Building a Scientific Vocabulary

Activity

Unit 1 - The Cell

(Chapters 1, 7, 8 and 9)

Chapter 1 - The Science of Biology (Page 2)

Section 1-2 - How Scientists Work (Page 8)

Designing an Experiment

Make an Observation

Ask a Question

Form a Hypothesis

Set Up A Controlled Experiment

Record Observations

Analyze the Results

Draw a Conclusion

7 steps
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A hypothesis is a proposed scientific explanation for a set of observations. It must be stated in a way that enables it to be tested.

Factors in an experiment that can change are called variables. (equipment, type of material, amount of material, temperature, light)

A controlled experiment has only one variable that changes. All others are kept unchanged (controlled).

manipulated variable - the variable that is deliberately changed

responding variable - the variable that is observed and that may change in response to the manipulated variable

observations - information obtained using the five senses

Scientists keep written records of their observations, or data. Sometimes drawings are included.

Evaluate the hypothesis. Is it supported or refuted/rejected?

Living Things Suddenly Appearing

Recipe for Mice

1. Place wheat husks in a jar.
2. Add sweaty underwear to the jar.
3. Leave husks and underwear in the jar for twenty-one days.

Recipe for Bees

Page 8

1. Kill a bull during the first thaw of winter.
2. Build a shed.
3. Place the dead bull on branches and herbs inside the shed.
4. Wait for summer. The decaying body of the bull will produce bees.

How do new living things, or organisms, come into being?

Hypothesis: Life can arise from non-living matter.

spontaneous generation or abiogenesis

Francesco Redi

Born: February 18, 1626
Place: Arezzo, Italy

Points of Interest:
1. Redi's father was the personal physician of the Grand Duke of Tuscany.
2. Redi became a physician.
3. Undertook a number of experiments to improve medical and surgical procedures.
4. Composed many literary works.
5. Attempted to disprove the theory of abiogenesis.

Died: March 1, 1698
Place: Pisa, Italy

Redi's Experiment on Abiogenesis

(Page 9)

Observations: Flies land on meat that is left uncovered. Later, maggots appear on the meat.

Question: Where do the maggots come from?

Hypothesis: Flies produce maggots.

Controlled Variables: jars, type of meat, location, temperature, time

Manipulated Variable: gauze covering

Responding Variable: whether maggots appear

Conclusion: Maggots only form when flies come in contact with meat.

The spontaneous generation of maggots did not occur.

Repeating Investigations

A key assumption in science is that experimental results can be reproduced. Scientists expect to test one another's investigations.

John Needham - Page 11

Lazzaro Spallanzani - Page 11

Louis Pasteur - Page 12

In science, a theory is a well tested explanation that unifies a broad range of observations.

Biogenesis is the theory that living organisms only originate from other living organisms.

Chapter 7 - Cell Structure and Function (Page 168)

Section 7-1 - Life is Cellular (Page 169)

The invention of the microscope lead to the discovery of the common structure that makes up every living thing.

The History of the Cell
(Page 170)

1665
Robert Hooke
Identifies empty chambers
in cork and names them cells.

1674
Anton van Leeuwenhoek
Observes tiny living organisms
in drops of pond water through
his simple microscope.

lay-vun-hook

"animalcules"

1838
Matthias Schleiden
Concludes that all plants
are made up of cells.

1839
Theodor Schwann
Stated that all animals
are made up of cells.

Swan

1885
Rudolph Virchow
Proposes that all cells
come from existing cells.

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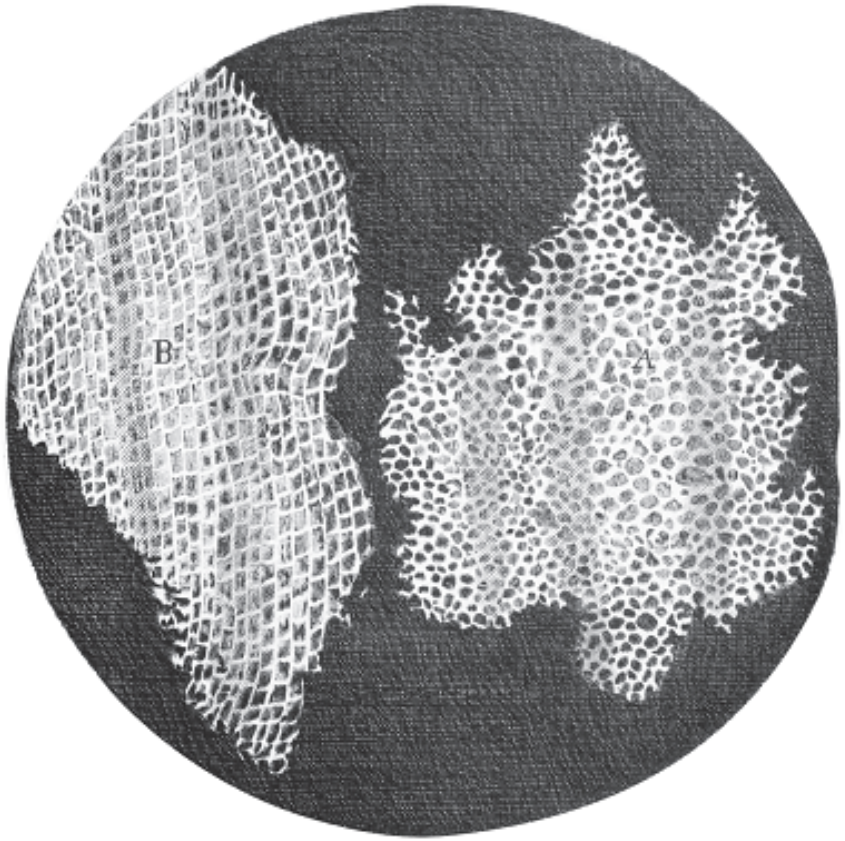
Hooke's Drawing of Cork Cells

Page 169

The cells looked empty because he was looking at dead plant matter.

Living cells are made up of many structures.



Cell Theory

1. All living things are composed of cells.
2. Cells are the basic units of **structure** and **function** in living things.
3. New cells are produced from existing cells.

Quiz

Thursday, September 15/11

Topics:

1. steps used in designing an experiment and appropriate vocabulary (hypothesis, manipulated variable, etc.)

2. contributions of Redi, Needham, Spallanzani and Pasteur

3. observations and conclusions of Robert Hooke, Anton van Leeuwenhoek, Matthias Schleiden, Theodor Schwann and Rudolph Virchow to the current understanding of the cell theory

4. the cell theory (3)

Format: MC, Completion, Short Answer