Introduction To Biology

Organization of Data

Scientific Method

Life Process

Vocabulary

Introduction to Biology

**Organization and Interpretation of Data**

A scientist’s observations need to be recorded in an \_\_\_\_\_\_\_\_\_\_\_\_ manner. Two common methods used to record observations are the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 **Data table:**

 The data table is used to record \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ data.

 The information is organized by arranging observations into columns with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

 **Bar Graph** (Histogram): A bar graph allows a scientist to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ data.

 

**Line Graph**: A line graph is used to show \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ between two or more variables



**Independent variable**: is placed on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Independent variables are usually the variables that the scientist \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Ex. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Dependent variable**: is placed on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Dependent variables depend on the changes in the independent variable.

**The Scientific Method**

The technique used by scientists to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and gain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

The Scientific Method is a process of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_thinking.

Steps of the scientific method:

1. Problem

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

 3. Experimentation

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

 5. Conclusions

**Problem:**

 A problem must be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 It is a question for which a scientist is trying to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Ex. Will a plant grow in complete darkness?

**Hypothesis:**

 An \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ about the answer to the problem.

 The hypothesis is based on information which has been learned about the problem.

 It is your \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to a possible answer to the problem

 Ex. I think that...

**Experimentation:**

 **S**et up a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that will test the hypothesis or claim

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: an experiment which tests only one factor.

 Ex. 2 of the same species plant, one grown in complete darkness, and the other grown in regular light

**Variable:**

 Is the factor to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Ex. amount of light

**Independent Variable**

* something that is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by the scientist
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by the scientist
* What is tested
* What is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Dependent Variable**

* + something that might be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the independent variable
	+ Changes because of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ What is observed
	+ What is measured
	+ The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ collected during the investigation

**Controlled Variable / Control**

* a variable that is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_changed
* Also called constants
* Allow for a “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_”
* An exact duplicate experiment without the variable.

Identify the variables in this investigation:

Students of different ages were given the same jigsaw puzzle to put together. They were timed to see how long it took to finish the puzzle

Independent Variable \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Dependent Variable \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Control(s) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Draw a Data Table

An investigation was done with an electromagnetic system made from a battery and wire wrapped around a nail. Different sizes of nails were used. The number of paper clips the electromagnet could pick up was measured.

Independent Variable \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Dependent Variable \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Control(s) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Draw a Data Table

**Observations / Claims:**

* + Measurements, notes, records of things seen, heard, felt, during the experiment.
	+ Usually, observations must be made using \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 **Conclusions:**

* + Explanations of the problem based on the observations. True conclusions must be backed up by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ data from the experiments\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Example:

**Scientific law**:

Scientific facts based on experiments which have been done \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Ex: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Theories**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ possible explanations of complex problems. Theories can \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

 Ex: Theory of Evolution

**Life Process**

**Life Functions**

There is not simple definition for life. However many characteristics of living things have been defined.

**Life Processes**

1. **Transport**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of materials within an organism. (Circulation)
2. **Excretion**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that the organism itself has made.

**3. Nutrition:** All activities that an organism does to get materials from the environment and prepare them for use.

 **Reasons for Nutrition:**

 **Energy:** all living things need \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Raw materials**: all living things need raw materials for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Steps in Nutrition:**

 **Ingestion:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the environment

**Digestion:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of food materials into \_\_\_\_\_\_\_\_\_\_\_\_ forms that an organism can use

 **Egestion:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (feces)

**Types of nutrition**

 **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:** (self feeder) an organism that can synthesize its own food (plants)

 **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:** (other eater) an organism that cannot synthesize its own food

4. **Growth:** Using the products of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_to increase cell size or number

5. **Respiration:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ process by which an organism obtains \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from food materials in order to maintain life functions.

 Respiration in this case refers to *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,* not breathing

6. **Regulation:** The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the activities of an organism and the response to its environment using nerve impulses or hormones

7. **Reproduction:** The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. This must occur in order for a species to survive, however, an individual organism does not need to reproduce in order to survive.

8. **Synthesis:** The process by which an organism \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ large molecules from smaller ones

All of the chemical reactions responsible for the life functions, occurring in an organism are known as that organism’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_…

The goal of these chemical reactions and the life functions is to maintain “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_” or a “Same State”.

Keeping a constant internal environment.

Examples:

* + Body temp remains relatively constant (37 degrees C)
	+ The amount of glucose (sugar) in the blood needs to be within a certain range.

**Key Vocabulary**

**MEASURING**

1. Length: the distance from point to point
2. Mass: describes an amount of matter
3. Volume: describe the space occupied by matter
4. Temperature: measures the average kinetic energy in matter
5. Gram: a small amount of mass used to measure small objects
6. Kilogram: a large amount of mass used to measure large objects
7. Meter: the basic unit of length
8. Centimeter: a small unit of measurement used for small distances
9. Kilometer: a large unit of measurement used for large distances
10. Liter: the basic unit of volume
11. Graduated cylinder: an instrument used to measure volume
12. Celsius: the Metric system for recording temperature
13. Fahrenheit: the English system for recording temperature

**GRAPHING AND THE SCIENTIFIC METHOD**

14)  Assumption: a possibility based on observations

15)  Bias: tendency to favor, prejudice

16)   Conclusion: decision about an experiment based on results and hypothesis

17)   Controlled Experiment: all variables are the same except for the tested one

18)   Data: collected results from tests during experiments

19)  Variable: one factor different from the conditions found in the control

20)  Dependent variable: what is measured because of the independent variable

21)  Independent variable: the factor that influences the dependent variable

22)   Evidence: support for something that is true or not true

23)  Experiment: series of tests to support or refute a hypothesis

24)   Hypothesis: an educated guess based on available information

25)   Inference: a conclusion based on observations

26)   Law: a fact based on proven evidence

27)   Model: representation to explain a process or structure

28)   Observation: information collected with the senses

29)   Research Plan: initial stage of an experiment

30)   Testing: to try something based on research

31)   Theory: accepted as true that may or may not be true

32)  Control: standard of comparison