

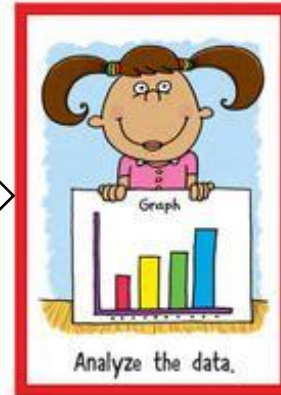
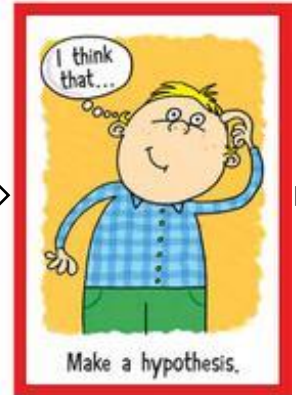
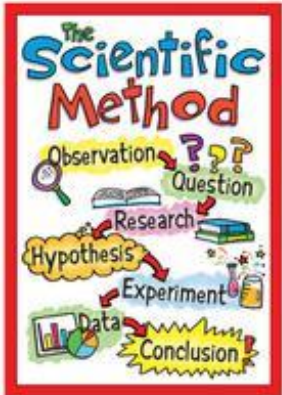
# INITIAL OBSERVATION



WONDER

RESEARCH

HYPOTHESIZE



PLAN

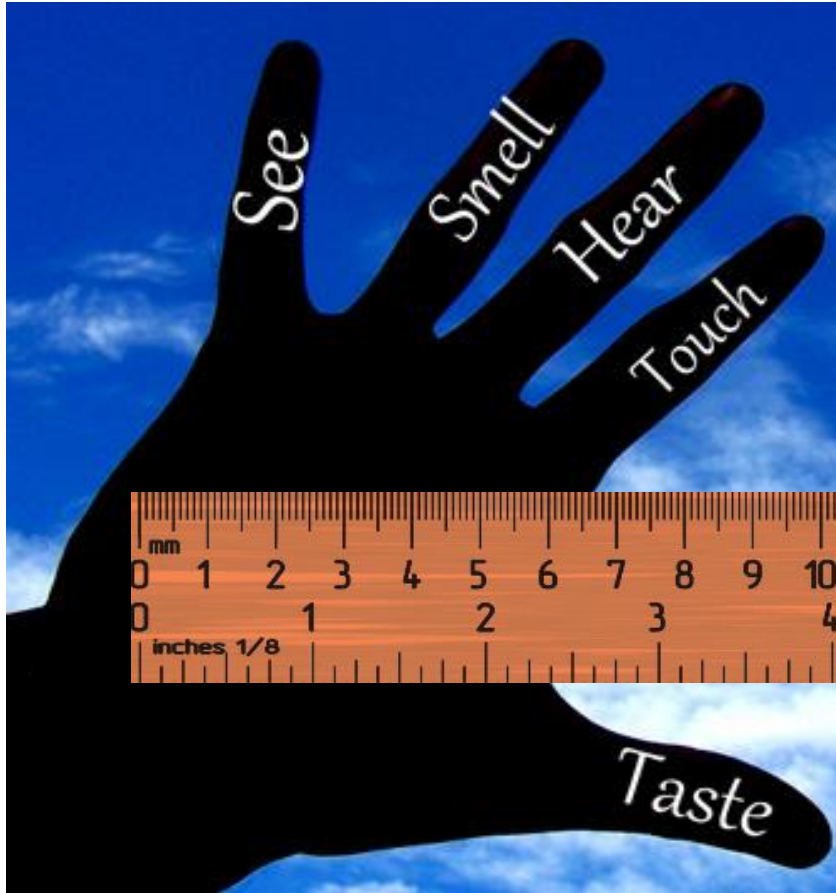
EXPERIMENT  
ADDITIONAL  
OBSERVATIONS

DATA

ANALYSIS

CONCLUSION!

# Evidence is based on Observation



- Observation is describing an object or event using your five senses (*what you see, hear, smell, taste, touch*) or measurement (*numbers*).
- Modern science employs *sensors* and *detectors* to make observations.
- Information gathered during an observation is called **data** (singular form *datum*).

TONGUE



TOUCH

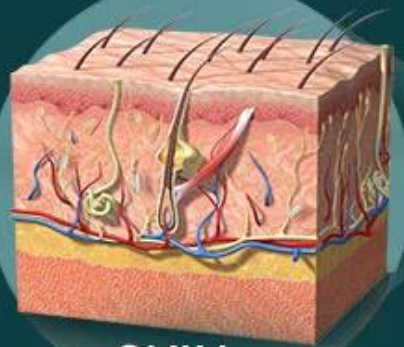
TASTE

SMELL

SOUND

SIGHT

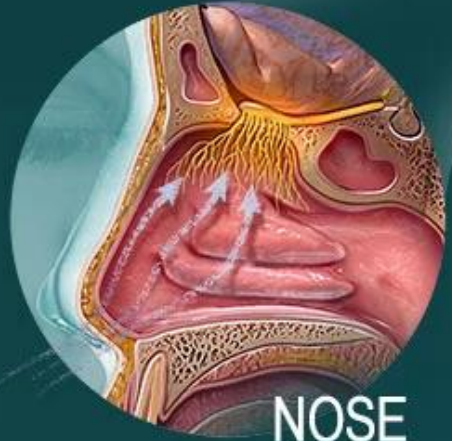
SKIN



EYE



NOSE



EAR



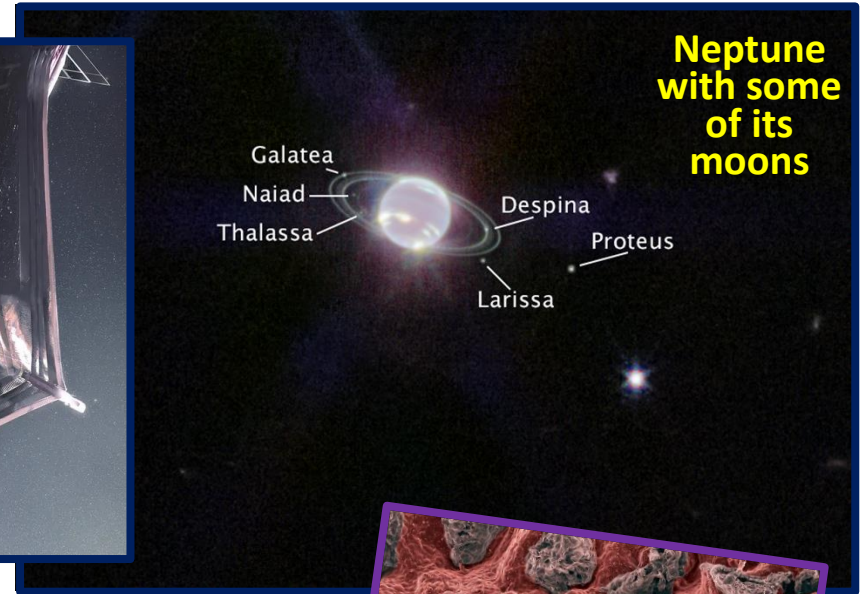
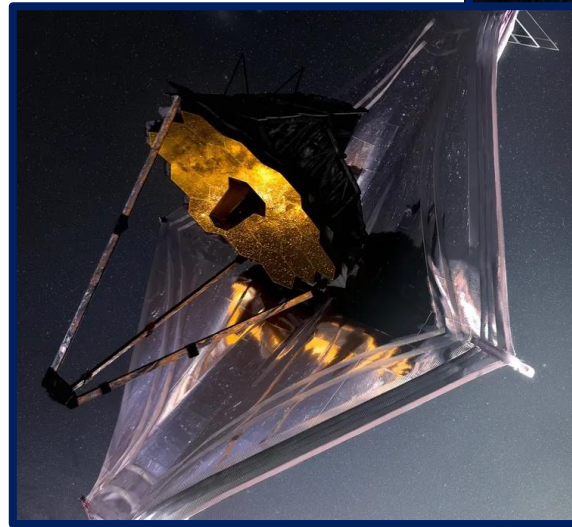
# THE SENSES

collecting evidence

# Instrument collecting evidence

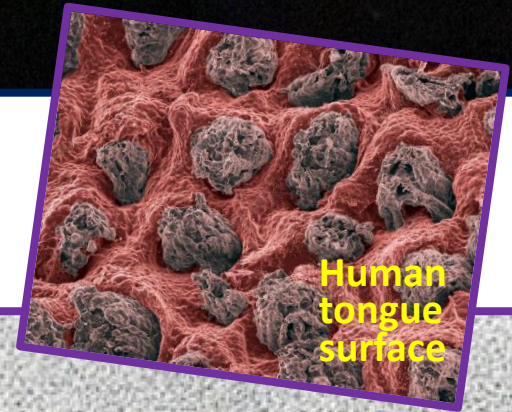
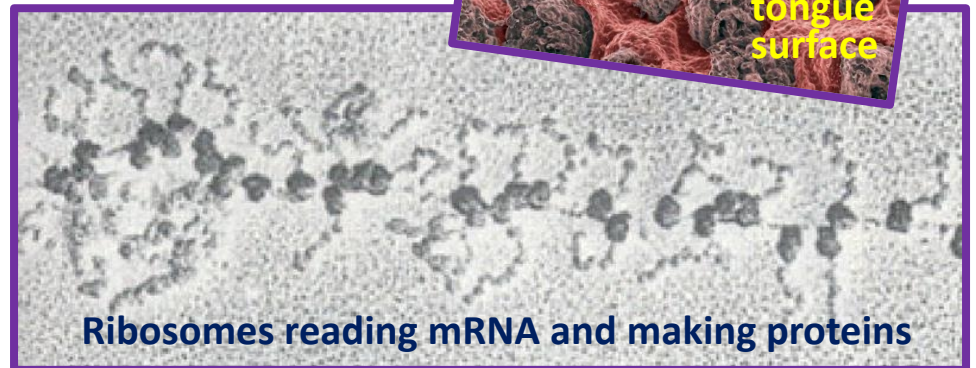
## James Webb Telescope

helps observe VERY FAR AWAY objects



## Electron Microscope

helps observe VERY SMALL objects



# Describe the Elephant



*Observation  
should NOT  
include  
opinion!*

**It weighs 480 kilograms.**

**It has large ears and long trunk.**

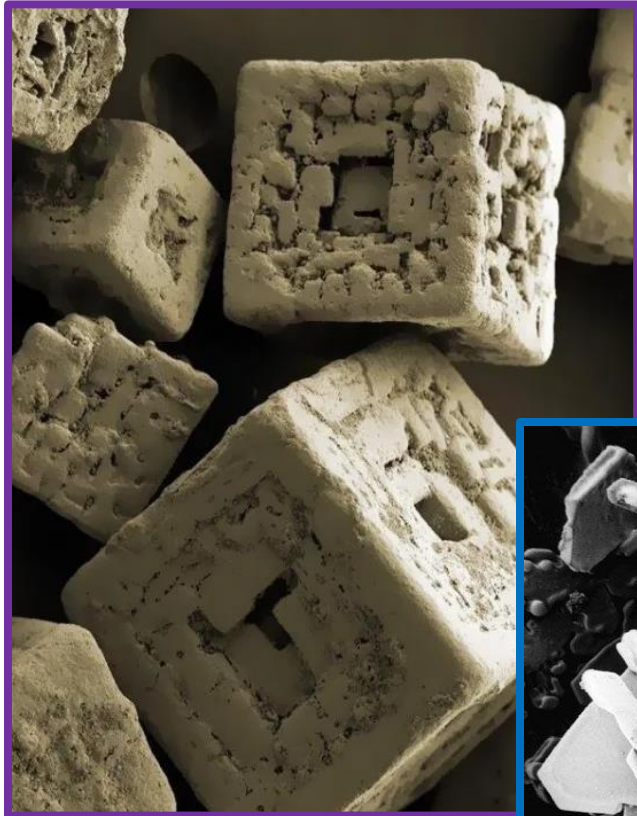
**It has gray wrinkly skin.**

~~**It is very cute!**~~

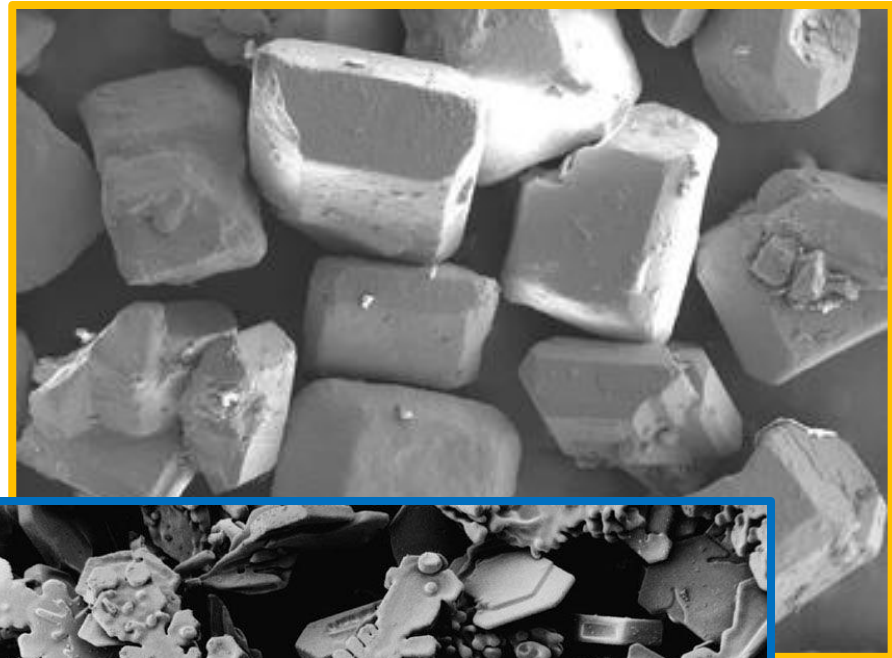
**It is young.**

**It is about 1.5 yards tall.**

# Describe the Crystals



**TABLE  
SALT**



**SUGAR**



**SNOW**

# DIY: Monarch Butterfly

common form



rare Hawaiian  
white form



Make one **qualitative** observation about each picture above.  
Explain why this is a qualitative observation.

Make one **quantitative** observation about each picture above.  
Explain why this is a quantitative observation.

# DIY: Clouds





# Qualitative vs Quantitative Data

## Qualitative (letters)

- **Descriptions** using words.
- Data which can be **observed** but **not measured**.
- What the object is *like*: texture, smell, taste, appearance, etc.

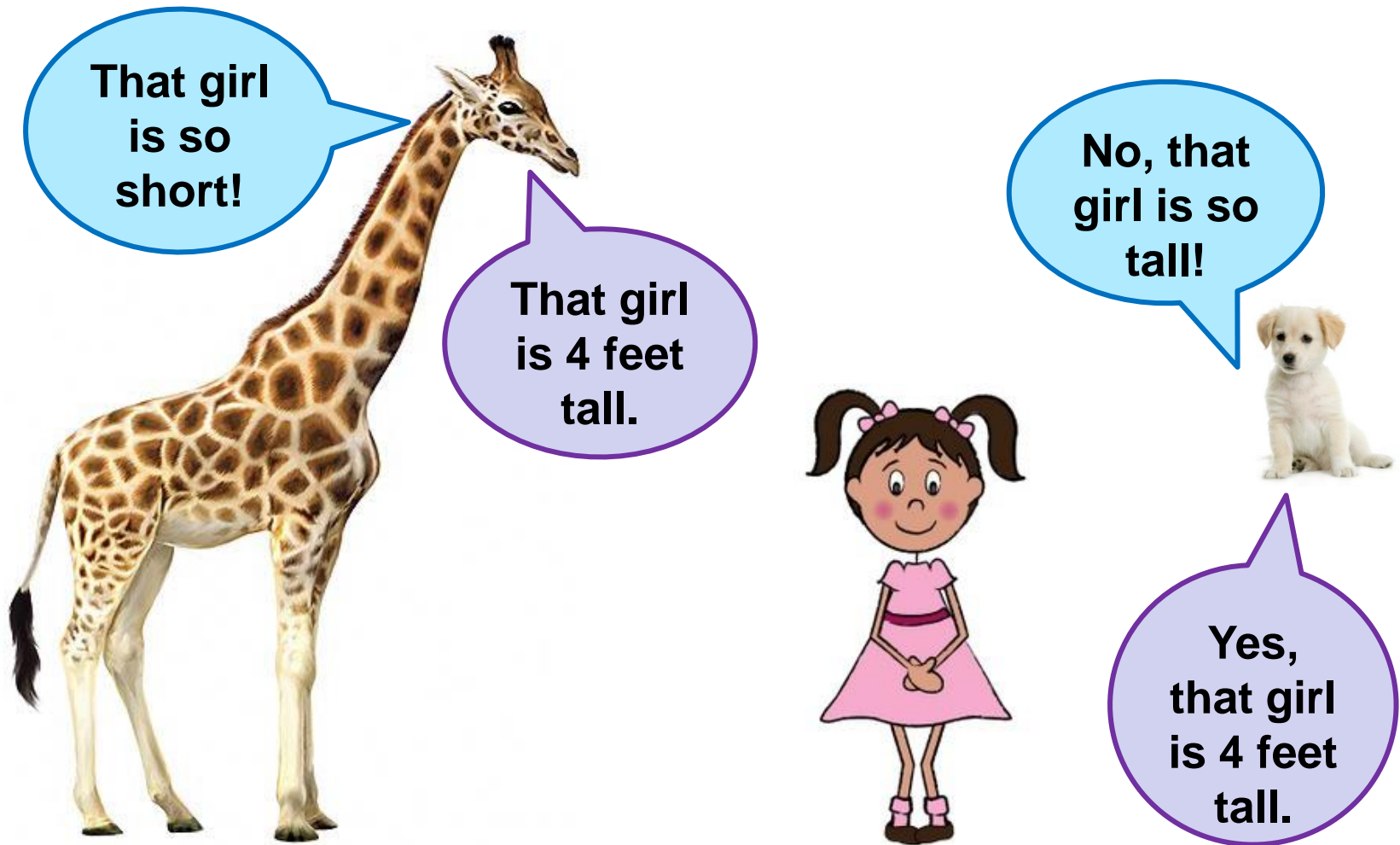
***Subjective, relative***

## Quantitative (numbers)

- Specific **numbers**.
- Data which can be **measured**.
- Length, height, area, volume, weight, speed, time, temperature, humidity, sound levels, cost, age, etc.

***Objective, specific***

# Qualitative observations are **subjective**



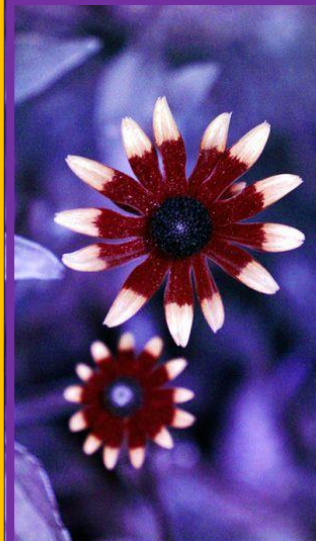
Quantitative observations are **objective**

# Observation depends on observer

- Location and size of an observer
- Observer limitations



can only see visible light



can see ultraviolet light

