Name: _____ Period: _____ Date: _____

Chapter 1: The Science of Biology

1-1 What is science?

- Science is a process of _____, _____, the answers to which produce a body of knowledge, which is subject to _____ and _____.
- The goal of science is:
  -
  -
- Science only deals with the _____. Biology is a field in science that focuses on the _____.
- Why is an understanding of science important?

- Scientists collect and organize information in a careful, orderly way, looking for _____ and _____ between events.

- Scientists propose explanations that can be tested by examining evidence. Scientists try to explain events logically and analytically.
- What does all scientific thinking begin with?

- Observation generally involves using the _____, particularly sight and hearing. The information gathered from observations is called _____. Data consists of observations that do not differ whether collected by one person or another.
- Two types of data:
  - Quantitative data:

  - Qualitative data:

- Inference:

- Hypothesis:

- Scientific hypotheses must be proposed in a way that enables them to be _____.
- Science is an ongoing process, knowledge is constantly being reevaluated, revised and updated because of new tools, techniques and discoveries.
- Good scientists are _____. What does that mean?

- Common steps for scientists to gather information and answer questions are known as _____. Not every scientific investigation uses every method nor do all investigations lead to scientific _____.

1-2 How Scientists Work

- While there are no fixed steps, generally the scientific method involves:

1) _____:

2) _____:

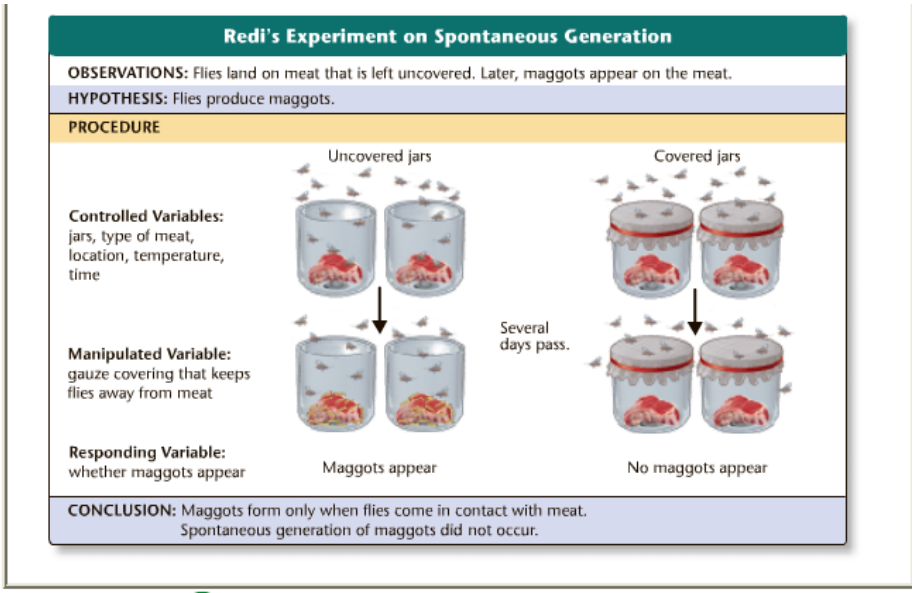
3) _____:

4) _____:

A controlled experiment involves two groups:

a) _____: test group that receives experimental treatment. A variable is the factor of an experiment that can *change*. In a controlled experiment, only one variable is tested at a time. There are three types of variables:

- _____ ***(controlled variables)***: same for both the control and variable group.
- _____ ***(manipulated) variable***: variable that is deliberately changed.
- _____ ***(responding) variable***: changes in response to the manipulated variable (what happened).



Redi's Experiment **In a controlled experiment, only one variable is tested at a time.** Redi designed an experiment to determine what caused the sudden appearance of maggots. In his experiment, the manipulated variable was the presence or absence of the gauze covering. The results of this experiment helped disprove the hypothesis of spontaneous generation.

b) _____: group that receives no experimental treatment, the standard against which results are compared.

5) _____:

6) _____: Use evidence to determine whether the hypothesis was supported or refuted.

7) _____: Results are only useful if they are made available to other scientists for peer review. Other scientists can try to verify the results by repeating the procedure.

- ***It is not always possible to do an experiment to test a hypothesis*.**
  - Alternative investigations may utilize fieldwork or surveys or large groups of subjects, controlling as many variables as possible.
  - What is a theory? Is it absolute?

1 – 3 Studying Life

- Biology:
- Biologist:
- No _____ characteristic is enough to describe a living thing.
- Some non-living things share _____ with living things.

Living things share the following characteristics:

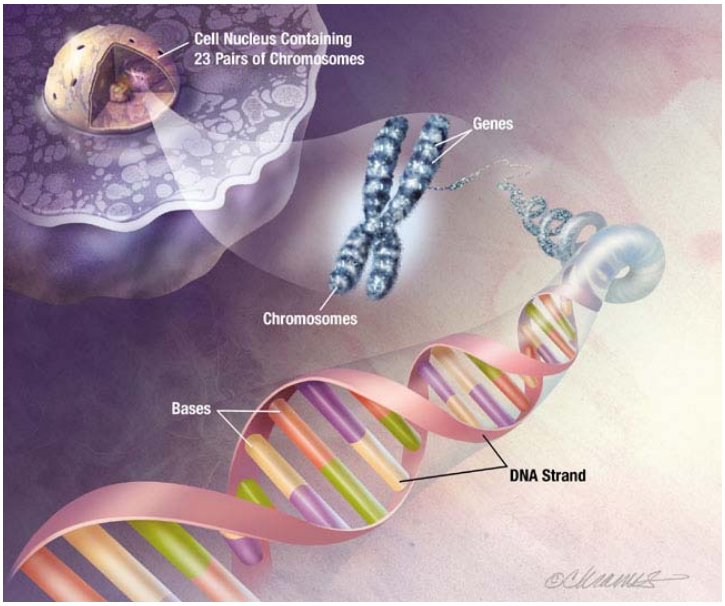
1. Living things are made up of units called _____
   - What are the characteristics of a cell?

   - Unicellular vs. Multicellular. What's the difference?

2. Living things _____.
   - All organisms produce new organisms (offspring) through a process called reproduction.
   - What is a species?

   - There are two types of reproduction:
     - _____:

     - _____:



3. Living things are based on a _____.
   - What's special about DNA?

4. Living things _____.
   - What's the difference between growth and development?

   - The development of specialized cells from a single fertilized egg cell is called _____, because the cells produced look different and perform different functions.
5. Living things obtain and use _____.

- Organisms take in _____ and transform it to do many kinds of _____.
- Organisms use a constant supply of _____ to grow, develop, reproduce, and stay alive.
- What is **metabolism**?

- All organisms get the material they need from their surroundings, or environment. The way organisms obtain energy varies.
- What is photosynthesis and who does it?

- Other organisms rely on photosynthetic organisms for their energy by eating plants or indirectly by eating organisms that ate plants.
- What's a decomposer? Examples?

6. Living things respond to their _____.
   - What are biotic and abiotic factors? (with examples)

   - Anything in an organism's external or internal environment that causes to react is a _____. A reaction to a stimulus is a _____.
   - External stimuli, which come from the environment outside an organism, include _____
   - Internal stimuli come from within an organism. For example, trees that drop their leaves in the fall conserve water and avoid freezing during the winter.
7. Living things maintain a _____.
   - Even though conditions in the external environment may vary widely, the internal conditions of most organisms stay fairly constant.
   - What is homeostasis?

   - Homeostasis often involves internal feedback mechanisms, which respond to internal stimuli. A thermostat in your home maintains a constant temperature in your home.
   - Negative feedback mechanism: A thermostat
   - A similar "thermostat" regulates _____.
   - Human body temperature is a constant ____^{o}C (98.6^{o}F), regardless of the _____ temperature of the environment.
   - How does it work with body temperature regulation?

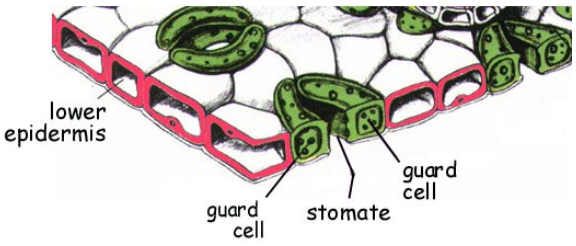
   - Another example of homeostasis: _____.

- The blood contains a constant amount of sugar in the blood. Yet the amount of sugar available to the body changes.
    - What happens after you eat a meal? What hormone is involved?

    - What happens after several hours of not eating? What hormone is involved?

- Animals are not the only organisms to use _____.
- Plants must regulate carbon dioxide intake and water loss.
    - Plants use structures call _____ (singular: stoma) to do so.
    - Stomata are microscopic holes in a plant leaf (usually on the underside) that allow gases to enter and leave and water vapor to leave as well.
    - Each stoma consists of two _____, which control the opening and closing of stomata by responding to changes in _____.
    - When guard cells are swollen with water, the stoma is open.
    - When the guard cell loses water, the opening closes, limiting further water loss from the leaf.

8. Taken as a group, living things _____.
    - Although individual organisms experience many changes during their lives, the basic traits they inherited from their parents usually do not change.
    - A group of organisms, however, can change over time through the process of _____.
    - What is an adaptation? Give an example.



- There are always some differences in the adaptations of individuals within any population of organisms.
- How do some adaptations become more common in a population? What will this result in?

- This process of change over time is called evolution. Life evolves as a result of the interaction between _____ and their _____.