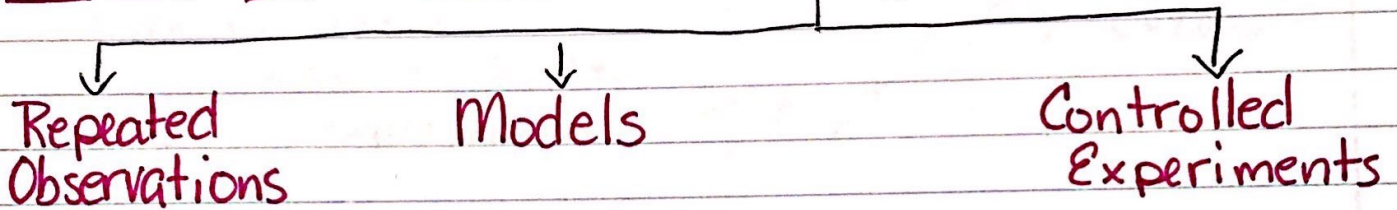


Unit 1 lesson 3 Types of Investigations

Process for Science

STEP 1: Make observations & ask **Questions** ^{??}
must be **testable** ^{??}
e.g. Why did the apple fall down?

STEP 2: Plan & Conduct Investigations




* Repeated many times for **ACCURACY**

STEP 3: Draw Conclusions / Make Claims

* Results of investigations based on Evidence "Proof"

* Empirical Evidence: information collected during an investigation using **tools**

Example:  measuring tape
The girl is 6ft 1in tall. ^{NON-example} The girl is tall, _(opinion)

STEP 4: Communicate Results

* Share results of an investigation with others

- Reasons*
- 1) Others repeat investigation for accuracy
 - 2) Expand on ideas
 - 3) Compare results

Unit 1 lesson 3

Types of Investigations

* Investigations **ALWAYS** start with a **QUESTION**

Repeated Observations

- * study nature without disturbing it
- too big
- too far away
- too uncontrollable for an experiment

Models:

- Represent the real object
- Understand how a system works with many parts
- too big
- too expensive
- too far away

① Computer Simulations

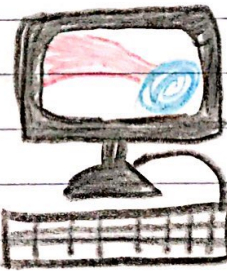
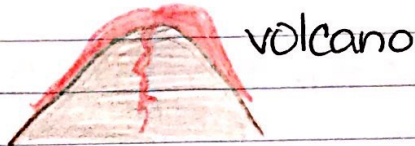
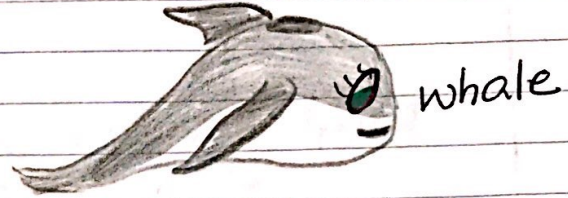
- to Predict
- vary the speed/intensity of winds/or quakes to see the effects on a storm/buildings

② Diagrams/Flowcharts

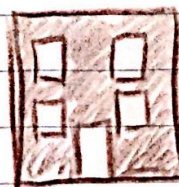
- Food webs / Food chains

③ Physical Model

- Buildings, bridges, elevators



Which way will the hurricane travel?



How does an earthquake affect the structure of building?



How much weight can the bridge hold?

Unit 1 lesson 3 ③
Types of Investigations

Controlled Experiments

- * An investigation in which **ALL** conditions are controlled
- * Uses the Scientific Method (**flexible** guide)



- ① Start with a testable question
- ② Make a hypothesis
 - a statement that can be tested (educated guess)
 - If then
- ③ Design an experiment
 - * Variables are a must
- ④ Carry out the procedures (steps)
 - Has multiple trials
- ⑤ Record and analyze the data
↳ break it down
- ⑥ Draw conclusions
 - Based on Evidence
- ⑦ Communicate Results
 - Use Charts & Graphs

Diagrams

- Shows data that does NOT include numbers

Bar Graph

- Used to compare things or groups when data is in categories

Chart

- to record data that is observed

Circle (Pie) Graph

• Compare parts to a whole
fractions / percentages out of 100%

Line Graph

• Shows change over time

Unit 1 lesson 3 (4)
Types of Investigations

VARIABLES

* **ALL** controlled experiments have variables

Variable - Any condition in an experiment that can be changed or kept the same

① Independent variable : the one being tested
the one that changes

- Type of _____
- Amount of _____

② Controlled variables : ALL the things in the experiment that are kept the same
* makes the experiment fair.

③ Dependant variable : data/outcome/result
* measurement being recorded in your chart
* Depends on what you change

Control Group : NOT the same as controlled variables
* the setup of group to which you will compare all others

Example Experiment

Does adding salt to water affect its freezing point?
(0°C , 32°F)

Independent variable: (what is being changed/tested)

- salt - what is being dissolved in H_2O

Controlled variables: (Keep the same so it is fair)

- Temperature of freezer
- Amount of water (type also)
- Same type of cups
- Type of thermometer
- Amount of salt (multiple trials) - Brand

Dependent variable: (outcome \rightarrow data)

- the temperature of the freezing point

Control Group:

- plain cup of water