Skills for the GED® Test	Skills for the HiSET™ Test
• Body systems • Homeostasis • Sources of nutrients • Disease and pathogens • Energy for life functions • Flow of energy in ecosystems • Carrying capacity • Symbiosis and changes in one population affecting another population • Disruption of ecosystems and extinction • Cellular components that assist the functions of life • Cell theory and cellular levels of organization • Mitosis, meiosis • Inheritance and chromosomes • Genotypes, phenotypes and the probability of traits in close relatives • Environmental altering of traits, and expression of traits • Common ancestry • Selection • Scientific models, theories and processes • Evaluate whether a conclusion or theory is supported or challenged by particular data or evidence • Reason from data or evidence • Cite specific textual evidence to support a finding or conclusion • Identify and interpret independent and dependent variables • Understand and explain textual scientific presentation	• Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. • Follow precisely a complex multistep procedure when carrying out experiments, taking measurements or performing technical tasks, attending to special cases or exceptions defined in the text. • Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.
Tips	**Tips**
• All of science is based on the scientific thinking covered in Unit 1. It's important to remember those concepts, learn information and vocabulary in the life science domain to be successful	• All of science is based on the scientific thinking covered in Unit 1. It's important to remember those concepts, learn information and vocabulary in the life science domain to be successful

Lesson 1: The Human Body

This lesson covers the following information:

- Health and wellness
- Various systems in the body
- Diseases that impact the human body

Highlights include the following:

- Our bodies are made up of systems that interact, allowing us to experience the world.
- There are multiple systems that work together to support the body's functions.
- Each system has its own function.
    - **Circulatory System** is made up of organs that transport oxygenated and de-oxygenated blood throughout the body.
        - This system is made up of the heart, blood vessels, and blood.
        - It supplies the entire body with blood that carries nutrients and fluids to working organs and muscles.
    - The **immune system** refers to the antibodies and lymphocytes that attack invading viruses and bacteria.
    - The **lymphatic system** filters out dangerous organisms that may cause disease. Lymph organs are the spleen, thymus gland lymph nodes, and lymph vessels.
    - The **urinary system** is made up of the kidneys, ureters, bladder, and urethra.
    - The brain, spinal cord, and nerves make up the **nervous system** that is the control and communication center of the body because it sends, receives, and processes impulses made by the body.
    - The **digestive system** is made up of organs in the body that break down food into proteins, carbohydrates, fats, vitamins, and minerals which the body uses to repair, grow, and make energy.
    - The **endocrine system** is made up of organs called glands. These glands produce hormones that regulate growth, sexual development, and metabolism.
    - The **integumentary system** is made up of skin, hair, and nails.
    - Bones, tendons, and ligaments make up the **skeletal system**.
    - The **muscular system** is made up of tissues that work with the skeletal system to control movement.
    - The **reproductive system** allows us the ability to have children.
    - The **respiratory system** allows our body to breathe and supply our body with oxygen. It includes the nose, throat, mouth, trachea, and lungs.
    - The **excretory system** removes pathogens and unnecessary debris to prevent infection in the body.
- Homeostasis is the term used to label the body's ability to maintain stability and regulate its internal environment.

- Nutrients are a chemical a living thing needs to grow, repair, regulate metabolism, and make energy. They include carbohydrates, proteins, fats, dietary minerals, vitamins, water, and oxygen.
- An organism is an individual form of life that works interdependently with many things inside and outside the body to carry out various process of life.
- Once a disease-causing organism called a pathogen infects the body, the immune system will begin defending the body against the illness.
- Diseases can be transmitted from a person, animals/insects, food, and water.
- A vaccine is a substance used to stimulate the antibodies to fight and provide immunity against one or many diseases.

Reflection:

- There are many systems in the human body that work together to ensure health and wellness.
- It's important to understand how nutrients fuel the body and help keep all the systems working correctly.
- Organisms work together to carry out various process of life.
- Pathogens infect the body and the immune system defends against the illness.
- Vaccines are used to stimulate the antibodies that fight against the pathogens.

Notes:

Cryptogram:

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

6 26 13 15 5 24 26 4 25 , 16 23 18 18 23 26 15 20 16 25 15 15 24 21

2 14 24 13 15 5 , 6 10 25 17 6 12 5 10 2 14 25 2 10 19 12 24 25 21

10 25 18 23 26 3 25 18 24 12 6 16 25 26 10 24 17 24 12 20 20 24 25 12 .

26 5 18 1 24 12 10 14 25 17 24 1 24 24 26 24 10 2 6 18 25 2 24 21

2 14 25 2 **65** 18 6 15 15 6 23 26 25 18 24 12 6 16 25 26 10

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2 14 24 13 15 5 17 6 12 5 10 18 5 2 25 2 24 10 23 13 2 24 26

Lesson 2: The Cell

This lesson covers the following information:

- Cell structures and functions
- Difference between plant and animal cells
- Division of cells
- How cells use energy
- How cells differentiate themselves

Highlights include the following:

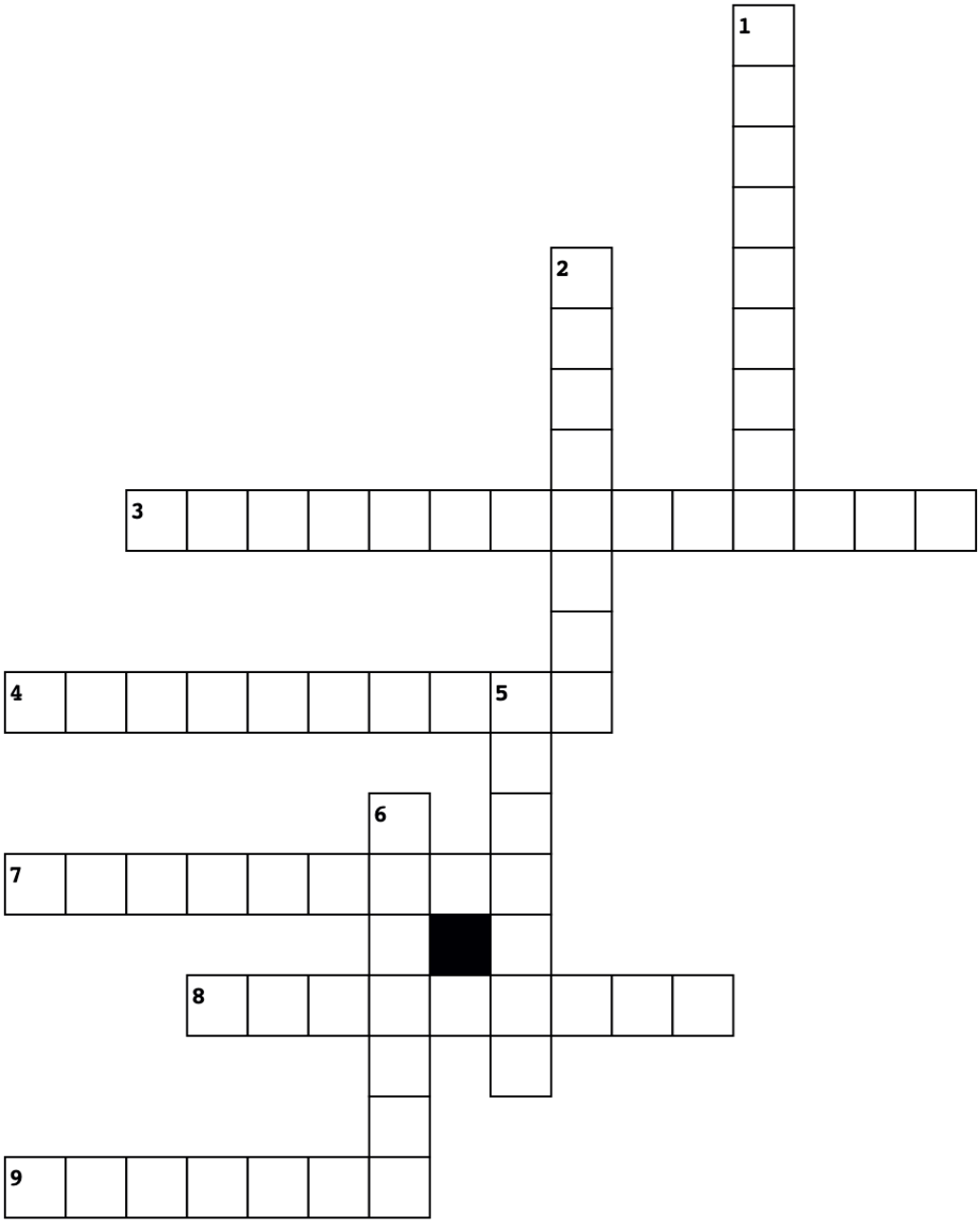
- All living things…
  - respond to stimuli.
  - require energy.
  - reproduce.
  - are made of cells.
- A cell is the smallest unit in a living organism that is capable of carrying out all the activities of life.
- The Cell Theory says…
  - A cell is the basic unit of life.
  - All organisms are made of one or more cells.
  - All cells come from existing cells.
- All cells are classified as either plant or animal cells.
- All plant and animal cells have the following:
  - A cell membrane
  - A nucleus
  - Cytoplasm
  - Organelles
- Plant cells have the following:
  - A cell wall.
  - Chloroplasts.
- A cells live cycle is broken down into Interphase and M phase (Mitosis)
- Mitosis has four phases: Prophase, Metaphase, Anaphase, and Telophase.
- Plants can make their own food though photosynthesis, a process that allows plants to build molecules of food by trapping the energy in sunlight.
- Cells are either breaking down molecules or building them.
- Catabolic reactions release energy and anabolic reactions use energy.
- All multi-cellular organisms begin life as one cell. They end up as a complex organism through a process called differentiation or specialization.

Reflection:

- There are important structures within a cell.
- There are differences between animal and plant cells
- All cells go through a process of cell division.
- Photosynthesis is important to all living things.
- Cells organize themselves into complex, multi-cellular organisms through differentiation.

Notes:

Crossword Puzzle:



Across:
3. Formation of carbohydrates from carbon dioxide and a source of hydrogen (e.g. water) in the chlorophyll-containing tissues of plants exposed to light
4. Destructive metabolism involving the release of energy and resulting in the breakdown of complex materials within the organism
7. The constructive part of metabolism concerned especially with macromolecular synthesis
8. The organized complex of inorganic and organic substances external to the nuclear membrane of a cell
9. A cellular organelle that is essential to cell functions

Down:
1. A specialized cellular part
2. A complex structure of interdependent and subordinate elements whose relations and properties are largely determined by their function in the whole
5. An agent that directly influences the activity of a living organism or one of its part
6. A process that takes place in the nucleus of a dividing cell, resulting in the formation of two nuclei, each having the same number of chromosomes as the parent nucleus

Lesson 3: Molecular Basis of Heredity

This lesson covers the following information:

- Predicting outcomes of genetic crosses
- Differentiate patterns of inheritance
- Identifying the structure of DNA molecules
- How DNA replicates itself
- How genes express themselves

Highlights include the following:

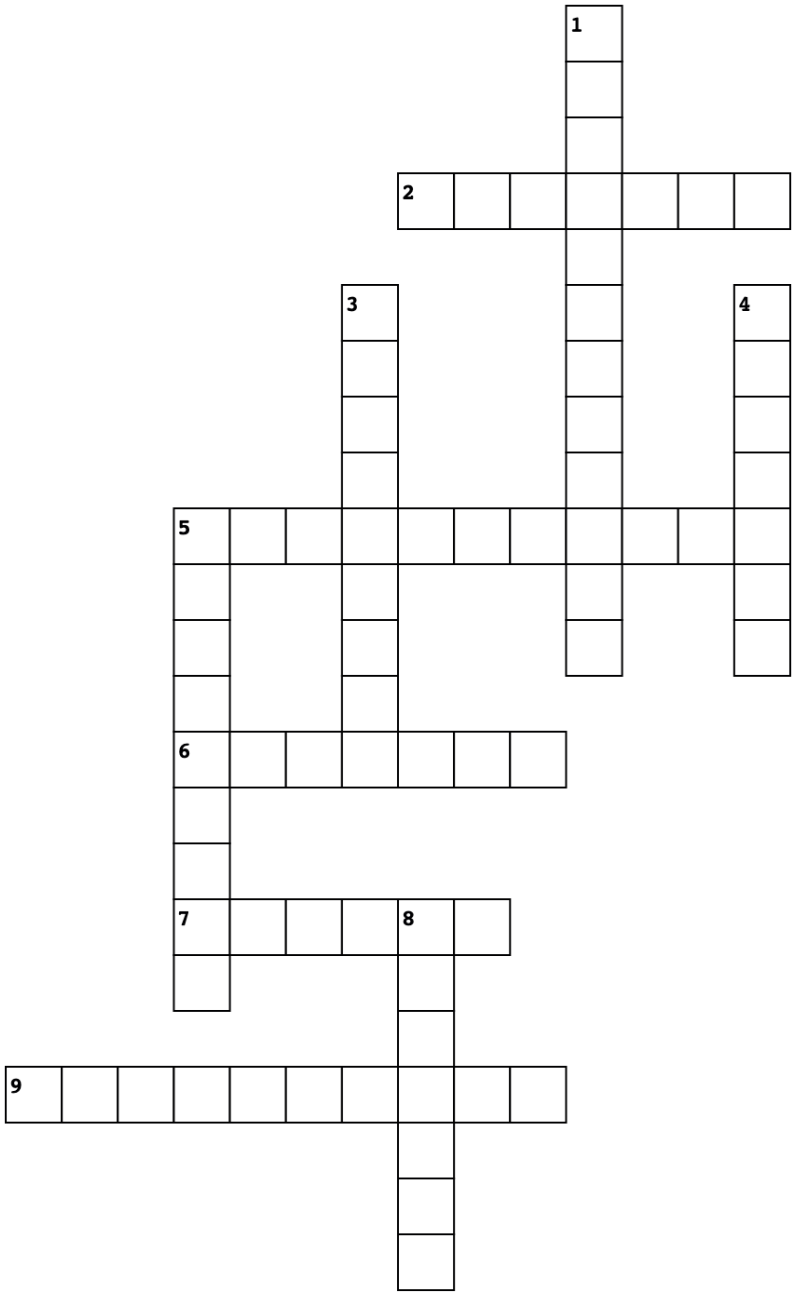
- Every living thing inherits a set of characteristics from its parents.
- In genetics, a diagram of the Punnett Square shows the probability of each possible outcome of a cross between two individuals.
- Inheritance is determined by factors, called genes, which pass from generation to generations.
- Different forms of a gene are called alleles.
- Some alleles are dominant (prevailing), and others are recessive (withdrawn).
- Genes are segregated from each other when gametes are formed.
- Alleles for different genes usually segregate independently from each other.
    - Incomplete dominance – One allele is not completely dominant over the other.
    - Codominance – Both alleles contribute to the phenotype of the organism.
    - Multiple Alleles – A trait is controlled by more than two alleles.
    - Polygenic Traits – Two or more genes control a trait.
- Genes are located on chromosomes in the cell nucleus.
- Cells that contain both sets of homologous chromosomes are referred to as diploid cells.
- Cells that contain one set of homologous chromosomes are called haploid cells.
    - Only gametes are haploid.
- The process that produces gametes with one half the number of chromosomes is called meiosis.
- Meiosis occurs only in gamete-producing cells. Male gametes are called sperm. Female gametes are called eggs. Both sperm and eggs only have half the number of chromosomes necessary to create another individual.
- When a sperm fertilizes an egg, the two haploid cells combine their chromosomes in order to produce a cell with a full set of chromosomes. The resulting diploid cell is called a zygote. The zygote then can develop by mitosis into a multi-celled organism (animal or human being).
- Genes are made up of DNA – shaped like a double helix, which allows for DNA to copy itself in a process called replication.
- A mutation is any change in a DNA sequence that impacts genetic information.

Reflection:

- Genetic outcomes can be predicted using Punnett Squares.
- Genes are made up of DNA molecules that replicate.

Notes:

Crossword Puzzle:



Across:
2. Sex cells
5. Carriers of the genetic material that is copied and passes from generation to generation of cells
6. Different forms of genes
7. Complex proteins produced by living cells that serve as a catalyst for certain biochemical reactions at body temperatures
9. Having two identical alleles for a certain trait

Down:
1. Having two different alleles for the same trait
3. A physical characteristic--the way something looks
4. The cellular process that results in the number of chromosomes in gamete-producing cells being reduced to one-half
5. A describable feature, such as eye color
8. Duplication of a cell and all of its parts

Lesson 4: Understanding Evolution

This lesson covers the following information:

- Key points of Darwin's theory of evolution
- Natural selection
- Punctuated equilibrium
- Evidence for evolution
- Classification of organisms

Highlights include the following:

- There are scientific examples of evolution and natural selection in the world.
- Most scientists accept the theory of evolution as the explanation for the great diversity of life that we see on Earth today and as an explanation for some interesting scientific findings. Do not confuse the theory of evolution with a theory for the origin of life. They are different.
- Evolution refers to the gradual changes that take place in organisms over a long period of time. A process called natural selection drives evolution.
    - Variation naturally exists within the genes of every species.
    - A particular environment can only support a certain number of a species, so members of a species will be in competition with each other for water and food.
    - As time progresses, members of the species with favorable traits will outlive those with unfavorable traits simply because they have better odds of survival.
- A fossil is formed only under special conditions and fossil records show a progression from the earliest types of one-celled life to the complex organisms living today.
- Punctuated equilibrium helps to explain the sudden disappearance or appearance of a species. The disappearance of the dinosaur from the earth (extinction) is one of the most discussed sudden disappearances of a species.
- Another line of evidence of the appearance of a new species (evolution) comes from the study of anatomy, the way in which organisms are put together.
- Scientists have developed a system of classifying organisms that reflects their evolutionary relationships. Organisms with similar characteristics are grouped together.

Reflection:

- The theory of evolution is controversial between evolutionists and creationists.
- Natural selection refers to the evolutionary idea of "survival of the fittest."
- Punctuated equilibrium is also an evolutionary theory that puts forth the idea of rapid as opposed to gradual change in a species.
- Natural selection and punctuated equilibrium help scientists explain the fossil record.
- Scientists explain evolutionary relationships of organisms by using a classification system for organisms.

Notes:

Cryptogram:

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

8 18 4 13 4 16 15 20 7 13 15 4 13 4 2 16 16 20 14 13 13 6 20

13 6 20 18 24 12 18 25 20 3 18 10 23 13 15 18 7 2 4 13 6 20

20 22 14 10 2 7 2 13 15 18 7 25 18 24 13 6 20 21 24 20 2 13

1 15 3 20 24 4 15 13 12 18 25 10 15 25 20 13 6 2 13 9 20

4 20 20 18 7 20 2 24 13 6 13 18 1 2 12 2 7 1 2 4

2 7 20 22 14 10 2 7 2 13 15 18 7 25 18 24 4 18 8 20 15 7 13 20 24 20

4 13 15 7 21 4 16 15 20 7 13 15 25 15 16 25 15 7 1 15 7 21 4 .

1 18 7 18 13 16 18 7 25 23 4 20 13 6 20 13 6 20 18 24 12

18 25 20 3 18 10 23 13 15 18 7 9 15 13 6 2 13 6 20 18 24 12

25 18 24 13 6 20 18 24 15 21 15 7 18 25 10 15 25 20 . 13 6 20 12

2 24 20 1 15 25 25 20 24 20 7 13 .

Lesson 5: Form and Function

This lesson covers the following information:

- Key relationships between form and function
- How form and function influence the world around you
- How the elements of evolution effect form and function

Highlights include the following:

- The relationship between form and function probably can be tracked to the beginning of mankind's quest to survive and be a more efficient worker.
- The form and function of living things can be modified through the process of evolution.
- The degree to which biological form and function can be modified has strict limits. Organisms can evolve and change according to their environment, but they don't have unlimited ability to change.
- Many of today's animals represent a compromise between inherited potential and environmental opportunity. Animals we see today are a mix between their genes (inherited potential) and their surroundings (environment).

Reflection:

- There is a relationship between form and function.
- Form and function influence the world around you.

Notes:

Word Search:

CHANGES	COMPROMISE	FORM	MODIFIED	STRUCTURE
RELATIONSHIP	DARWIN	FUNCTION	ORGANISM	
SHAPE	EVOLUTION	LIMITS	RELATED	

P R K D X N V O X C D D Y R Z

R V E T N X Y Y S O E A H H S

X E D L M A S X E M I R F E L

N L L M A V L V Y P F W T E J

M O K A M T O V H R I I R R H

Z P I J T L E G D O D N D A Q

D X L T U I I D I M O V M E M

G D X T C C O D S I M S M S Z

N M I T K N K N F S L M I D F

C O C L W X U V S E Y N R L H

N X E P A H S F E H A O I O Q

E R U T C U R T S G I M R Y F

C H A N G E S G R U I P R W H

O Y R F X V M O O T U T B W C

L J Z U G L P M S T N Z Z T F

Lesson 6: Independence of Organisms

This lesson covers the following information:

- Ecosystems
- The flow of energy from one organism to another
- How energy flow impacts a food web
- The relationship between organisms within an ecosystem

Highlights include the following:

- Scientists who study ecology look at how organisms interact with each other and their environment.
- An ecosystem is made up of…
    - **Individuals –** members of a particular species.
    - **Population –** groups of individuals that belong to the same species and live in the same area.
    - **Community –** assembly of different populations that live together in a defined area.
    - **Ecosystem –** All the living things in an area combined with their physical environment.
- Everything an organism does requires energy.
- The flow of energy through an ecosystem is one of the most important factors that determine the system's capacity or ability to sustain life.
- Produces are organisms that capture energy from the sun and produce food through a process called photosynthesis.
- Consumers are organism that cannot capture energy directly from the sun or chemicals in order to make their food. They must get (consume) it from other organism.
- In ecosystems, organisms interact with each other. As a result, matter and energy flow in one direction from one organism to another.
- Energy flows from the sun or chemicals to producers and then to consumers. The path the energy makes as it transfers from producers to consumers is called a food chain.
- A food web links all the food chains in an ecosystem together.
- Within an ecosystem, each organism has its own habitat, or a place where the organism lives out its life.
- A habitat can change as a result of nature or man.
- Every organism has a role to play. A niche includes the role an organism has in its environment.
- Many organisms can occupy the same habitat but have a different niche.
- Organisms that live together in an ecosystem interact constantly. These interactions, such as competition, predation, and symbiosis can have a great effect on the ecosystem.
    - **Competition –** Organisms compete for food, water, and space to live.
    - **Predation –** One organism (the predator) kills and eats another organism (the prey).
    - **Symbiosis –** Two species living together

Reflection:

- Groupings within an ecosystem are species, populations, communities, and ecosystem.
- Some organisms are producers (make their own food) and some are consumers (rely on other organisms for their food).
- Consumers can be herbivores, carnivores, omnivores, or decomposers.
- The sun is the ultimate source of energy on earth.
- Energy flows from the sun to plants (producers)
- and from the plants to different consumers.
- Two species can occupy the same niche (role) in an ecosystem.
- Organisms interact in relationships that are called competition, predation, or symbiosis.
- Man or events in nature can upset the natural flow of energy in an ecosystem.

Notes:

Cryptogram:

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

23 20 17 21 18 19 10 13 20 17 22 20 26 10 7 21 21 20 6 22 18 24 20 11 21 20 10

13 20 17 7 24 1 22 11 2 24 18 10 13 20 10 7 13 15 22 10 13 10 19

13 18 21 25 24 18 10 7 21 19 23 18 6 22 6 13 9 24 25 13 20

21 16 24 19 8 19 10 21 11 . 13 7 21 13 9 10 7 8 13 20 17 15 13 9 13 20 16

21 17 21 16 24 19 8 19 10 21 11 10 7 18 22 6 21 19 13 20 17 2 18 24 6 22

17 21 19 25 24 24 17 13 20 17 20 23 10 18 22 10 22 24 20 25 24 18

2 21 24 2 9 21 . 8 24 23 7 13 6 21 15 21 21 20 18 21 6 22 21 1 22 20 26

13 9 24 10 24 25 22 20 25 24 18 11 13 10 22 24 20 13 15 24 23 10

7 24 1 21 16 24 19 8 19 10 21 11 19 1 24 18 5 13 20 17 11 13 22 20 10 13

22 20 15 13 9 13 20 16 21 22 20 13 25 24 24 17 1 21 15 .

Lesson 7: Behavior of Organisms

This lesson covers the following information:

- Difference between as stimulus and response
- Difference between learned and innate behaviors
- How organisms use learned and innate behavior

Highlights include the following:

- Studying the behavior of animals can teach scientists a great deal not only about the animals themselves but also about the evolutionary history of the animals.
- Behavior is anything an animal does in response to a stimulus in its environment. Stimulus examples include the following:
- Natural selection is part of Darwin's theory of evolution. It is the idea that those members of a species with the most favorable traits will survive. Certain behaviors also give an individual a better chance of survival. Since certain behaviors can be inherited, that individual's offspring will also have the behavior.
- Most scientists now believe that both heredity and learning play roles in shaping behavior. Behaviors can be classified as one of two kinds: innate or learned.
    - An innate behavior is one that is not learned. It just comes naturally.
    - When something is automatic, it "takes over" without a person having to do anything to bring it about.
    - In a learned behavior, an animal alters its behavior as a result of experience.
    - Habituation is the simplest type of learned behavior.
- Classical Conditioning – An animal makes a connection between a stimulus and a reward or punishment.
- Trial and Error – Animal learns to behave in a certain way through repeated practice.
- Examples of Insight, or high-level learning.
    - Animals use previous experience to respond to a new situation.
    - Any time animals interact with members of their own species, they are exhibiting social behavior.
    - The type of communication they use depends on the types of stimuli their senses can detect. They use visual, sound, touch, and chemical signals to communicate.

Reflection:

- There is a difference between a stimulus and a response.
- Natural selection can work with behavior as well as traits.
- Natural selection favors the individual rather than the species.
- Innate behavior is like inherited behavior (automatic response and instinct).
- There are four kinds of learned behavior: habituation, classical conditioning, trial and error, and insight learning.

- Natural cycles are daily (circadian rhythms) and seasonal (dormancy, migration).
- Animals participate in four types of social behavior: courtship, defense, competition, and aggression.
- Animals communicate with sound, visual, chemical, touch, and language signals. Only humans use language.

Notes:

Word Search:

AUTOMATIC	INSIGHT	LEARNING	CONDITIONING
MIGRATION	RESPONSE	CLASSICAL	SPECIES
INHERITED	STIMULUS	CIRCADIAN	LEARNED
TRAITS	HABITUATION	BEHAVIOR	INNATE
INSTINCT	DORMANCY		

G D O R M A N C Y V B K H G I

I N N A T E O C D C E S J N I

V Y I Y C S I E N I H U T I O

B Z I N T L T V T R A L H N U

M T W I O I A V M C V U G R O

H M A A R I U S T A I M I A P

E R R E C V T P S D O I S E A

T M H W L V I I Z I R T N L O

D N T N M Y B S D A C S I T L

I L X G N O A T P N E A I H E

E M Z B C M H F C E O B L M A

A U T O M A T I C W C C K L R

I E X Y N O I T A R G I M I N

R E S P O N S E G W X D E U E

Q Q T C N I T S N I F E Q S D