

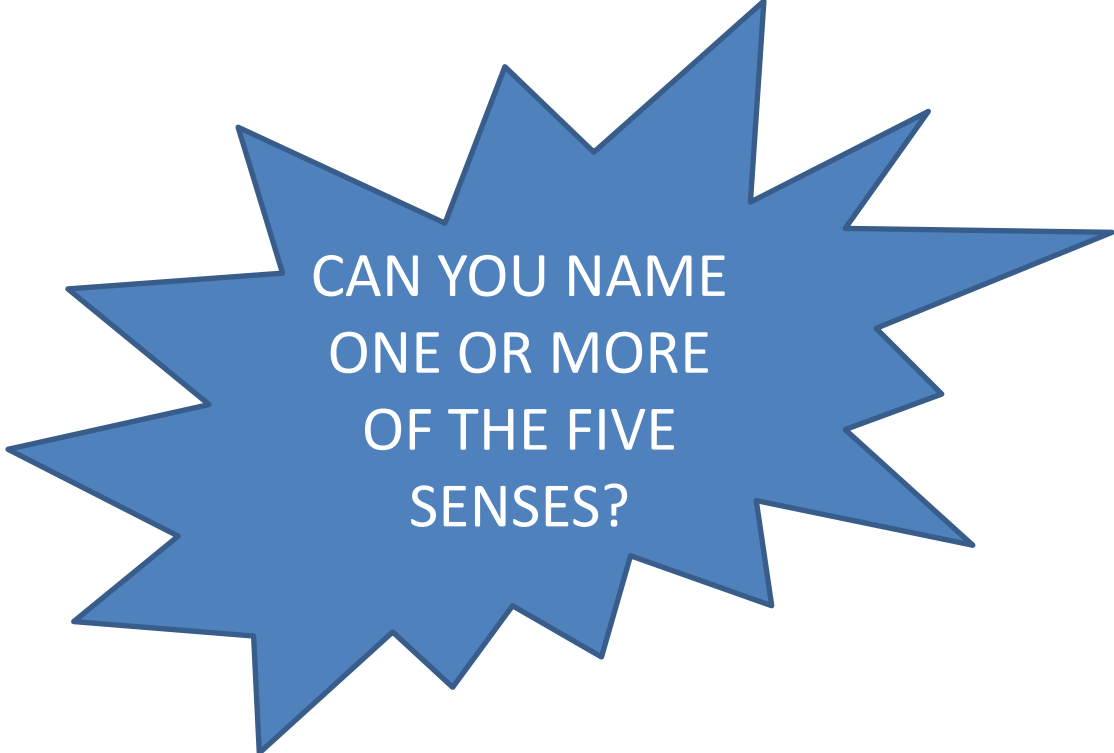
THINKING LIKE A SCIENTIST



Scientists use five skills that make them successful!

SKILL#1 OBSERVING:

It means to use one or more of your five senses to gather information.

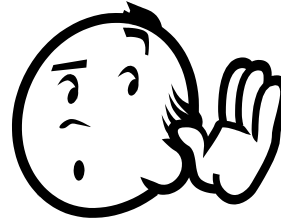


CAN YOU NAME
ONE OR MORE
OF THE FIVE
SENSES?

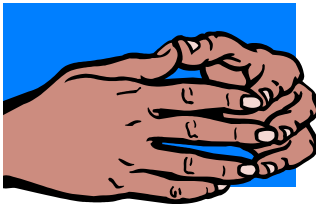
SIGHT



HEARING



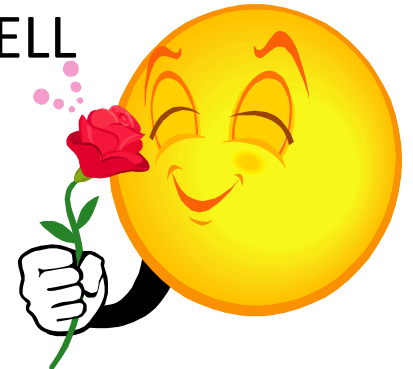
TOUCH



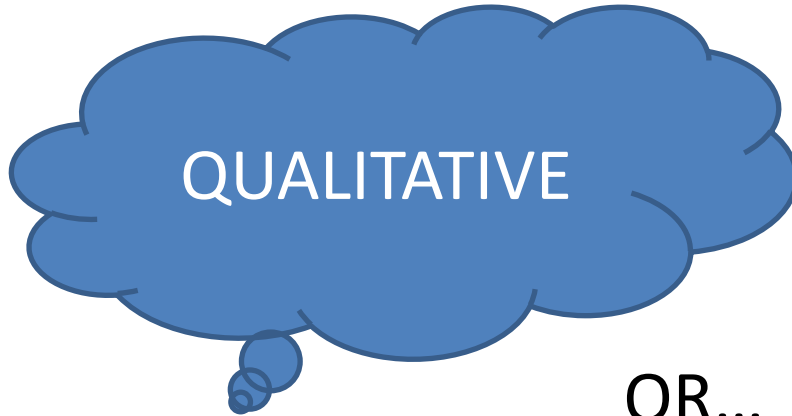
TASTE



SMELL



THERE ARE TWO TYPES OF OBSERVATIONS



OR...



WHAT'S THE DIFFERENCE?

Qualitative Data

- **Overview:** Deals with **descriptions**.
- Data can be observed but **not measured**.
- Colors, textures, smells, tastes, appearance, beauty, etc.
- **Qualitative → Quality**

Quantitative Data

- **Overview:** Deals with **numbers**.
- Data which can be **measured**.
- Length, height, area, volume, weight, speed, time, temperature, humidity, sound levels, cost, members, ages, etc.
- **Quantitative → Quantity**

EXAMPLE #1



- ***Oil Painting***
 - **Qualitative data:**
 - blue/green color, gold frame
 - smells old and musty
 - texture shows brush strokes of oil paint
 - peaceful scene of the country
 - masterful brush stroke
- ***Oil Painting***
 - **Quantitative data:**
 - picture is 10" by 14"
 - with frame 14" by 18"
 - weighs 8.5 pounds
 - surface area of painting is 140 sq. in.
 - cost \$300

EXAMPLE #2



- *Latte*
- **Qualitative data:**
- robust aroma
- frothy appearance
- strong taste
- burgundy cup

- *Latte*
- **Quantitative data:**
- 12 ounces of latte
- serving temperature
150° F.
- serving cup 7 inches in
height
- cost \$4.95

EXAMPLE #3

- 6TH GRADE CLASS
 - **QUALITATIVE:**
 - friendly demeanors
 - helpful
 - environmentalists
 - positive school spirit
- 6TH GRADE CLASS
 - **QUANTITATIVE**
 - 672 students
 - 394 girls, 278 boys
 - 68% on honor roll
 - 150 students
accelerated in
mathematics

Jane Goodall

**A scientist in the act of
making observations**

LET'S

DISCUSS

THIS

PICTURE!



SKILL #2 INFERRING

- INFERRING MEANS TO EXPLAIN OR INTERPRET THE THINGS THAT YOU OBSERVE

**LET'S INFER ABOUT THIS
PICTURE!**



What if I told you that chimps were afraid of water?

SKILL #3 PREDICTING

- PREDICTING MEANS MAKING A FORECAST OF WHAT WILL HAPPEN BASED ON...



OR...

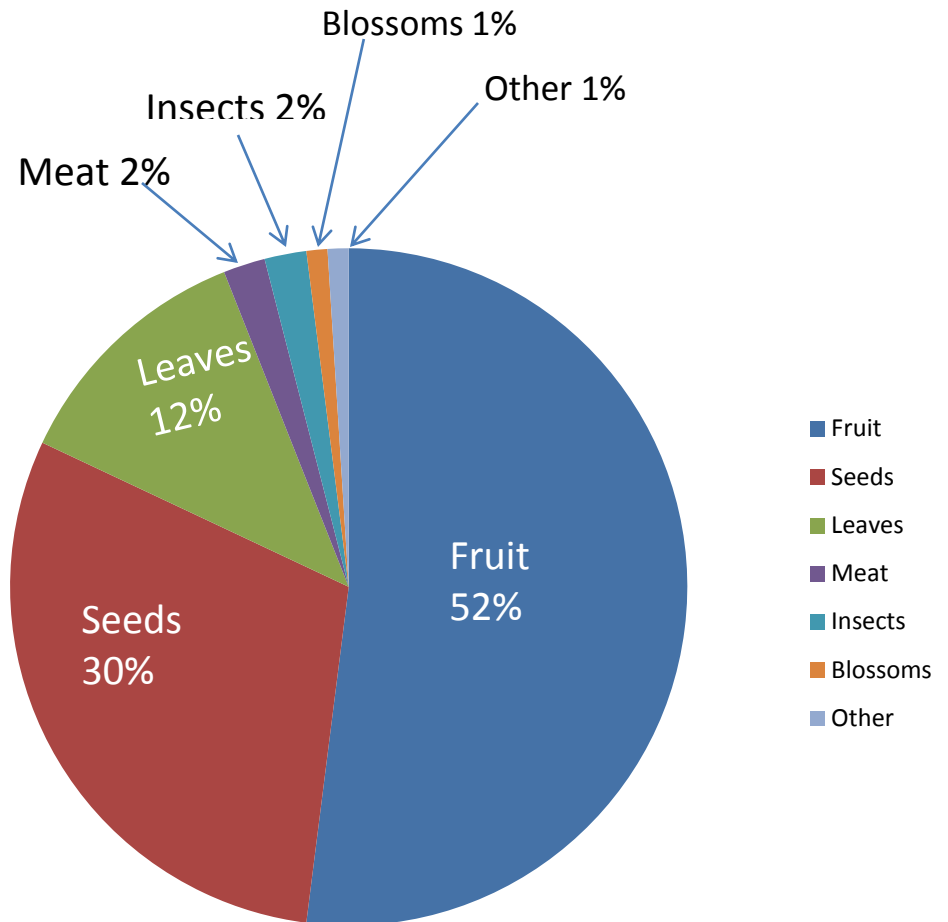


LET'S ANALYZE THE DATA AND MAKE A PREDICTION.

Chimp Food

This graph shows the diet of chimps at Gombe National Park during May of one year.

1. **Reading Graphs** According to the graph, what foods do chimps eat?
2. **Interpreting Data** Did chimps feed on seeds or leaves during this month?
3. **Calculating** What percentage of the diet did blossoms, seeds, leaves and fruit make up?
4. **Predicting** Suppose you learn that **November** is the main **termite** fishing season when chimps spend a large part of their time eating termites. **Predict** how the chimp **diet** might **change** in November.



CHIMP DIET IN MAY

SKILL #4 CLASSIFYING

- CLASSIFYING IS THE PROCESS OF GROUPING TOGETHER ITEMS THAT ARE ALIKE IN SOME WAY.

SKILL #5 MAKING MODELS

- MAKING MODELS INVOLVES CREATING REPRESENTATIONS OF COMPLEX OBJECTS OR PROCESSES. SOME EXAMPLES ARE..



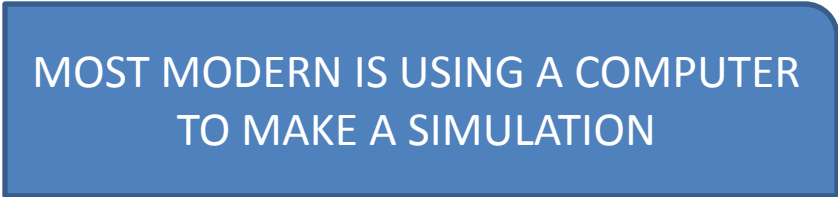
GLOBES
AND MAPS



SETS TO
RECREATE A
SCENE



SMALL
REPLICAS



MOST MODERN IS USING A COMPUTER
TO MAKE A SIMULATION

**LET'S DISCUSS SCIENTIFIC
ATTITUDES!**

- **SCIENTIFIC ATTITUDES**

Curiosity

Honesty

Open-Mindedness and
Skepticism

Creativity

CURIOSITY

- An important attitude that drives scientists.
- Successful scientists are eager to learn more about the topics they study.
- They stick with problems in spite of setbacks!



HONESTY

- Good scientists always report their observations and results truthfully.
- Honesty is especially important when the results go against previous ideas or predictions.



OPEN-MINDEDNESS AND SKEPTICISM

- Scientists need to be able to accept new and different ideas, however....
- Open-mindedness must be balanced by skepticism which is having an attitude of doubt.



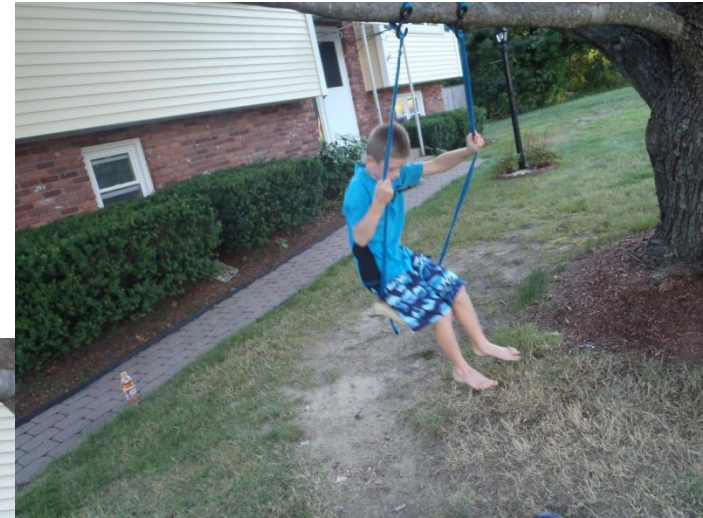
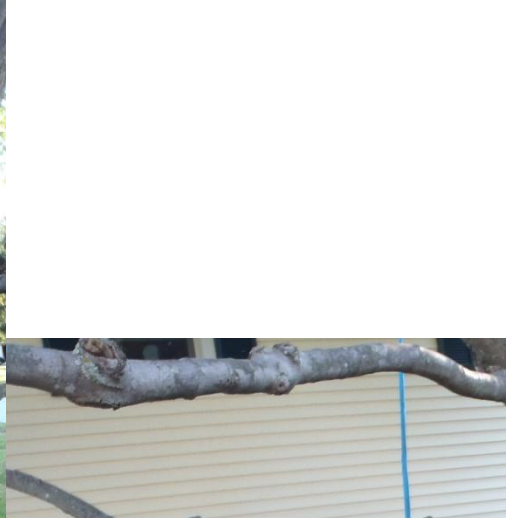
CREATIVITY

- Whether scientists study chimps or earthquakes, problems may arise.
- Sometimes it takes a bit of creativity to solve a problem.
- Creativity means coming up with inventive ways to solve problems or produce new things.

REAL WORLD EXAMPLE: DOMINIC'S INSPIRATION



DOMINIC'S INVENTION



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- [286 jane goodall jane3.jpg](#)