

Explaining & Interpreting Evidence

- **Hypothesis**: a proposed scientific explanation for a set of observations. (*hypotheses* plural)
- Generated using prior knowledge
- Able to be tested
- Can be supported and confirmed or dropped to form new hypotheses



Several Truths about Science

- Science is an *ongoing process*
- Scientists are open-minded skeptics
- Scientists accept that the physical universe is a system with parts that interact.
- Natural laws govern all events and objects



1.2 How Scientists Work

Ask a question

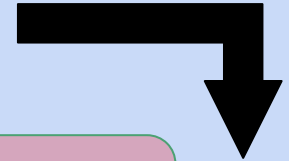
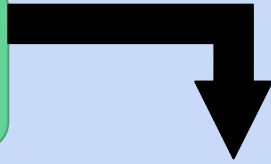
Designing an experiment

Form a hypothesis

Set up a controlled experiment

Record and analyze results

Draw a conclusion



Setting up a controlled experiment

Only ONE variable is changed at a time.

All other variables should be unchanged.

Manipulated variable: changed variable
(independent variable)

Responding variable: observed variable
which responds to manipulated variable
(dependent variable)

Controlled variables: all other unchanged variables



Zero drops
of fertilizer




2 drops of
fertilizer



4 drops of
fertilizer



6 drops of
fertilizer

 = fertilizer

Manipulated variable

Amount of fertilizer



Responding variable

Plant height/ amount of growth



Controlled variables

Amount of light
Amount of water
Size of pot



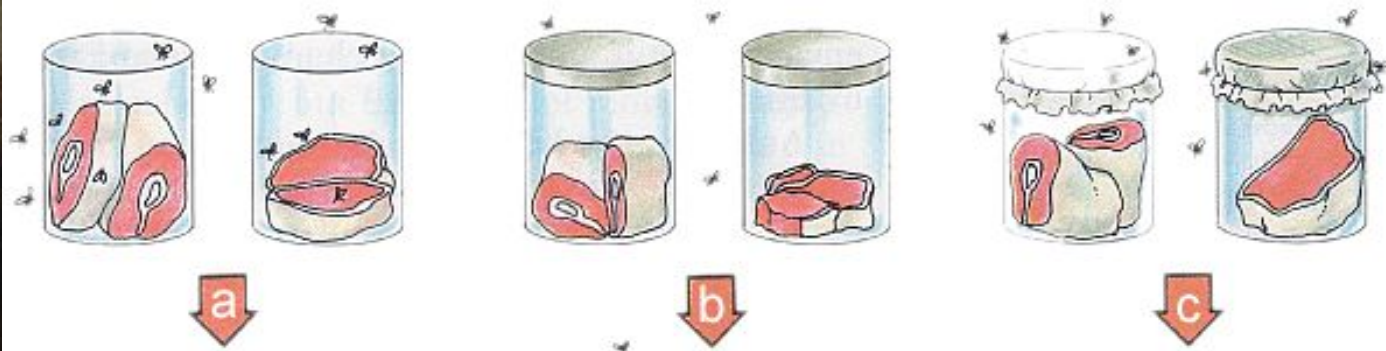
4 drops of
fertilizer



6 drops of
fertilizer

Francesco Redi's experiment

Spontaneous generation: life can arise from nonliving things



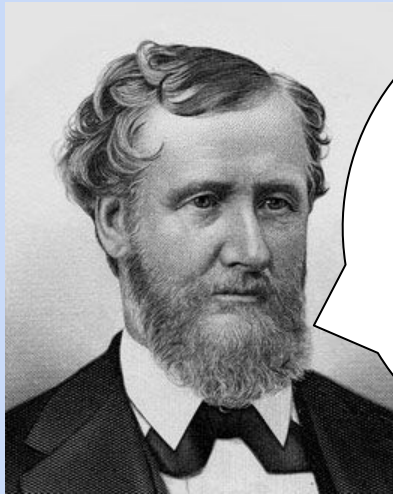


Life can only
arise from living
things!

Experiment
needs to be
repeatable...

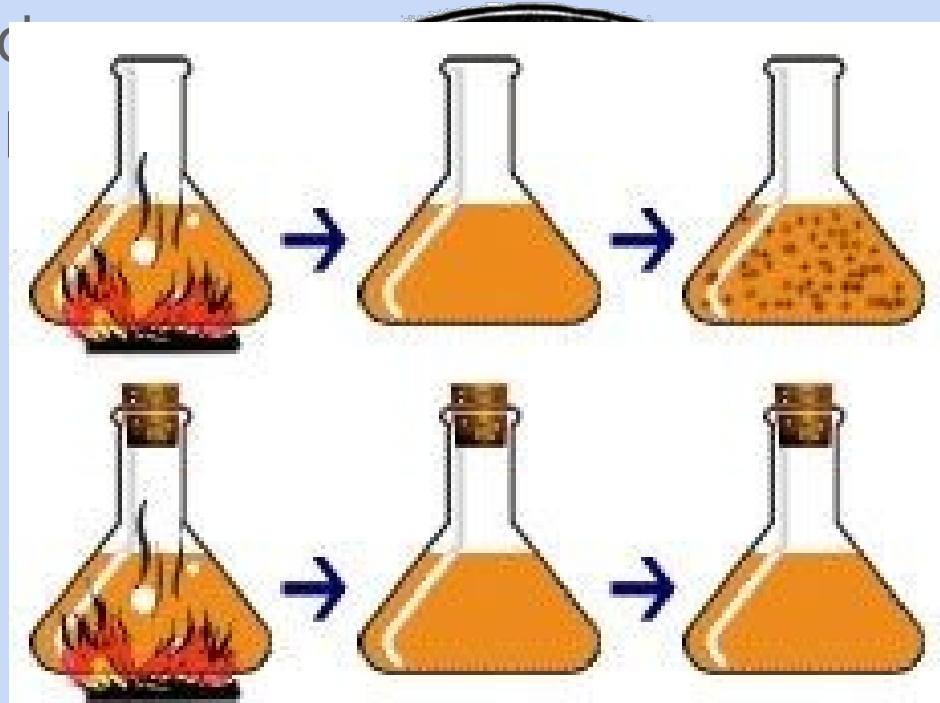
Needham's test on Redi's Findings

John Needham retested
Anton van Leeuwenhoek had
Redi's experiment.
discovered small organisms
called "animalcules"

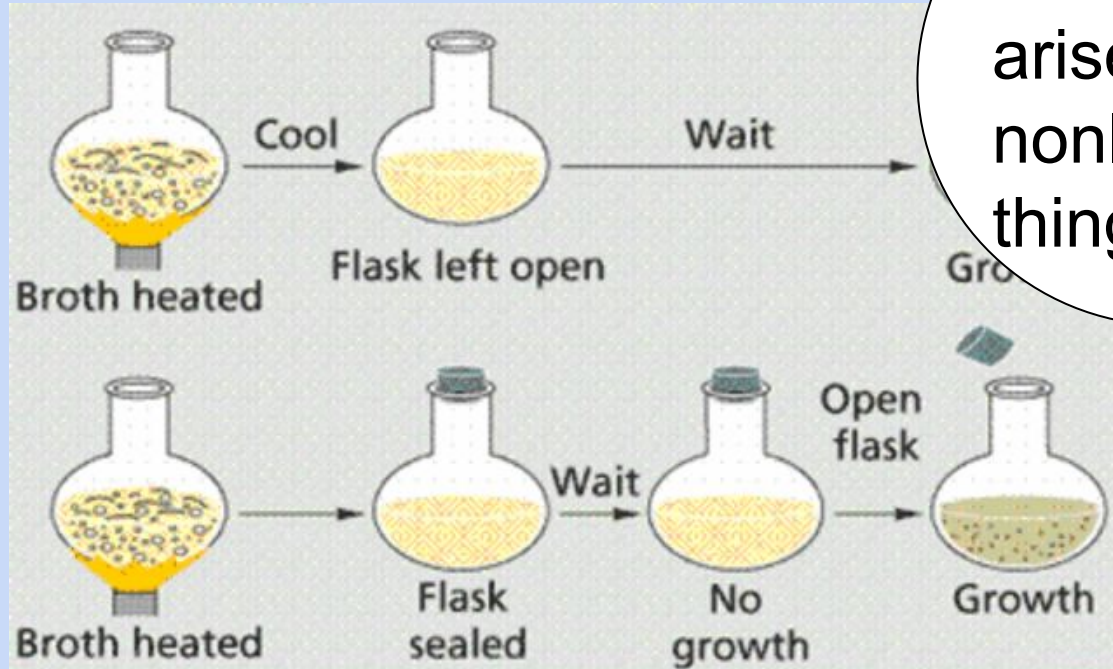


Life CAN
arise from
nonliving
things!

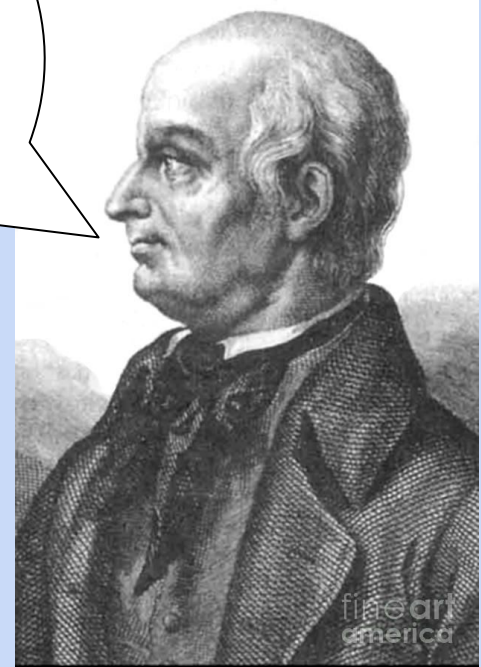
ANIMALCULÆ IN WATER.



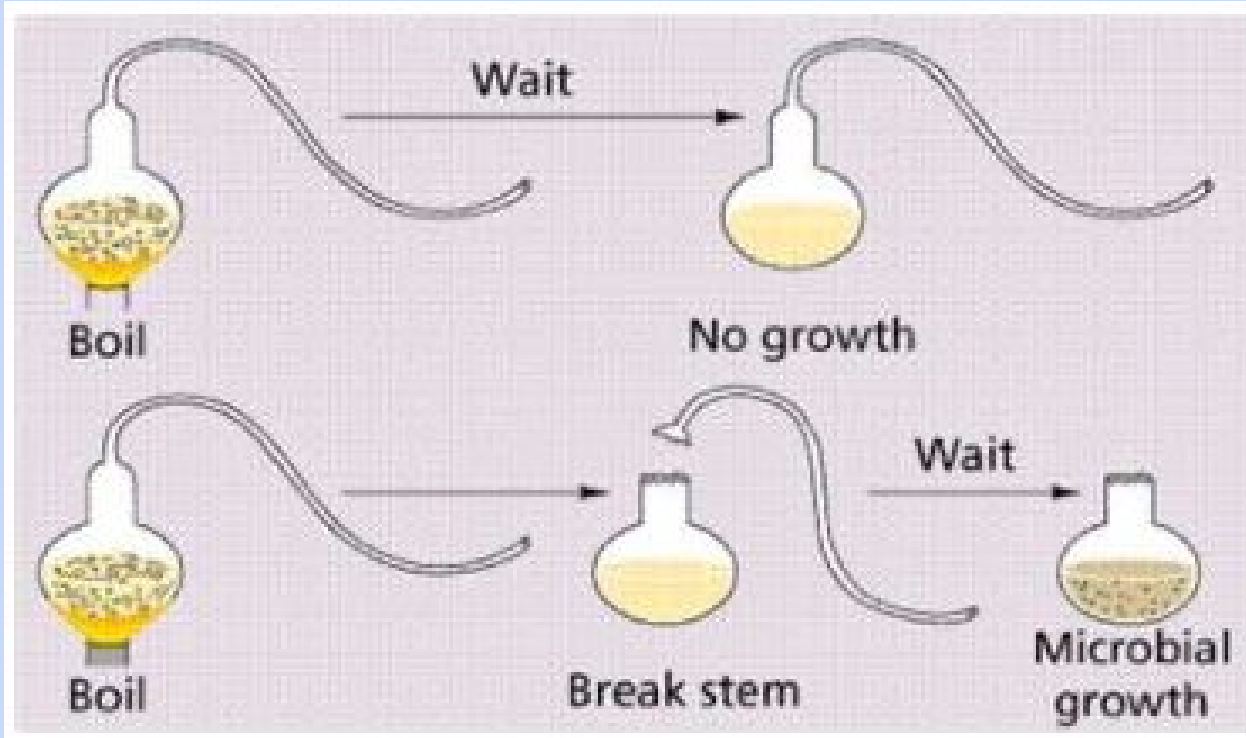
Lazzaro Spallanzani retested both Redi and Needham's findings....



Life cannot
arise from
nonliving
things!



Pasteur's test of Spontaneous Generation



Louis Pasteur was able to disprove the hypothesis of spontaneous generation