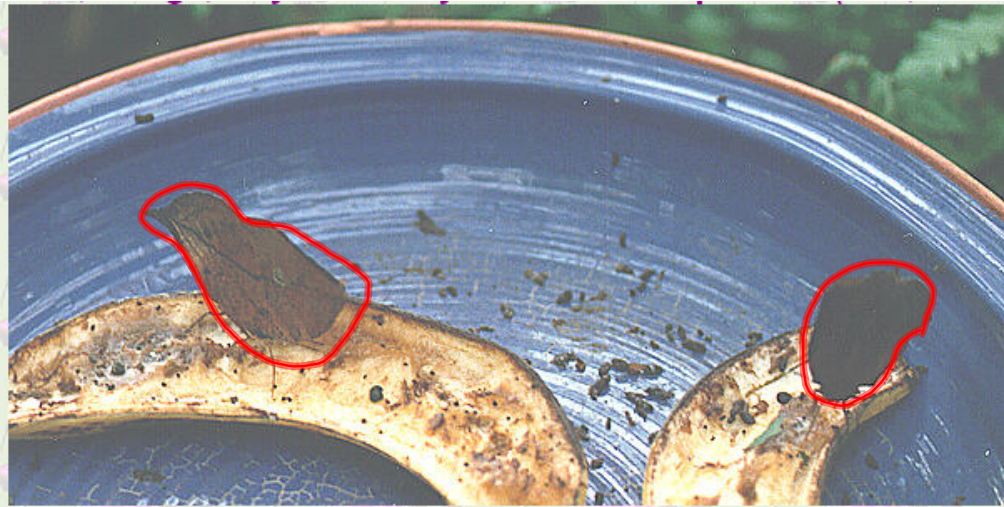


# Scientific Method

## Current biological problems or questions.

Cancer  
Ozone  
H<sub>2</sub>N<sub>2</sub>  
Global Warming  
Endangered Species  
birth rate  
death rate  
life expectancy  
best life



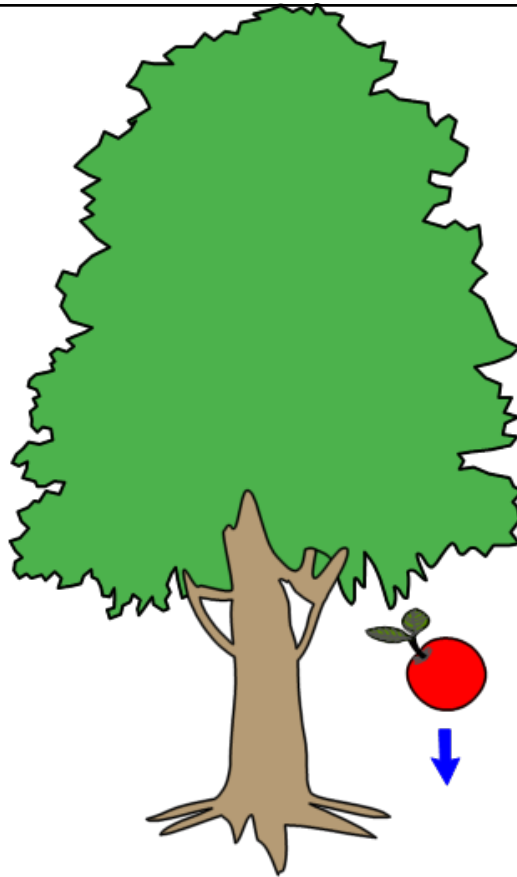
[http://biology.clc.uc.edu/courses/bio104/sci\\_meth.htm](http://biology.clc.uc.edu/courses/bio104/sci_meth.htm)



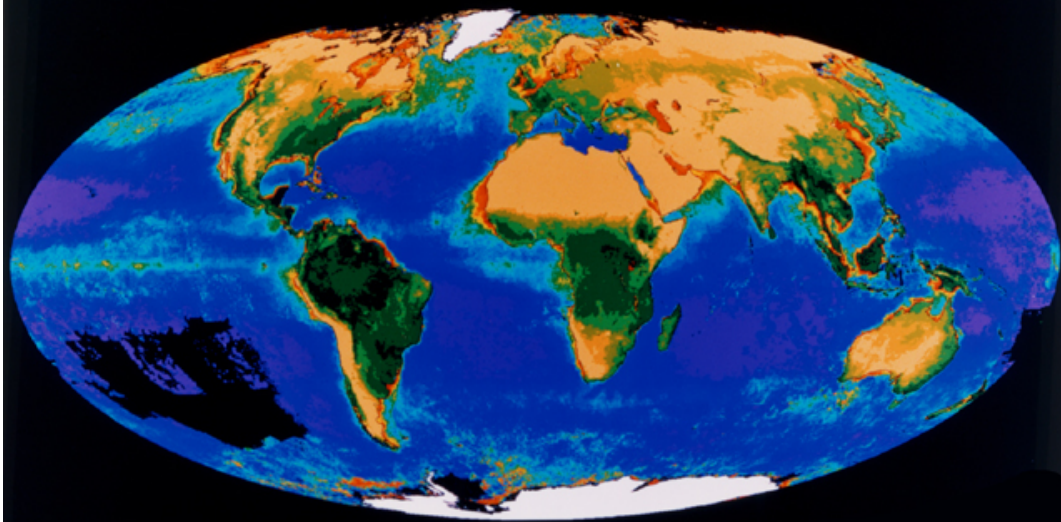
First step in the scientific method.

Observation

The apple  
fell on  
Newton's  
head.

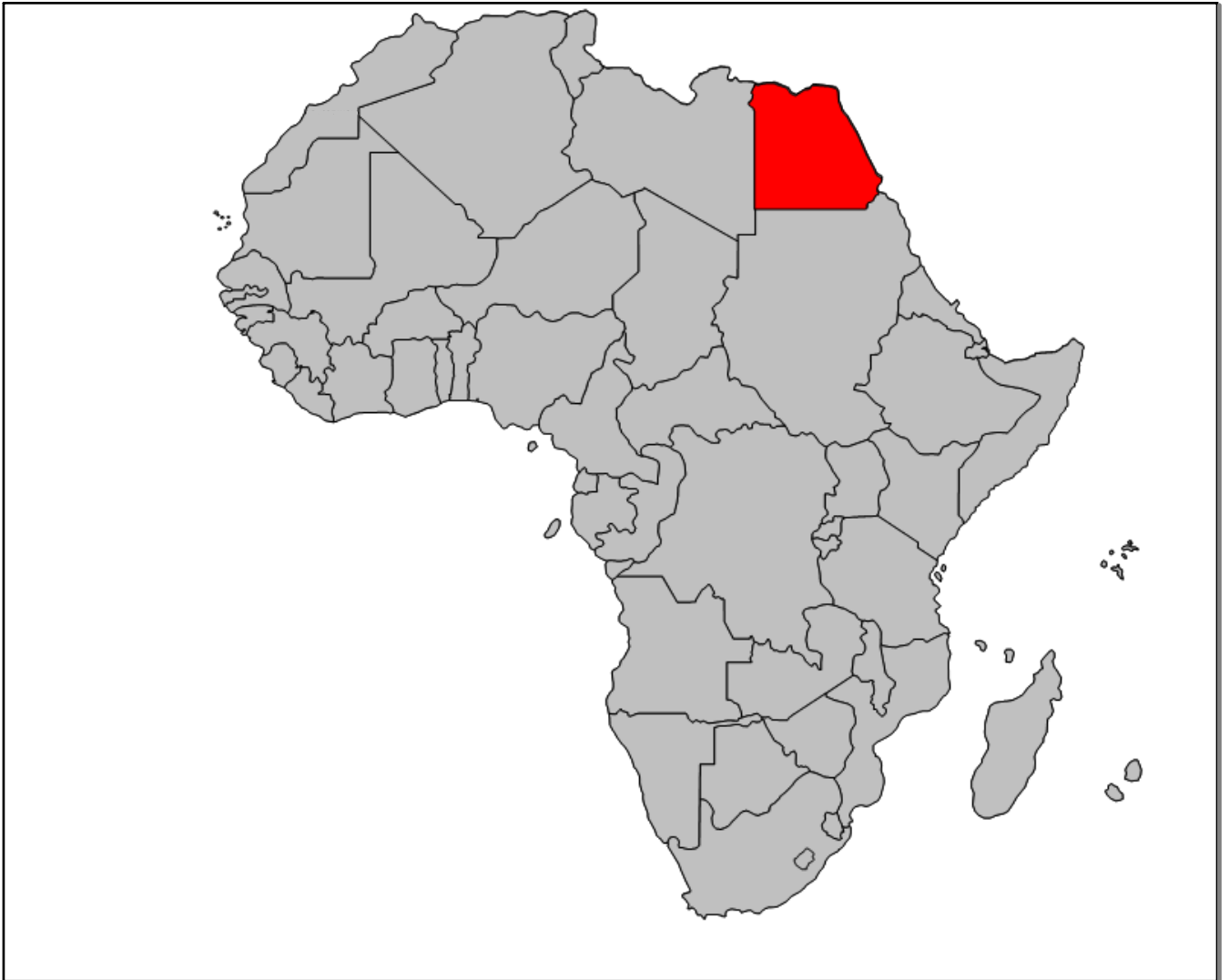


Falling apple





Galileo  
knew that  
you could  
not fall  
off the  
earth.







Map of Ancient Egypt

**Observation:** Every year in the spring, the Nile River flooded areas of Egypt along the river, leaving behind nutrient-rich mud that enabled the people to grow that year's crop of food. However, along with the muddy soil, large numbers of frogs appeared that weren't around in drier times.



**Observation:** In many parts of Europe, medieval farmers stored grain in barns with thatched roofs (like Shakespeare's house). As a roof aged, it was not uncommon for it to start leaking. This could lead to spoiled or moldy grain, and of course there were lots of mice around.





## Recipe for Bees:



Kill a young bull, and bury it in an upright position so that its horns protrude from the ground. After a month a swarm of bees will fly out of the corpse.



Jan Baptista van Helmont's recipe for mice:



Place a dirty shirt of some rags in an open pot or barrel containing a few grains of wheat or some wheat bran, and in 21 days some mice will appear. There will be adult males and females present, and they will be capable of mating and reproducing mice.



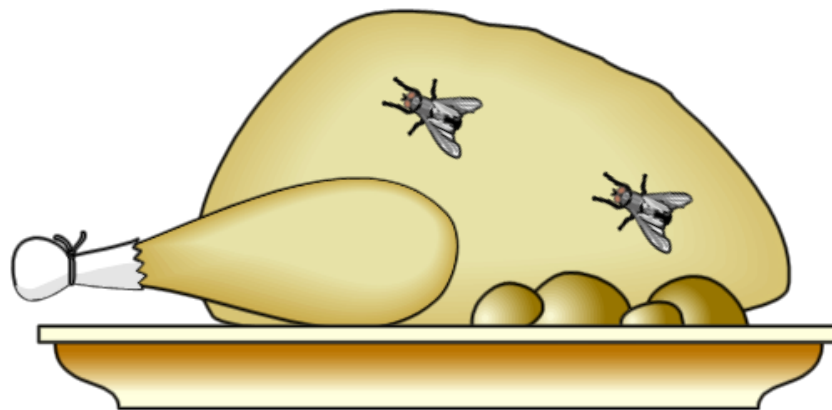
Second step in the scientific method.

Question

“How many students came to school today?”

“Why did you come to school today?”

**Question:** Where do the flies at the butcher shop really come from?  
Does rotting meat turn into or produce the flies?





Third step in the scientific method.

Hypothesis  
"an educated  
guess"

- **Hypothesis:** Rotten meat does not turn into flies. Only flies can make more flies.



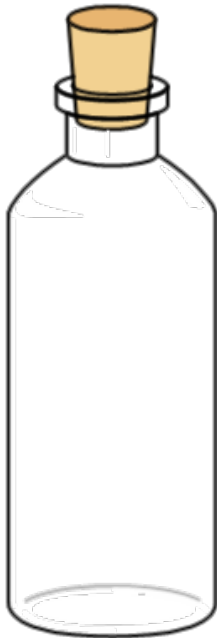
Team up with the person next you!

- Record the number of times you breathe during a one minute period
- How do you think exercise will affect this?
- Guess the number
- Jog in place for two minutes
- Record the number of breaths for one minute after completing exercise
- How did the exercise affect your breathing?
- What is the connection?

Fourth step in the scientific method.

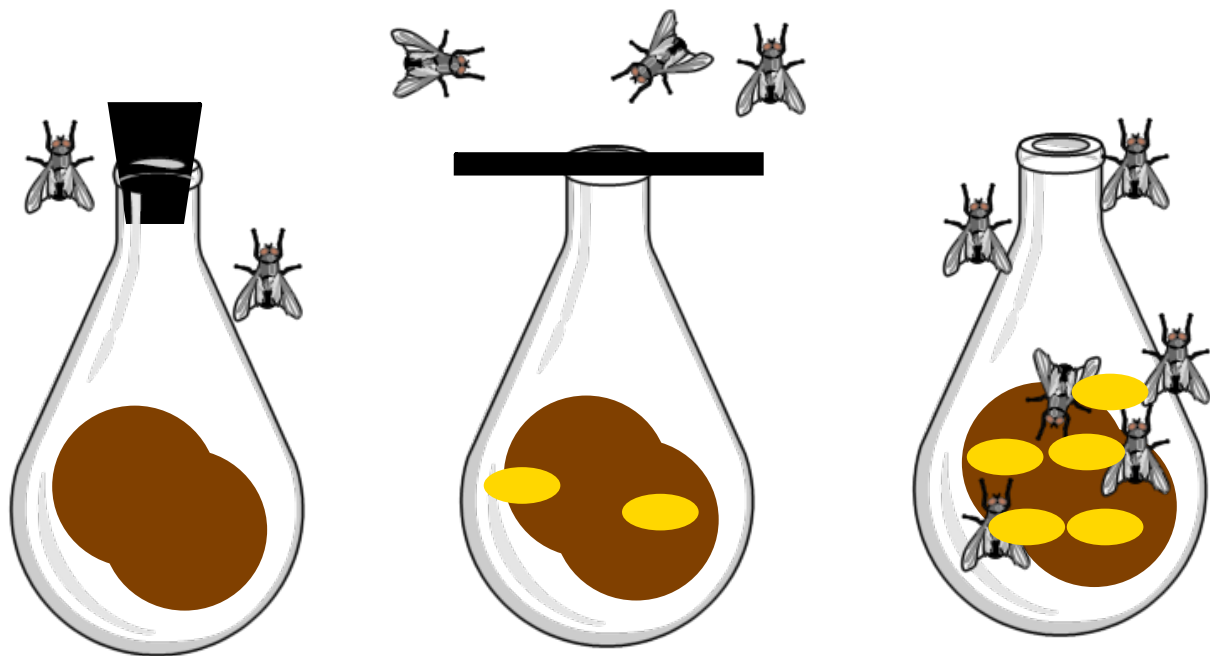
Prediction

- **Prediction:** If meat cannot turn into flies, rotting meat in a sealed (fly-proof) container should not produce flies or maggots.



Fifth step in the scientific method.

Experiment



Sixth step in the scientific method.

Conclusion



Seventh step in the scientific method.

Repeat

## Put on your thinking caps

- An insurance company is claiming that white cars are safer than other cars. Work with a partner and form a model for a research project that would determine the validity of the "white- car claim."

Experiment	Observation	Hypothesis	
Question	Repeat	Conclusion	Prediction