

USING OBSERVATIONS AND INFERENCES IN SCIENCE

What is an observation?

- When you observe, you become aware of something using one of your senses.
- Your five senses are **smell, taste, sight, touch, and sound.**

What is an observation?

- In an observation you simply describe something as it appears.
- An observation is a statement describing a **fact**.

Types of Observations

- There are **two** types of observations.
 - Qualitative
 - Quantitative

Qualitative

- Qualitative observation: (quality) Usually made with our senses.
 - Color, shape, feel, taste, sound.

Examples:

- The dog is wearing a blue sweater.
- The lab tabletop is smooth.
- The dog is laying on a blanket.



Quantitative

- **Quantitative observation:** (quantity)
How many. Will always have a number.
- Based on exact **measurement**.

Examples:

- The room is 8 meters across.
- Sarah is 141-cm tall.
- Sam weighs 450 Newtons.

Observations

In the space below, record 5 observations about your science classroom.

1.

2.

3.

4.

5.

Qualitative Observations

- ▶ Sometimes scientists must make very careful observations. Often their senses are not good enough.
- ▶ There are some things that cannot be observed using just your senses.
- ▶ Examples: radiation, sound waves, planets, cells, etc.

- Can you think of ways that scientists have solved this problem?

- How can scientists extend their senses?
 - Microscopes
 - Telescopes
 - Satellites
 - Etc.

What is an inference?

- Logical interpretation based upon prior **knowledge and experience.**
- It is based upon **observations.**
- When you infer, you make a mental judgment based on observations.
- Inferences cannot be directly observed.
 - ▣ They require thought.

Making Inferences

- If you get up in the morning, look up at the sky and observe dark clouds, observe the air is cool and humid, and observe puddles on the ground, you might infer that it has recently rained.
- Note: you did not **see** rain; you **decided** that it rained based on your observations.
- **An inference is a statement based on your interpretation of the facts.**

Making Inferences

- You are at the counter in the office to get a bus pass signed. You see a student leave the principal's office crying and upset. We could make an inference as to why the student is upset.
- Could be in trouble (ISS, OSS, expelled)
- Family problems at home (sick, accident)
- Student not feeling well
- Student has poor grades (failing, retention)

List 3 inferences about the classroom

1.

2.

3.

Comparison of Observations and inferences

□ Observations

- That plant is extremely wilted.
- The car stopped running.
- The Sox are leading their division.

□ Inferences

- That plant is extremely wilted due to a lack of water.
- The car stopped running because it was out of gas.
- The Sox are leading their division because they are playing well right now.

List 3 **observations** and 3 **inferences** we can make from these pictures.



List 3 Observations & 3 Inferences

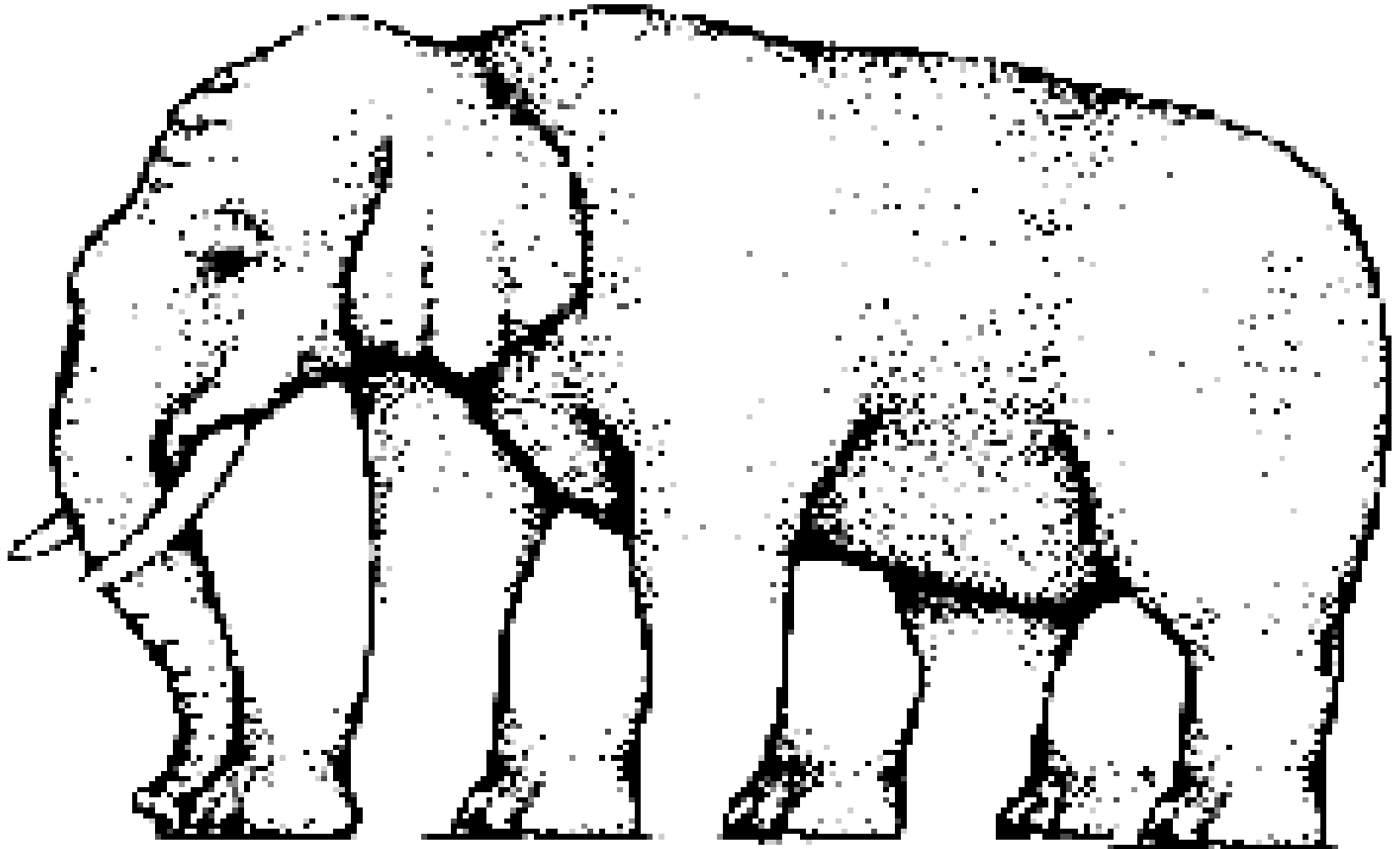


In Conclusion

- ▶ When you **do** something with that observation, like **draw a conclusion** or **offer an explanation** or **decide that a chemical reaction occurred**, then you are making an **inference**.
- ▶ The inference may or may not be a correct one. Correctness is not what makes the difference between observation and inference.
- ▶ An observation is the awareness of some condition; **inference is the result of a mental process** which attempts to explain or catalog or speculate about that observation

**Is it an observation,
inference or can it be
both???**

How many legs does the elephant
have?



What do you see?



What do you see?

Hint:

There are 3 images:

1. An old lady
2. A young woman
3. A man with a big brown mustache

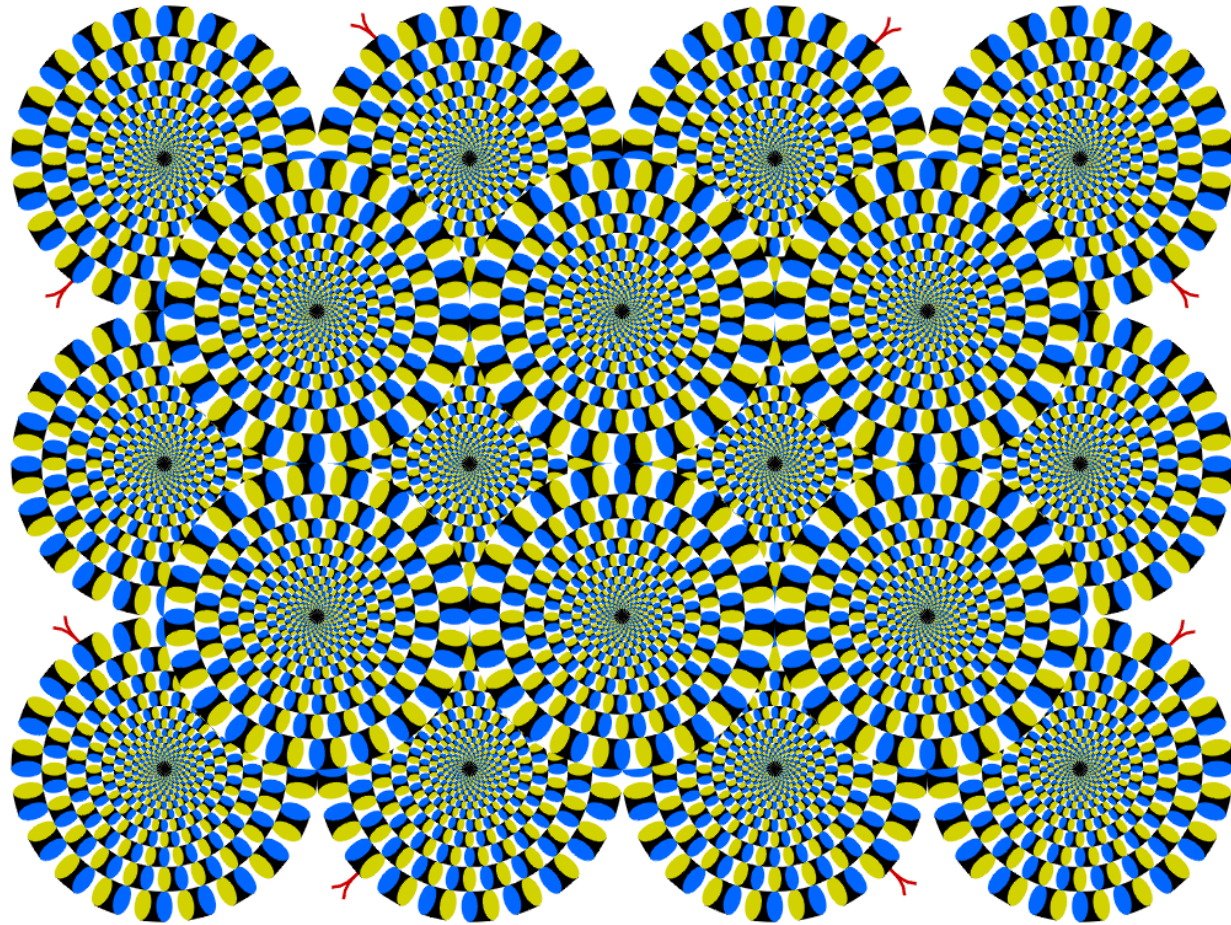


Look at the chart and say the color,
NOT the word

YELLOW	BLUE	ORANGE
BLACK	RED	GREEN
PURPLE	YELLOW	RED
ORANGE	GREEN	BLACK
BLUE	RED	PURPLE
GREEN	BLUE	ORANGE

Your right brain tried to say the color,
but your left brain was reading the
word.

These circles are not moving, your brain is making them appear to move. Try focusing on one circle. It will stop moving.



- http://www.michaelbach.de/ot/col_lilacChaser/index.html