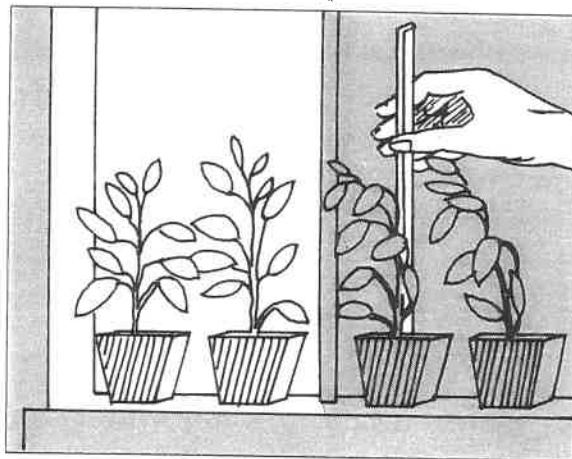


Figure H

8. \_\_\_\_\_

9. What is the independent variable in this experiment? \_\_\_\_\_

Match each term in Column A with its description in Column B. Write the correct letter in the space provided.

**Column A**

- \_\_\_\_\_ 1. analyze
- \_\_\_\_\_ 2. scientific method
- \_\_\_\_\_ 3. conclusion
- \_\_\_\_\_ 4. hypothesis
- \_\_\_\_\_ 5. experiment

**Column B**

- a) explains the data
- b) suggested solution
- c) test the hypothesis
- d) guide for solving problems
- e) figure out the meaning

Each sentence below describes a step of the scientific method. Match each sentence with a step of the scientific method listed below.

- A. Recognize a problem
- B. Form a hypothesis
- C. Test the hypothesis with an experiment
- D. Draw conclusions

- \_\_\_\_\_ 1. Stephen predicted that seeds would start to grow faster if an electric current traveled through the soil in which they were planted.
- \_\_\_\_\_ 2. Susan said, "If I fertilize my geranium plants, they will blossom."
- \_\_\_\_\_ 3. Jonathan's data showed that household cockroaches moved away from raw cucumber slices.
- \_\_\_\_\_ 4. Rene grew bacteria from the mouth on special plates in the laboratory. She placed drops of different mouthwashes on bacteria on each plate.
- \_\_\_\_\_ 5. Kathy used a survey to determine how many of her classmates were left-handed and how many were right-handed.
- \_\_\_\_\_ 6. Jose saw bats catching insects after dark. He asked, "How do bats find the insects in the dark?"
- \_\_\_\_\_ 7. Justin wondered if dyes could be taken out of plant leaves, flowers, and stems.
- \_\_\_\_\_ 8. Alice soaked six different kinds of seeds in water for 24 hours. Then she planted the seeds in soil at a depth of 1 cm. She used the same amount of water, light, and heat for each kind of seed.
- \_\_\_\_\_ 9. Bob read about growing plants in water. He wanted to know how plants could grow without soil.
- \_\_\_\_\_ 10. Kevin said, "If I grow five seedlings in red light, I think the plants will grow faster than the five plants grown in white light."
- \_\_\_\_\_ 11. Angela's experiment proved that earthworms move away from light.
- \_\_\_\_\_ 12. Scott said, "If acid rain affects plants in a particular lake, it might affect small animals, such as crayfish, that live in the same water."
- \_\_\_\_\_ 13. Michael fed different diets to three groups of guinea pigs. His experiment showed that guinea pigs need vitamin C and protein in their diets.
- \_\_\_\_\_ 14. Kim's experiment showed that chicken eggshells were stronger when she gave the hen feed, to which extra calcium had been added.

- Modern medicine uses the scientific method to determine how effective any particular medicine is.
- This is done using what's called a **"Double Blind Study"**, which is a procedure that works something like this:
  - Get your group of subjects, and divide them into three.
  - One group gets the drug.
  - One group gets a **placebo**, which is a sugar pill.
  - One group gets nothing at all.
  - Monitor the changes.
- No one except for the researchers know who's in the first group and who's in the second, because knowing you're taking the real thing or the placebo, will change how you act, and bias the results.
- The goal is to **eliminate bias**, so that you get the results of the drug or treatment, rather than their preconceived idea which could influence their behaviour.

Access and watch the You tube video "The Power of the Placebo Effect" on the Class Weebly before continuing on.



**The Strange Case of Beri Beri**

In 1887 a strange nerve disease attacked the people in the Dutch East Indies. The disease was beriberi. Symptoms of the disease included weakness and loss of appetite, victims often died of heart failure. Scientists thought the disease might be caused by bacteria. They injected chickens with bacteria from the blood of patients with beriberi. The injected chickens became sick. However, so did a group of chickens that were not injected with bacteria.

One of the scientists, Dr. Eijkman, noticed something. Before the experiment, all the chickens had eaten whole-grain rice, but during the experiment, the chickens were fed polished rice. Dr. Eijkman researched this interesting case. he found that polished rice lacked thiamine, a vitamin necessary for good health.



1. State the Problem
2. What was the hypothesis?
3. How was the hypothesis tested?
4. Should the hypothesis be supported or rejected based on the experiment?
5. What should be the new hypothesis?

**SpongeBob and his Bikini Bottom pals have been busy doing a little research. Read the description for each experiment and answer the questions.**

**1 - Patty Power**

Mr. Krabbs wants to make Bikini Bottoms a nicer place to live. He has created a new sauce that he thinks will reduce the production of body gas associated with eating crabby patties from the Krusty Krab. He recruits 100 customers with a history of gas problems. He has 50 of them (Group A) eat crabby patties with the new sauce. The other 50 (Group B) eat crabby patties with sauce that looks just like new sauce but is really just mixture of mayonnaise and food coloring. Both groups were told that they were getting the sauce that would reduce gas production. Two hours after eating the crabby patties, 30 customers in group A reported having fewer gas problems and 8 customers in group B reported having fewer gas problems.

Which people are in the control group?

What is the independent variable?

What is the dependent variable?

What should Mr. Krabbs' conclusion be?

Why do you think 8 people in group B reported feeling better?

THE SCIENTIFIC METHOD

Complete each statement using a term or terms from the list below. Write your answers in the spaces provided.

supports  
problems  
data  
steps

observe  
question  
scientific method

different  
already known  
senses

1. To test a hypothesis, scientists may \_\_\_\_\_ natural events.
2. When scientists research, they may find out what is \_\_\_\_\_ about a problem.
3. Your \_\_\_\_\_ gather information.
4. A conclusion states whether or not data \_\_\_\_\_ a hypothesis.
5. A problem is usually stated as a \_\_\_\_\_.
6. Scientists use certain \_\_\_\_\_ to solve problems.
7. You solve \_\_\_\_\_ much like scientists do.
8. Different problems can be solved in \_\_\_\_\_ ways.
9. A guide used to solve problems is called \_\_\_\_\_.
10. Scientists use charts to put \_\_\_\_\_ in order.

REACHING OUT

Jennifer has never eaten asparagus. She is afraid that it might make her sick. At dinner, she eats some. She likes the taste, but soon she suffers from nausea. Jennifer concludes that asparagus makes her sick.

1. Why might Jennifer's conclusion be incorrect? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
2. What might be done to further test her conclusion? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Show What You Know ... See the teacher for a Hand - In Activity #1.1