

# Week of April ~~13-17~~, 2020

## Junior High Science

### Debra Welch

Hello students! I hope all of you are staying healthy. I just want everyone to know that I am thinking of you and miss having school as normal. Remember to keep your immune systems strong! Basic directions are: You need to complete one lesson a week for only the class you were currently enrolled in and choose from the 3 choices. Choices 1 & 2 are for review of material we have already covered this year. I will start at the beginning and go through the year's material. Choice #3 will always be new work using your textbook or other handouts I include. I will make every effort to keep your work simple to do, considering that we are not learning together in the classroom. Your work should be turned in as a hard (paper) copy to the office or through email in a word or google document. My email is: [debra.welch@oakland5.org](mailto:debra.welch@oakland5.org). Please be sure all work has your name! If you have not turned in the assignment by the following Monday, I will need to email your parents and/or place a phone call home. Please be diligent to turn work in on time. I suggest you set up a schedule just as if you were at school and allow for the normal time period. Most assignments I send you will take less time than our normal 40 minutes. Comments will be made on paper copies and returned to you. If you send in homework answers as an email I will reply to your email and give my comments/reflections of your work. I will be supplying you with the necessary notes or you will need to use your book to find the answers. If you have any questions feel free to email me and I will get back to you by email during my office hours. If you can't email feel free to call the office and leave me a message. Good Luck and stay healthy!

Class	Choice 1	Choice 2	Choice 3 (Enrichment)
8th Grade Life Science	Use the Notes provided & text and answer questions on the Nature of Life handout.	Vocabulary for Chapter 1: write the word and definition. Use a complete sentence!	Viruses: Use your notes from last week & Chap 2-3 in text to fill out worksheet Directed Reading p21 & Reinforcement p29.
6th Grade General Science	Take the Quiz on the Branches of Science using the wordlist. (see attached Notes).	Give the function of each piece of equipment used in the lab for a-m on the handout. (See notesheet included).	Read the powerpoint on Weather provided. Do the handout: Directed Reading p19 & 20.

"The Nature of Life"

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In this chapter we will look at the characteristics of living organisms. **Organisms** have certain features that rocks and water don't have. We will compare the features that cause non-living and living things to be different. All organisms are made up of the same basic elements:

- 1) Carbon (C)
- 2) Hydrogen (H)
- 3) Oxygen (O)
- 4) Nitrogen (N)

**Theory of Spontaneous Generation:**

During the 1600's and previous to that people used to believe that:

"Life comes from non-living matter"

Some examples during this time period were:

- 1) Earthworms fell from the sky when it rained. This is because the worms would be all over the ground after a rain.
- 2) Jan Baptist van Helmont wrote a recipe for making mice by placing grain in a corner and covering it with rags.
- 3) Frogs and turtles came from rotting wood.
- 4) Maggots came from decaying meat.

During this time period in history people were very superstitious about their beliefs in life and did not use logical, scientific "methods" to test untrue ideas.

Spontaneous generation was disproved in 1668 by **Francesco Redi**:

Redi was an Italian doctor who performed one of the first "controlled" experiments in science. The experiment goes as follows:

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Results-

- Group I: Open jars containing rotting meat---> Flies and maggots present
- Group II: Jar with meat is sealed -----> No flies or maggots present
- Group III: Jar with meat covered with netting--> Flies laid eggs at top of netting, nothing forms on meat. Air can get in proving flies/maggots don't come from the air.

**Lazzaro Spallanzani (1700's):** Proved that tiny organisms came from other tiny organisms in the air.

Experiment:

- 1) He boiled broth in 2 flasks, sealed one and left the other one open to the air.
- 2) Open flask became "cloudy" with organisms.
- 3) Sealed flask remained clear and did not develop any organisms.

He had destroyed a "vital force" when he boiled the broth. But spontaneous generation was finally laid to rest as a theory after Louis Pasteur performed his classic experiment.

**Louis Pasteur (1800's):**

- 1) Pasteur boiled broth in flasks with long, curved necks.
- 2) Broth only got cloudy when the dust on the lip of flask was allowed to mix with the broth inside the flask.
- 3) Microbes had become trapped in the curved neck of the flask but did not mix with broth unless flask is tilted allowing broth and microbes to mix.

The important work of these scientists and others disproved the theory of spontaneous generation and helped scientists to learn how to experiment in a more logical and orderly fashion (scientific method). Instead, a new theory called: **Biogenesis-**

**"living things come only from other living things"**

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**Characteristics of Living Things:**

- 1) Made up of cells
- 2) Able to move (locomotion)
- 3) Performs complex chemical reactions/activities
- 4) Grow and develop
- 5) Respond to stimulus or environment.

↓  
anything an organism responds to

6) Reproduces

1) **Made up of Cells-** The cell is the basic building block of life.

Just like the atom is the basic unit of matter. Life consists of elements. Cells are protected by a barrier from the outside which allows certain "needed" things in and sends out things not needed to the outside (wastes).

**Unicellular-** one-celled organism. Ex. bacteria

**Multicellular-** "many celled" organisms. In humans there are about 6 trillion cells. Each cell is specialized to do a specific job.

2) **Living things can move (locomotion)-**

Movement is necessary for three reasons: 1) find food  
2) find shelter  
3) protection from predators

Movement occurs in many different ways: jump, run, crawl, swim, fly, plants can even move toward the sun.

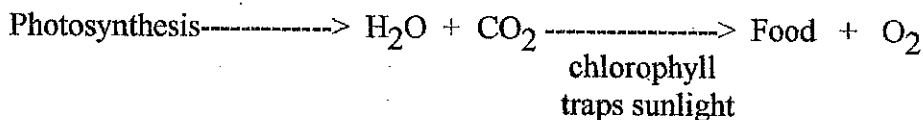
3) **Living things perform complex chemical reactions:**

This occurs by the building and breaking down reactions in order to re-assemble new substances. Substances that are needed for the organism to grow, store energy, repair and replace cells.

**Metabolism-**process of breaking down substances releasing energy and usable food substances.

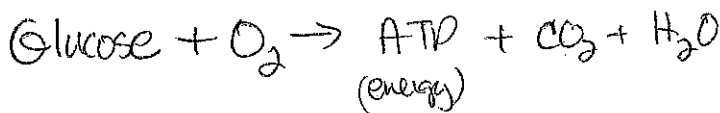
First, the organism must take in food:

a) **ingestion-** taking in or producing own food. Plants make their own food by using leaves to capture sunlight and manufacture sugar (glucose).



b) **digestion-** getting food into the body so it can be broken down. This is the process of food being broken down into simpler substances and re-assembled into more complex substances or energy stored for later use. Begins in the mouth.

c) **respiration-** organisms take in oxygen and use it to produce energy -3-



Combines oxygen with products of digestion or photosynthesis. Energy you need released from foods you eat + oxygen you breathe.

d) **excretion**- some products of metabolism are wastes. These wastes must be released from the cell or it will become toxic and kill the cell. This is the process of getting rid of wastes.

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**4) Living Things Grow and Develop-**

**growth**- increase in size and becoming more complex (development). Ex. tadpole

**life span**- maximum length of time an organism can be expected to live. This varies with each organism.

ex: dog-13 yrs; human- 80 yrs; horse- 25 yrs; insect- 6-9 months; RBC- 120 days

**5) Living things Respond to their environment-**

**stimulus**- any change in environment or surroundings.

**response**- action, movement, or change in behavior.

ex: (outside) smell, sound, light, water, heat, cold

(inside) lack of oxygen (yawn); rapid heartbeat; fright or flight reaction.

**6) Living Things Reproduce-**

**Reproduction**- process in which organism gives rise to the same type of organism like itself.

Humans have babies. Babies grow to be adults just like their parents. When a species ceases to reproduce itself it becomes **extinct**. Like produces like because of genes that are passed down from generation to generation. There are 2 forms:

a) **Sexual**- requires 2 parents in which each contributes a sex cell: egg and sperm, that combine genetically to produce offspring like the parents. Higher forms of plants/animals do this.

b) **Asexual**- reproduction by 1 parent. Simple as cell dividing in half: Ex. bacteria reproduce this way. Yeast forms growths called buds which break off and form a new yeast plant. Plant propagation is another example, in which a new plant will develop from a cutting of the stem of the parent plant. This new plant is exactly like its parent.

## “Needs of Living Things”

Organisms rely upon other organisms as well as their environment. They “interact” in many ways in order to survive.

Examples: birds pick up dead twigs to build nests or catch worms to feed their young, crayfish build homes in the sand or mud of a stream and absorb a chemical called lime to build their hard body covering.

To insure survival, living organisms depend upon the following factors:

- 1) Energy
- 2) Food and Water
- 3) Oxygen
- 4) Living Space (territory)
- 5) Maintenance of body temperature

### 1) Energy-

All organisms requires energy to maintain themselves even under the simplest body functions. Energy may be used differently depending upon the organisms needs. The single most important source of energy used by all organisms is the SUN.

- a) Plants- capture sun’s energy to manufacture food that is sthen stored in the plant’s stems and leaves. *photosynthesis*
- b) Animals- eat the plants to obtain the energy stored in the plants. Other animals eat the plant-eating animals so sthe energy originating from the sun is passed on from one organism to another.

### 2) Food and Water-

Food is necessary for all organisms. It’s the source for energy (fuel) as well as supplying raw materials needed for:

- a) growth
- b) development
- c) repair of body tissues

All organisms eat different diets depending upon their needs:

Venus Fly Trap - Plant-eats  
Animal

- 1. **Herbivore**- eats plants such as grass, leaves, stems, etc.
- 2. **Carnivore**- eat meat by killing other animals or scavenging off meat left somewhere or killed by another animal (**scavenger**, ex. vulture)
- 3. **Omnivore**- eats both plant material and meat, ex. bear, human.

Plants use the sun's energy with the help of a pigment, **chlorophyll**, along with carbon dioxide, water and minerals from the soil to make food in the form of a sugar, **glucose**. This occurs in the leaves and results in the release of oxygen which other organisms use.

Water is necessary for all life. Some organisms have the unique ability of storing water and going several days without it. But most organisms would die within a few days. **65-70%** of your body consists of water. Water serves several functions:

- 1. Dissolves many substances in the body. This is so many chemicals can be transported throughout the body. Most water is located in the blood. Also in tree sap.
- 2. Necessary for chemical reactions to take place. This includes metabolism.
- 3) Carries away wastes.
- 4) Water is a raw material for photosynthesis in plants.

**3) Oxygen-**

Necessary for respiration. This occurs at the cellular level.

**Respiration-** oxygen combines with glucose to release stored energy and carbon dioxide and water are given off as waste products.

Organisms need to obtain oxygen and this depends upon where the organism lives on earth:

- a) Land- oxygen is obtained directly from the air.
- b) Water- organism swims to surface to get a breath (purpose, turtle) or removes dissolved oxygen in the water with the use of gills (fish).

When oxygen is taken in a waste gas called, carbon dioxide (CO<sub>2</sub>) is released. You inhale oxygen and exhale carbon dioxide. Plants take in carbon dioxide from the air and use it in photosynthesis. This is a cycle and it works this way so that oxygen or carbon dioxide can be recycled throughout the earth.

#### 4) Living Space-

All organisms have to compete for many things and one of them is for space or **territory**. Since there's a limited amount of resources only so many organisms can be supported in each particular location. Many animals defend their "space" or territories.

Ex: Birds dart and fly and chirp at intruders. Some will even dive-bomb esp. if defending a nest.

coyotes howl

fish swim close to intruders

some animals show bright colors or "puff" themselves up to appear larger.

Plants compete for sun and water also.

**Competition-** struggle among living things to get proper amount of food, water and energy.

#### 5) Proper Temperature-

**Metabolism-** All of the changes in an organism that enable it to live, grow and reproduce. This process needs to occur within a certain temperature range. There are few organisms in places on the earth where temperatures vary drastically.

**Homeostasis-** ability of an organism to keep conditions inside its body the same, even though the conditions outside the body are changing. This is necessary for survival.

a) **warm-blooded:** animals that maintain a constant body temperature, no matter what it is outside.

Ex: Hair, fur, and body fat keep animals warm in winter.

Feathers on birds traps air which helps keep them cool.

Panting and sweating also cools body of a dog or horse.

Pigs lay in mud to cool off since they can't sweat.

b) **cold-blooded:** animals that have an internal temperature that fluctuates with the environment to a degree. When it gets very cold or hot these animals become slow and inactive:

Ex: reptiles, insects, fish



## Biology – Study of Life Notes

### Chapter One

#### Biology: The Study of Life

##### Biologists:

1. Study the diversity of life.
  - How living things function in their environments. Plants, animals, microorganisms, fungus, bacteria. All things pertaining to life are part of biology.
2. Research Diseases
  - Causes, transmission, immunity, medicine
3. Technology
  - scientific knowledge used to solve human needs
  - prosthesis, medical techniques
4. Improve agriculture – genetically altered seed, plants, farming techniques
5. Preserve environment – forest management, ethical issues, climate change, man vs. nature

##### Characteristics of Life:

1. one or more cells
2. organized structure
3. grows (size) and develops (maturity)
4. reproduces
5. responds to stimuli
6. requires energy
7. maintains homeostasis
8. adapted to environment

Science – body of knowledge based on the study of nature.

Scientific Inquiry – develop explanations

Theory – explanation supported by observation and experiments over time.

- Cell theory

Pseudoscience – “false science” – driven by cultural or economic goals, unsupported by research, biased.

Questioning is an integral part of science.

Peer Review – process where new research is evaluated by other scientists before released publically.

Metric System (SI) – International System of Units

Meter – length

Gram – mass

Liter – volume

**Scientific Use:****Forensics – apply science to legal interest****Ethics – moral principles, values****Scientific Inquiry/Method**

1. **State the Problem** – ask a question
  - a. **Observations** – gather information, record, and research information, use senses
  - b. **Inferences** – logical conclusions based on observations
  
2. **Form Hypothesis**
  - Testable explanation of a situation.
  - Serendipity – accidental but fortunate occurrence or result.
  
3. **Collect Data / Form an Experiment**
  - Control group – used as a comparison
  - Experimental group – exposed to factor being tested.
  
  - Independent variable** – one factor changed (supplemental feeding)
  
  - Dependent variable** – results from independent variable (energy level changes from supplemental feeding).  
Measureable outcome.
  
  - Constant** – factor that remains fixed.
  
  - Data** – information gathered
    - Quantitative – numbers
    - Qualitative – descriptions (senses)
  
4. **Analyze Data**
  - Hypothesis supported or not?
  - Different procedures needed?
  - Graphs, charts
  - Repeat experiments
  
5. **Report Conclusions**
  - Peer review
  - Journals. publications

"Nature of Life"

**Section 1 Questions:**

- 1) A living thing is a(n) \_\_\_\_\_.
- 2) The smallest units of organisms that carry on the functions of life are: \_\_\_\_\_.
- 3) Anything an organisms responds to is a(n) \_\_\_\_\_.
- 4) The ability to maintain steady conditions no matter what is going on inside or outside an organism is \_\_\_\_\_.
- 5) What are the characteristics of organisms?
- 6) Explain how a tree shows the features of life:
- 7) Compare the theory of spontaneous generation to the theory of biogenesis:
- 8) Explain how it is possible for some of Pasteur's flasks to be uncontaminated after 100 years.

Biology: Vocabulary Words for Chap. 1

18 pts.

1-1:

- 10
- autotrophy
  - biology
  - differentiation
  - ecosystem
  - gene
  - heterotroph
  - homeostasis
  - natural selection
  - unicellular organism
  - photosynthesis

1-2:

- 2
- metabolism
  - development

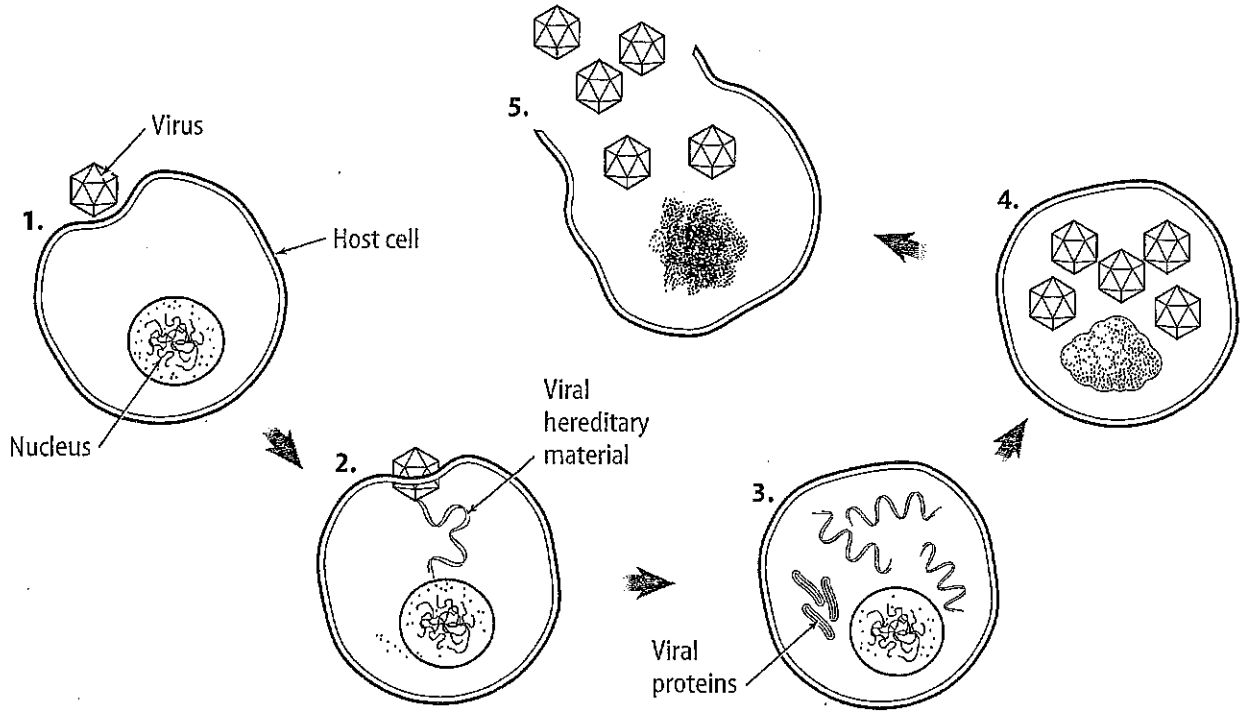
1-3:

- 6
- control group
  - dependent variable
  - independent variable
  - hypothesis
  - inference
  - theory

**Directed Reading for  
Content Mastery**

**Section 3 ■ Viruses**

**Directions:** Study the diagram showing the reproduction cycle of viruses. Then write a sentence describing each stage.



1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_



# Reinforcement Viruses

1. Listed below are the steps by which an active virus copies itself and destroys a cell. Number the steps in the correct order in the blanks provided at the left.

- \_\_\_\_\_ a. The cell bursts open and hundreds of new virus particles are released. These new virus particles go on to infect other cells.
- \_\_\_\_\_ b. A specific virus attaches to the surface of a specific host cell.
- \_\_\_\_\_ c. The viral hereditary material takes control of the host cell and the cell begins to make new virus particles.
- \_\_\_\_\_ d. The hereditary material of the virus entering the host cell.

**Directions:** Answer the following questions using complete sentences.

2. Explain what a latent virus does when it enters a cell.

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3. Discuss several ways to prevent viral infections.

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4. What are vaccines made from?

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5. How does gene therapy work?

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