

Name: _____

Science Teacher: _____ Period: _____



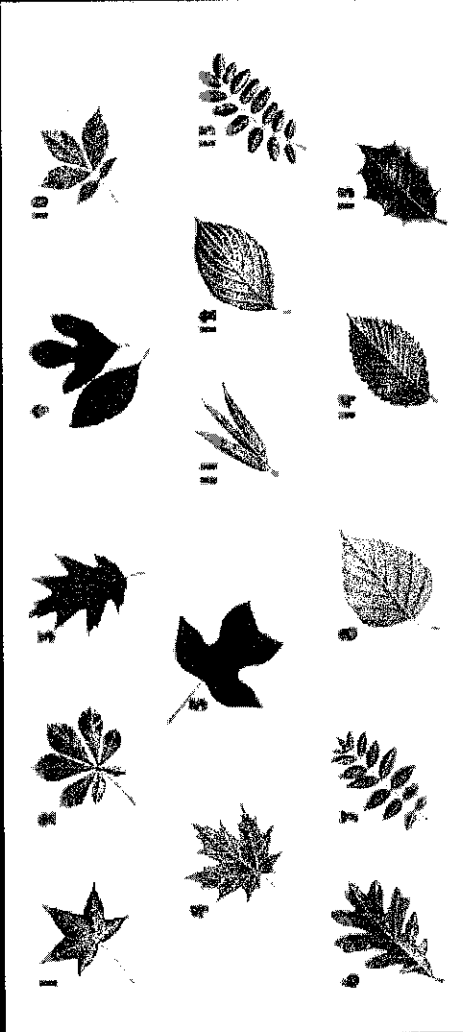
Natural Selection and Adaptations Workbook

Hopewell Middle School 7th Grade Science

Unit 5: Natural Selection and Adaptations Part 1

TEKS Analysis

TEKS 7.11A- examine organisms or their structures such as insects or leaves and use dichotomous keys for identification [supporting standard]



Use the numbered leaves on the left and group them into 2 groups according to their similar structures. Make sure to label the categories of each group.


Essential Questions

How do you use a dichotomous key to identify organisms based on their structural characteristics?

TEKS 7.11B- explain variation within a population or species by comparing external features, behaviors, or physiology of organisms that enhance their survival such as migration, hibernation, or storage of food in a bulb

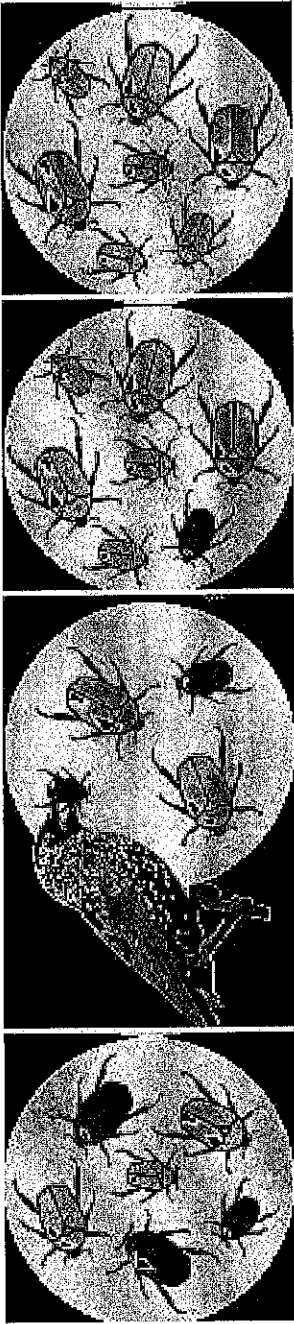
Essential Question

How does the survival or reproduction of an organism depend on its adaptations to its environment?

What is..	How would these behaviors enhance organisms survival?
Migration-	
Hibernation-	
Bulb-	

TEKS 7.11C- identify some changes in genetic traits that have occurred over several generations through natural selection and selective breeding such as the Galapagos Medium Ground Finch (*Geospiza fortis*) or domestic animals [supporting standard]

Identify the changes that have occurred to the genetic traits of the beetle and cow populations over time. Label both sets of pictures as either Natural Selection or Selective Breeding. Finally, explain what you believe to be the reason for each of the genetic changes over time.



Natural Selection or Selective Breeding (circle one)

Changes:

Reason:



Normal Cow



Belgian Blue

Natural Selection or Selective Breeding (circle one)

Changes:

Reason:

Essential Questions

How do genetic traits in populations and species change over several generations?

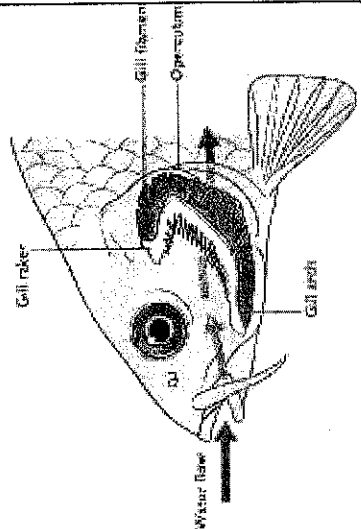
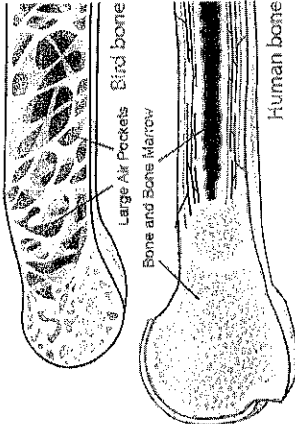
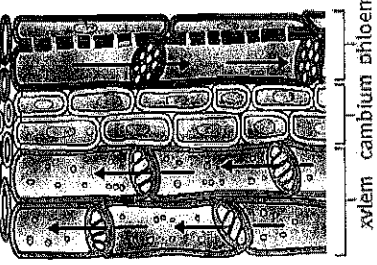
What changes in genetic traits have occurred due to natural selection?

What changes in genetic traits have occurred due to selective breeding?

Essential Question

How do the adaptations of the internal structures of organisms allow for specific functions?

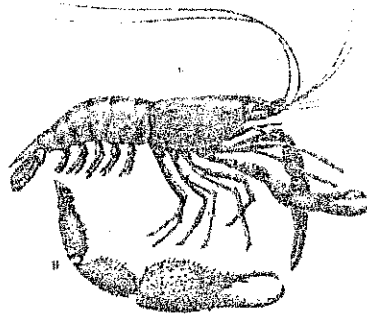
TEKS 7.12A- investigate and explain how internal structures of organisms have adaptations that allow specific functions such as gills in fish, hollow bones in birds, or xylem in plants

		
<p>Fish Gills</p>	<p>Bird Hollow Bones</p>	<p>Xylem flow in Plants</p>
<p>What do gills do to keep fish alive?</p>	<p>How do hollow bones benefit birds?</p>	<p>What is xylem? How does it work to keep plants alive?</p>

TEKS Unit 5: Natural Selection and Adaptations Part 1 DCA Analysis

TEKS	Test Question (Shade # if correct)	My %	Class Mastery %	HMS Mastery %	My Unit Mastery Overall
7.11A I can examine organisms or their structures such as insects or leaves and use dichotomous keys for identification [supporting standard]					%
7.11B I can explain variation within a population or species by comparing external features, behaviors, or physiology of organisms that enhance their survival such as migration, hibernation, or storage of food in a bulb					
7.11C I can identify some changes in genetic traits that have occurred over several generations through natural selection and selective breeding such as the Galapagos Medium Ground Finch (Geospiza fortis) or domestic animals [supporting standard]					
7.12A I can investigate and explain how internal structures of organisms have adaptations that allow specific functions such as gills in fish, hollow bones in birds, or xylem in plants					

1. appendage



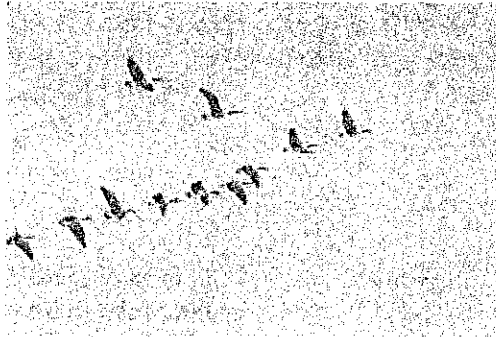
Any structure, such as a leg or an antenna, that grows out of an animal's body

6. external stimulus



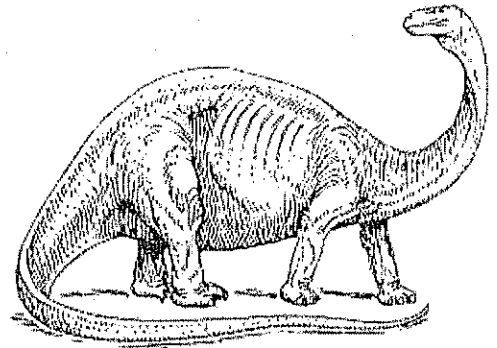
Anything outside the body of the organism that can cause a response in an organism

2. behavioral adaptation



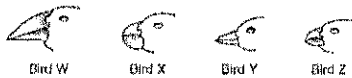
an inherited behavior that helps an organism survive

7. extinction



when a species that no longer has any known living individuals.

3. dichotomous key



Dichotomous Key to Representative Birds	
1. a. The beak is relatively long and slender.....Crows
b. The beak is relatively short and heavy.....go to 2
2. a. The bottom surface of the lower beak is flat and straight.....Crows
b. The bottom surface of the lower beak is curved.....go to 3
3. a. The lower edge of the upper beak has a distinct band.....Carnivorous
b. The lower edge of the upper beak is mostly flat.....Pintails

a key for the identification of organisms based on a series of choices between alternative characters

8. genes

A segment of DNA on a chromosome that codes for a specific trait

4. domestic animals



Those species that have been brought under human control and that have adapted to life with humans

9. geotropism



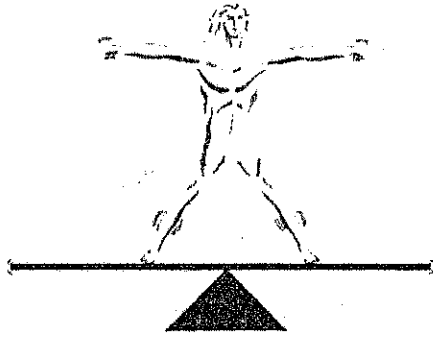
response to earth's gravity, as the growing of roots downward in the ground

5. evolution



A change in a species over time

12 homeostasis



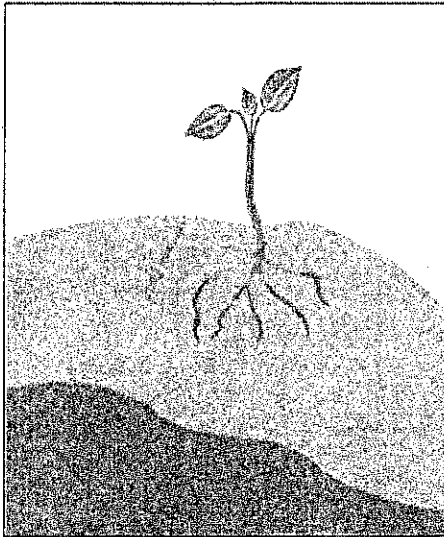
A tendency to maintain a balanced or constant internal state; the regulation of any aspect of body chemistry, such as blood glucose, around a particular level

13 mutation



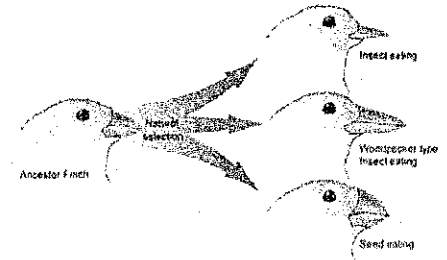
A change in a gene or chromosome.

11 hydrotropism



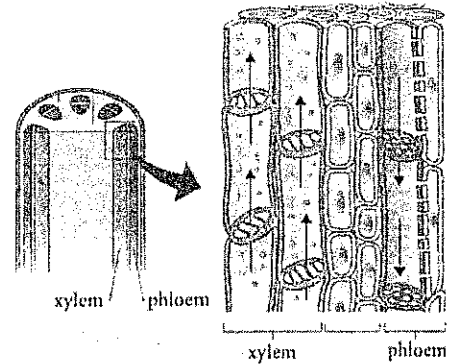
a plants growth response to water; plant grows towards the water

14 natural selection



Changes in genetic traits over many generations based on organism's ability to survive and reproduce.

15. phloem



Elizabeth Morales

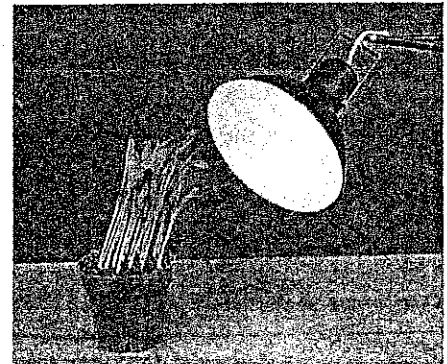
Name the tissue that transports food

14 internal stimulus



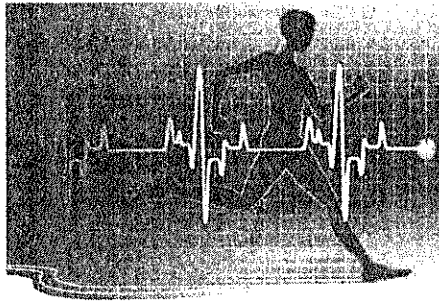
A change from within an organism, such as hunger and thirst, that causes the organism to respond

16. phototropism



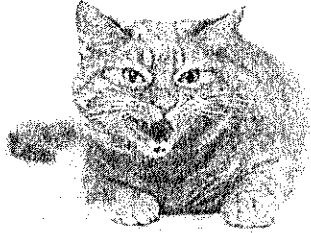
Plant growth in response to light

17. physiology



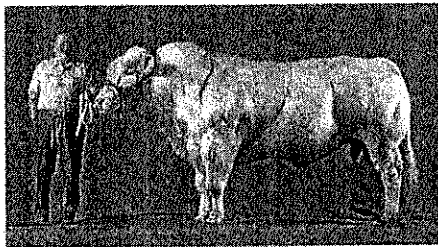
the study of how the physical structures of an organism function

18. response



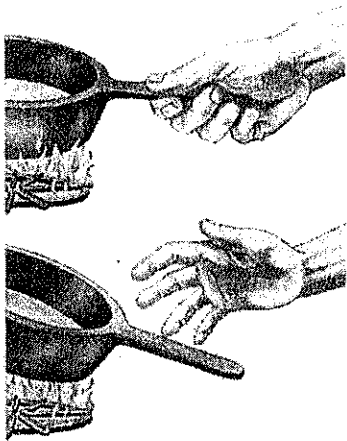
A reaction to a stimulus.

19. selective breeding



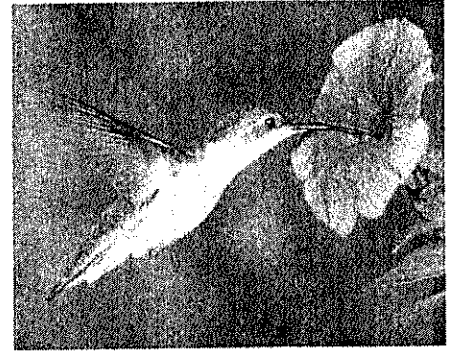
The man-made process of selecting a few organisms with desired traits to serve as parents of the next generation.

20. stimulus



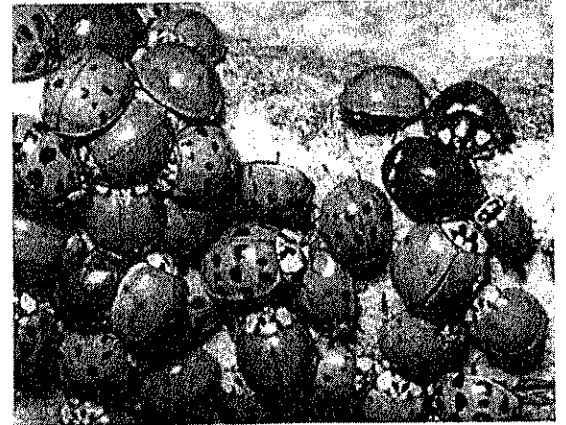
A change in an organism's surroundings that causes the organism to react

21. structural adaptation



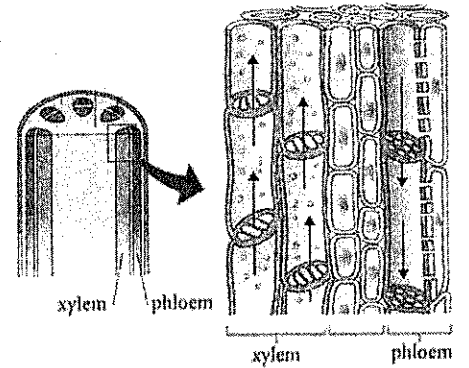
A physical feature that helps an organism survive in its environment

22. variation



Any difference between individuals of the same species.

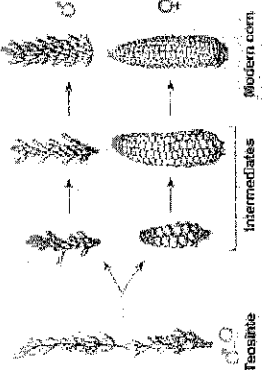

23. xylem



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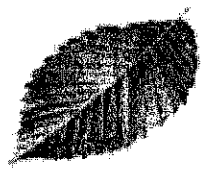
Name the tissue that transports water

Daily Work

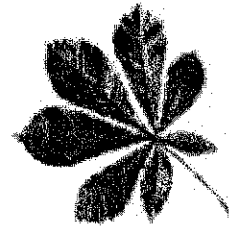
	A	B	C	D	E
1	Define natural selection and give an example of natural selection. _____ _____ _____	The fur of a snowshoe rabbit changes to white during the winter. This change is an example of: a. adaptation b. competition c. metamorphosis	Define selective breeding and give an example of selective breeding. _____ _____ _____	Feathers, wings and hollow bones of birds are examples of _____ a. adaptations in flight b. responses to stimuli c. unnecessary body parts d. reproductive structures	Some kind of fish, like salmon, live most of their lives in salt water but lay their eggs in fresh water. Their ability to survive in several different kinds of environments is an example of _____
2	A walking stick blends in with its environment. Therefore, a walking stick uses _____ to protect itself. A. Deadly toxins B. Warning colors C. Camouflage D. Odors	 <p>The diagram illustrates the evolutionary path of corn. It starts with Teosinte on the left, which has a small, hard-shelled fruit. Through several 'Intermediates', the fruit becomes larger and softer. Finally, it reaches 'Modern corn' on the right, which has a large, soft, multi-corned ear. Arrows indicate the progression from left to right.</p>	What would be the advantage for farmers to manipulate Teosinte to produce Modern corn? _____ _____ _____ Is this natural selection or selective breeding? _____ _____ _____	Why do animals migrate? _____ _____ _____ _____	
3	Which of the following statements listed below BEST supports evidence that owls are nocturnal? a. The shape of its beak b. The size of its eyes c. The thickness of its feathers 	Mudskippers are a species of fish which, over thousands of generations, have developed adaptations that allow them not only to survive outside of the water, but to actually travel from one water source to another. What environmental condition most likely led to these adaptations? A Lower temperatures B Frequent droughts C Larger predators D Increased precipitation	Crickets communicate with other crickets by chirping. Crickets who cannot make a sound are less likely to find a mate and reproduce. For this reason, there are few crickets that cannot make a sound. This is an example of A learned behavior B genetic replication C natural selection D selective breeding	A farmer selectively breeds tomatoes to be shipped in a train to grocery stores all across the United States. The tomatoes need to be healthy when they arrive at the stores. Which of the following genetic traits would it be most important to selectively breed in the tomatoes? a. The flavor of the tomatoes b. The spoiling time of the tomatoes c. The appearance of the tomatoes d. The size of the tomato plants' leaves	

- 1. a. Needle leaves go to 2
b. Non-needle leaves go to 3
- 2. a. Needles are clustered Pine
b. Needles are in singlets Spruce
- 3. a. Simple leaves (single leaf) go to 4
b. Compound leaves (made of leaflets) go to 7
- 4. a. Smooth edged go to 5
b. Jagged edge go to 6
- 5. a. Leaf edge is smooth Magnolia
b. Leaf edge is lobed White Oak
- 6. a. Leaf edge is small and tooth-like Elm
b. Leaf edge is large and thorny Holly
- 7. a. Leaflets attached at one single point Chestnut
b. Leaflets attached at multiple points Walnut

Use the dichotomous key to the left to identify the following leaves:



A.



B.



Which of the following provides the best explanation of why birds have hollow bones?

- A. Hollow bones provide more structure for walking stability.
- B. Hollow bones provide extra storage for food needed by birds in winter.
- C. Hollow bones provide balance so birds can float when swimming in water.
- D. Hollow bones provide strength with less mass.

Classification Key

- 1a Body kite-like in shape Ray
- 1b Body not kite-like in shape Go to 2
- 2a Nose saw-like in shape Swordfish
- 2b Nose not saw-like in shape Go to 3
- 3a Head extended on both sides Hammerhead shark
- 3b Head not extended on both sides Go to 4
- 4a Body has spots Leopard shark
- 4b Body does not have spots Nurse shark



Using the picture and classification key, what is this animal?

- A. Swordfish
- B. Hammerhead Shark
- C. Leopard Shark
- D. Nurse Shark

Animal Traits and Behaviors that Enhance Survival

What We Are Going To Learn:

- What are traits?
- Inherited vs. Learned
- Response to stimuli
- Evolutionary Adaptations
- Natural Selection and Selective Breeding



What We Are Going To Learn:

- _____
- **Inherited vs. Learned**
- _____
- **Evolutionary Adaptations**
- **Natural Selection and Selective Breeding**

What is a Trait?

Write down on your own paper what you think a trait is. You may give an example as well.



When the teacher tells you to, share your definition with your neighbor.

Discuss what you both have written down and re-write your definition if you and your partner come up with something better.



What is a Trait?

Discuss what you both have written down and re-write your definition if you and your partner come up with something better.

What is a Trait? Cont.?

Do you come up with something like this?

- A characteristic of some organism, like how it looks or acts.
- Can be passed down from parents to offspring = (inherited)
- Can be learned
- Allows organism to survive and reproduce in its environment in which it lives.

Add this information to your definition if you do not have it.



- A characteristic of some organism, like how it looks or acts.
- Can be passed down from parents to offspring = (inherited)
- Can be learned
- Allows organism to survive and reproduce in its environment in which it lives.

Inherited vs. Learned

What do we mean when we say inherited?

- Whom are traits inherited from?
- How are they passed down?

Give some examples of things you inherit:

- Looks
- Behavior



Inherited vs. Learned

What do we mean when we say inherited?


- Whom are traits inherited from?
- _____
- How are they passed down?
- _____

Learned Behaviors

What are some things you are NOT born knowing?

List some items you must learn and share with a partner to see if you come up with some similar or different ideas.

Share your thoughts with the class.



– Give some examples of things you inherit:

- Looks...
- Behaviors...



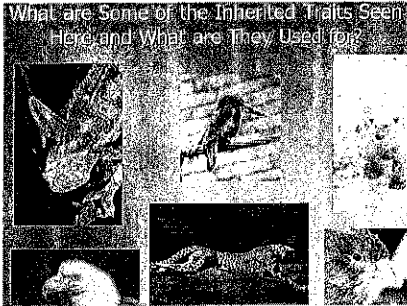
■ Learned Behaviors

What are some things you are NOT born knowing?

– List some items you must learn and share with a partner to see if you come up with some similar or different ideas.

What are some of the Inherited Traits Seen Here and What are They Used for?


What are Some of the Inherited Traits Seen Here and What are They Used for?



Animal Behaviors: Learned vs. Instinct

Discuss the following pictures and label them on your paper as learned or instinct. Some may be both, be able to explain.

Be able to share your thoughts on how or why you labeled them.



■ Animal Behaviors: Learned vs. Instinct:

Discuss the following pictures and label them on your paper as learned or instinct. Some may be both, be able to explain.

3 Bears _____

Raccoon _____

Elephant _____

Bear _____

■ A Few More Behaviors to Discuss:

How would you explain the last three pictures on this page? Instinctive or Learned behaviors?

Chimp _____ Why? _____

Opossum _____ Why? _____

Orcas _____ Why? _____

■ Other Instinctual Behaviors:

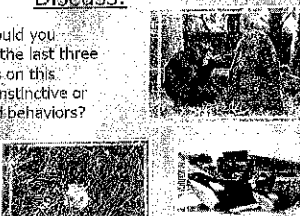
■ Fight or Flight response:

– When startled by an _____ the animals _____ behavior will be triggered.

A Few More Behaviors to Discuss:

How would you explain the last three pictures on this page? Instinctive or Learned behaviors?

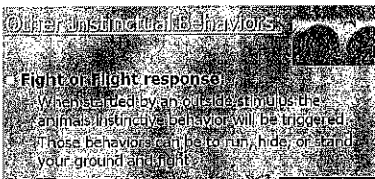
Why?



Other Instinctual Behaviors:

Fight or flight response

When startled by an outside stimulus the animals' instinctive behavior will be triggered. These behaviors can be to run, hide, or stand your ground and fight.



- Those behaviors can be to _____, hide, or _____ your ground and fight

Some Other Behaviors: Living in herds and packs vs. living solitary lives

Three reasons to live in herds or packs:

1. _____
2. Hunting packs- more efficient at _____
3. Reproductive Efficiency – _____ found within pack or herd

Solitary Lives:

Why do some animals live solitary lives?

- Some animals live alone because there are _____ enough _____ to support more than one animal in the territory (i.e. food, shelter, etc)

Predator vs. Prey:

Most prey animals live in _____, packs, schools (fish), herds, for _____, finding of resources and reproducing;

Some do live solitary lives. Where these animals live determines how they live...can you look at the pictures below and conclude why?

Some prey animals react to a predator very differently from other prey animals.

Predator vs. Prey continued:

Predator animals can either live _____ lives or live in _____.

They live in packs not for protection like prey animals, but for easier _____ and reproducing.

Some predator animals do live in social or _____ groups as well (such as chimpanzees and apes).

Behavioral Differences Between Male And Female Animals?

Female animals: tend to _____ of the young, can lead the herd/pack and be the hunters/gatherers of the pack/herd and watch/listen for danger.

Male animals: In some cases lead, watch for _____ but in most cases they must fight off other males who may want the females of the pack/herd for reproducing and thus the passing on of his traits. The stronger male wins, which means the stronger traits get _____ on.


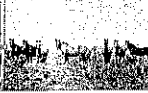
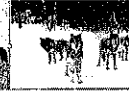
There are Alpha males and females in all packs/herds. What is the difference between them and non-alpha animals?

Some Other Behaviors:

Living in herds and packs vs. living solitary lives

Three reasons to live in herds or packs:




- Protection from predators
- Hunting packs- more efficient at capturing prey
- Reproductive Efficiency – mates found within pack

Solitary Lives

Why do some animals live solitary lives?

Some animals live alone because there are not enough resources to support more than one animal in the territory (i.e. food, shelter, etc)


Predator vs. Prey:

Most prey animals live in social groups, packs, schools (fish), herds, for protection, finding of resources and reproducing.

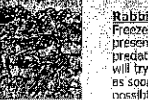
Some do live solitary lives. Where these animals live determines how they live...can you look at the pictures below and conclude why?

Some prey animals react to a predator very differently from other prey animals

Horses: Run away from predator



Rabbits: Freeze in the presence of a predator, and will try to hide as soon as possible.


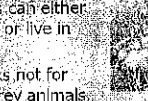



Predator vs. Prey continued:

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Female animals: tend to take care of the young, can lead the herd/pack and be the hunters/gatherers of the pack/herd and watch/listen for danger.

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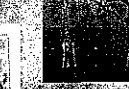




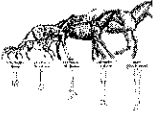
Changes Over Time!!

Evolutionary Adaptations

What can cause changes in animal behaviors or genetic traits?


Changes Over Time Continued:



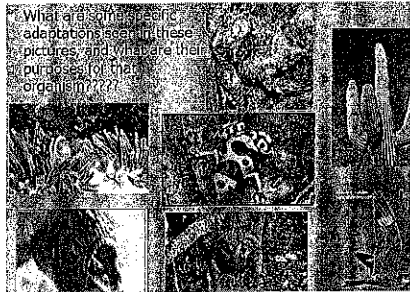
Evolutionary Adaptations are the changes that occur over long periods of time.
 Adaptations are changes made by organisms in response to the environment. (external stimuli)
 If an organism can survive without needing to change/adapt anything about itself then it will. Example, armadillos, many insects, fish...
 However, some organisms must adapt to environmental changes or risk the chance of extinction.

Changes Over Time!! Evolutionary Adaptations

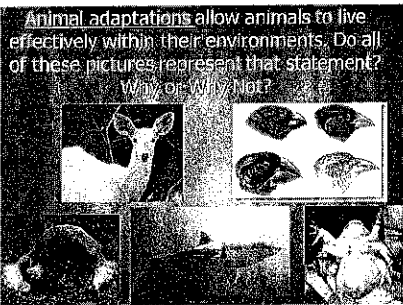
What can cause changes in animal behaviors or genetic traits?

Evolutionary Adaptations are the changes that occur over _____ periods of time.

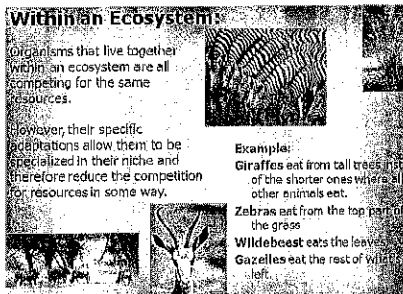
- _____ are changes made by organisms in response to the environment. (external stimuli)
- If an organism can survive without needing to change/adapt anything about itself then it will. Example, armadillos, many insects, fish...
- However, some organisms must adapt to environmental changes or risk the chance of _____.



What are some specific adaptations seen in these pictures, and what are their purposes for that organism?



Animal adaptations allow animals to live effectively within their environments. Do all of these pictures represent that statement? Why or Why Not?



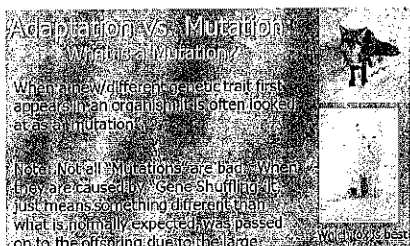
Example:

Giraffes eat from tall trees instead of the shorter ones where all other animals eat.

Zebras eat from the top part of the grass
Gazelles eat the rest of what's left.

Wildebeest eats the leaves,

Gazelles eat the rest of what's left.



Adaptation vs. Mutation:

What is a

Mutation?

- When a _____/_____ genetic trait first appears in an organism it is often looked at as a "mutation".
- Note: Not all "Mutations" are bad. When they are caused by "Gene Shuffling" it just means something different than what is normally expected, was _____ to the offspring due to the large amount of _____ combination possibilities.

Adaptations/Mutations:

If the "mutation" allows for the organism to survive and reproduce it may become a new trait and in fact it may create a new species with those traits being important/necessary for their survival. Competition for resources and the ever changing environment calls for organisms to change if they are going to survive and continue in the future.

Adaptation/Mutation Continued:

If a mutation is caused by some sort of outside interference like air pollution, then severe mutations can occur and they may in fact be harmful to the organism. These types of mutations are different than a gene shuffling mutation caused by the different DNA possibilities of the parents without such outside interference.



A piglet was born with three eyes and two mouths. The piglet was among eight newborn piglets at Liu Dingling's farm in Chongren County, Zhejiang province. A local vet said the abnormality may have been caused by genetic mutation or feed pollution. China suffers heavily from environmental pollution.

Adaptations/Mutations:

If the "mutation" allows for the organism to _____ and _____ it may become a new trait and in fact it may create a new _____ with those traits being important/necessary for their _____.

_____ for resources and the ever changing environment calls for organisms to change if they are going to survive and continue in the future.

Adaptation/Mutation Continued:

If a mutation is caused by some sort of outside _____ like air pollution, then severe mutations can occur and they may in fact be harmful to the organism.

These types of mutations are different than a _____ mutation caused by the different DNA possibilities of the parents without such outside interference.

Adaptation/Mutation Student Break:

Take a moment and come up with some examples of possible mutations that are due to interference with the growth of the organism and what the causes may have been and come up with some examples of mutations caused by gene shuffling that may get passed on as a new trait.

Just Some Cool Animals You May Not Know About:

What do you think their adaptations are for?

Natural Selection: These pictures show variation in species in big cats and owls.

Natural Selection:

All organisms need to reproduce to survive. The successful organisms pass on the genetic information of the surviving species from *generation* to generation.

Adaptation/Mutation Student Break:

Put your thinking cap on!

- Take a moment and come up with some examples of possible mutations that are due to interference with the growth of the organism and what the causes may have been and come up with some examples of mutations caused by gene shuffling that may get passed on as a new trait.

Just Some Cool Animals You May Not Know About:

What do you think their adaptations are for?

Look them up and check them out!

Natural Selection: These pictures show variation in species in big cats and owls.

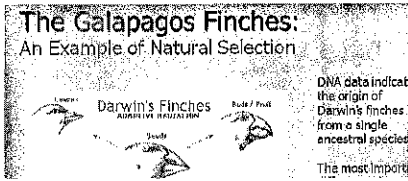
Natural selection is considered to be the big factor resulting in the diversity of species (speciation).

Natural Selection:

All organisms need to reproduce to survive. The successful organisms pass on the genetic information of the surviving species from *generation* to *generation*.

This 'weeding out' of the less suited organisms and the reward of survival to those better suited led Darwin to conclude that species evolve different times and places and his survival of the fittest.

■ The Galapagos Finches:
An Example of Natural Selection



What is Selective Breeding?

Angora Rabbits - bred for soft fluffy fur. Used in clothing.

The toughest Horses - bred for speed.

Breeders of animals and plants in today's world want to produce organisms that will possess the most desirable characteristics. What are desirable characteristics?

So how do you think they make plants and animals with all the best characteristics?????

Corn - new hybrids created to be high producing, drought resistant, and disease resistant.

Selective Breeding

This process of selecting the best parents is called artificial selection or selective breeding.

Specific plants or animals with specific traits are crossed to get offspring with the same desirable traits.

In Conclusion:

- Adaptations can be both how an organism looks and how it acts.
- Adaptations are how a population becomes better suited to live in its environment. They can be random at times and thus called mutations at first.
- Natural Selection - Organisms with the most favorable traits survive in the natural environment and reproduce most successfully.
- Selective Breeding - People picking only the traits they like to be passed on.

What is Selective Breeding? _____

Breeders of animals and plants in today's world want to produce organisms that will possess the most desirable characteristics. What are desirable characteristics?

So how do you think they make plants and animals with all the best characteristics?

Selective Breeding:

This process of selecting the "best" parents is called _____ or selective breeding.

Specific plants or animals with specific _____ are crossed to get offspring with the same desirable traits.

In Conclusion:

_____ can be both how an organism looks and how it acts.

Adaptations are how a population becomes better suited to live in its _____. They can be random at times and thus called _____ at first.

Natural Selection -- Organisms with the most favorable _____ survive in the natural environment and _____ most successfully.

Selective Breeding -- _____ picking only the traits they _____ to be passed on.



Natural Selection in Peppered Moths

You have read that favorable adaptations enable a species to survive within its environment. When something within the environment changes, the species must adapt or die out. Those species able to adapt are said to be “selected” by the environment or by nature. This process is called natural selection.

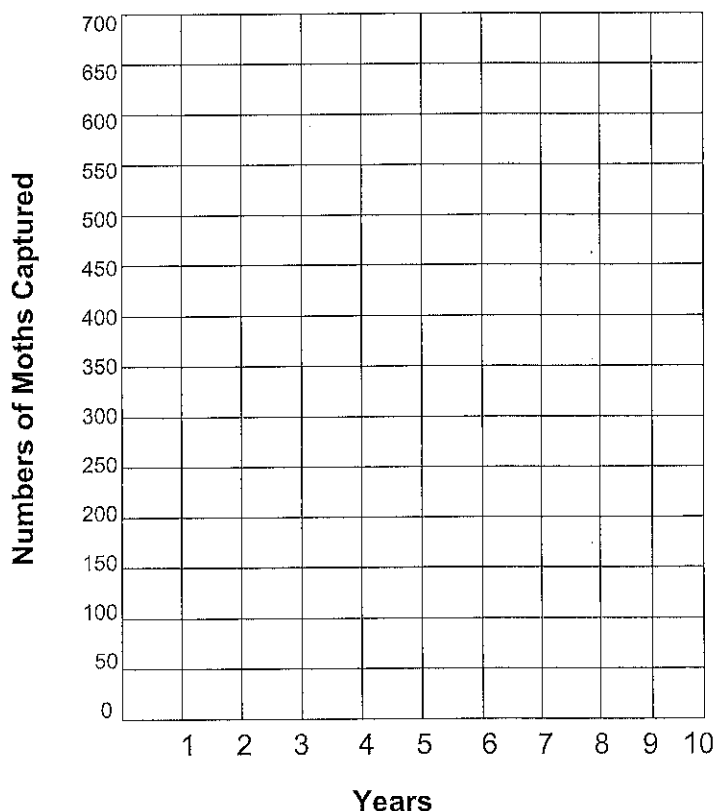
The environment may change due to natural events such as a forest fire, a volcanic eruption, or a change in climate. Humans and human activities may also change the environment. One such change occurred near Manchester, England, between 1845 and 1890. This change affected a population of peppered moths.

Before the Industrial Revolution, the trees in the forests near Manchester were light grayish-green in color due to the lichens growing on the tree trunks. Peppered moths that lived in the area were also light colored. Their color served to camouflage the moths when they landed on the tree trunks. The light-colored moths were not easily seen by birds that preyed on the moths.

As the revolution progressed, the trees became dark with soot from the nearby factories. In 1948, the first dark-colored moth was observed. Over a period of 45 years, the peppered moth population changed to a mostly dark colored species. Today, 90% or more of the peppered moths are dark in color.

Table A shows the results of a ten-year study of peppered moths. Study the table, then make a graph of the two populations. Use two different colors to graph the populations of moths.

Year	Number of Light Moths Captured	Number of Dark Moths Captured
1	556	64
2	537	112
3	484	198
4	392	210
5	246	281
6	225	357
7	193	412
8	147	503
9	84	594
10	56	638



Directions: Answer the questions in complete sentences.

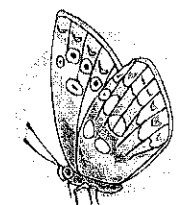
1. How did the populations of moths change in the ten-year period represented on your graph?

2. Give a reason for this change.

3. What is the "variation" in the moth population that first appeared in 1948?

4. How is dark color in peppered moths an advantageous adaptation?

5. How is the change from a light - colored population to a dark - colored population an example of natural selection?



Evolution Lab

Purpose:

We will study Darwin's steps of evolution by simulating the evolution of nine different make-believe organisms that feed on beans. Each organism has evolved a special structure that it uses to pick up beans. However, the easy days of bean picking are now over. A succession of droughts has greatly reduced the number of beans available for food, and every generation has many deaths due to starvation. We will assign students to play the roles of these bean-eating creatures and collect information on their survival and evolution over time.

Procedure:

Step #1: Variation exists within species.

The nine different variations that bean-eating creatures have for collecting beans are listed below:

<u>Creature name</u>	<u>Object used to collect beans</u>
A. Forkies	forks
B. Spooners	spoons
C. Forcepies	forceps
D. Knifers	knives
E. Tongers	tongs
F. Pinnerers	clothespins
G. Scissorheads	scissors
H. Choppers	chopstix
I. Strawsies	straws

Step #2: All organisms compete for limited natural resources.

Two student members of each species will use only their special adaptations to collect beans for 30 seconds. (the 30 second collection period will represent a "generation.") Because some adaptations are better than others, not everyone will obtain the same amount of food. At the end of the 30 seconds, student counters will count the number of beans collected by each species.

Step #3: Organisms produce more offspring than can survive.

Because the environment is limited in how many organisms it can support, the person with the lowest number of beans collected each generation dies. This person will sit down and his/her place will be taken by a new member of the species that collected the most beans.

Step #4: Natural selection: the environment selects organisms with the most beneficial traits.

The number of students in each species will change as time goes on. Eventually, only the best adapted species will survive, and all others will become extinct. Only the most fit will have survived!

Data Collection:

Each person watching the action must count the number of live persons representing each species at the start of each generation. The student counters will keep records of the number of beans collected by each species, and report their data to the teacher. You can copy the bean data at the end of the lab.

Data Table

Number of persons living (#P): Top space

Number of beans collected (#B): Bottom space

Species		Generation Number							
		1	2	3	4	5	6	7	8
A. Forkers (forks)	#P								
	#B								
B. Spooners (spoons)	#P								
	#B								
C. Forcepies (forceps)	#P								
	#B								
D. Knifers (knives)	#P								
	#B								
E. Tongers (tongs)	#P								
	#B								
F. Pinners (clothespins)	#P								
	#B								
G. Scissorheads	#P								
	#B								
H. Choppers (chopstix)	#P								
	#B								
I. Strawsies (straws)	#P								
	#B								

Analysis:

You will have two graphs to prepare to analyze your data. **Be sure each graph has all 5 items listed below!** HINT: make sure your graphs are large; you will need room for **9 lines** on each graph.

Graph A:

1. Title: "Changes in Population Size of Nine Species of Bean Eaters"
2. Side line (Y axis): Number of Persons Alive
3. Bottom line (X axis): Generation Number
4. Lines: the graph will have 9 lines, one for each species. Label each line with the species name.
5. Conclusion: state which species was the most fit and which species was the least fit.

Graph B:

1. Title: "Food Collecting Ability of Nine Species of Bean Eaters"
2. Side line (Y axis): Number of Beans Collected
3. Bottom line (X axis): Generation Number
4. Lines: the graph will have 9 lines, one for each species. Label each line with the species name.
5. Conclusion: state which species was the best at collecting food and which species was the worst.

Conclusion:

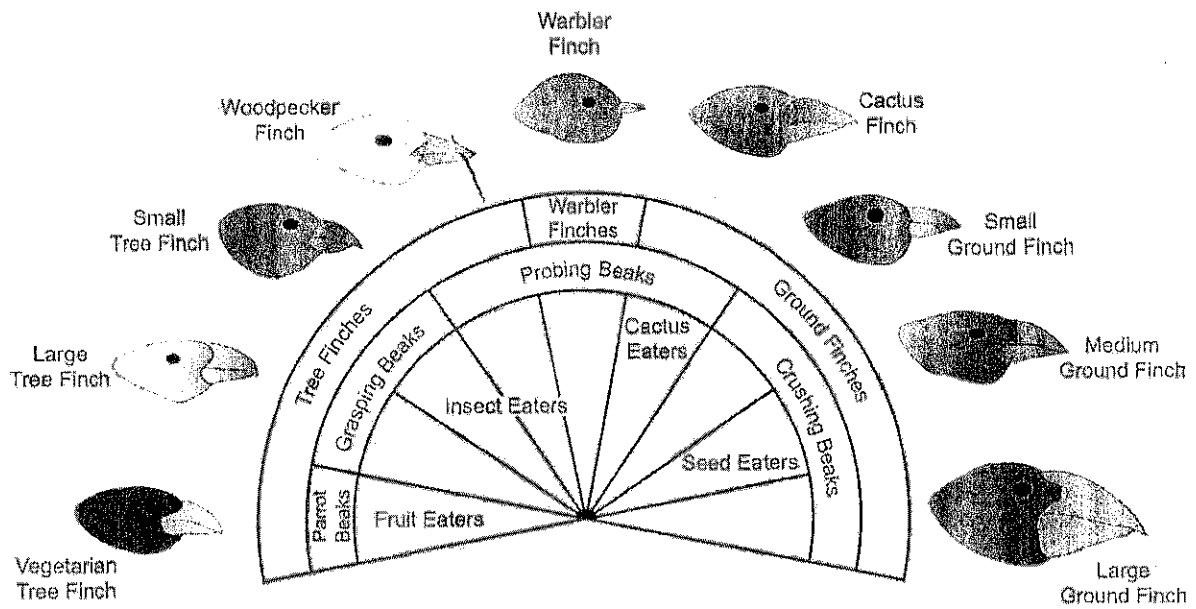
Based on the results displayed on your two graphs, explain the relationship between the ability to gather food and the ability to survive. (1 paragraph).

WHAT YOU ARE TURNING IN FOR YOUR LAB REPORT:

For this lab, you will be writing a formal lab report. Your report must be typed, and it must follow the format below:

1. Purpose – a sentence or two explaining why we did this lab, what we are trying to learn from the lab.
2. Materials – a list of all the materials needed for the lab.
3. Procedure – directions for completing the lab. A procedure should be very specific, so that anyone reading your lab report could be able to follow the directions to complete the lab.
4. Data – fill in the data table with the data we collected during class.
5. Analysis – your two graphs. Make sure you follow the directions!!! These should be LINE graphs, NOT bar graphs.
6. Conclusion – a paragraph (5 sentences – topic sentence, 3 concrete details, and concluding sentence). The prompt is written above.

Organisms and Environments
TEKS 7.11 C
Concept: Natural Selection



Seeds are the major food source for the finches of the Galapagos Islands. Extremely dry conditions increase the population of plants with large seeds and decrease the population of plants with small seeds. Only finches with large beaks are able to crack and eat the large seeds.

During periods of drought, which of the above finches are most likely to survive? How will this affect the finch populations? Explain your answer.

During periods of normal rainfall, which finches are more likely to survive? How will this affect the finch population?

Organisms and Environments**TEKS 7.11 C****Concept: Natural Selection**

Read the passage below and answer the following question.

A rodent species migrates to a mountainous environment with mild summers and cold winters. Most of the rodents have a short, smooth coat, but some of the rodents have a longer, fluffy coat. Many of the smooth-coated rodents die the first winter because they cannot protect themselves from cold temperatures.

The rodents with longer, fluffy coats are able to stay warm and search for food during the winter, increasing their chances for survival and reproduction. More and more offspring are born with long, fluffy coats. Over time, the population of rodents with long, fluffy coats increases, while the smooth-coated rodent population decreases. Gradually, the smooth coats become a rare trait of this rodent species.

What changes in genetic traits have occurred in this rodent species? Why?

Evolution of the dogs

Ever wonder how your dog evolved? There are more than 350 different breeds of dog, each one--from the Chihuahua to the Great Dane--descended from the grey wolf.

The domestication of dogs by man dates back at least twelve thousand years. Domestication of the wolf may have begun with orphaned wolf cubs brought into villages and raised by children. Ancient man may have also started the domestication process by befriending wolves which helped them hunt and drive herds.

There were advantages at that time to having semi-tame wolves. The acute hearing of the wolf would alarm humans of imminent danger at night, for example. However, as civilization evolved, the jobs of dogs became more varied and specific; as a result, different breeds were created to handle different jobs. Selective breeding has allowed human manipulation to create the traits that you see in dogs today, such as the pushed-in face of the pug, or the speed of the greyhound to catch its prey.

Regardless of how far your dog has evolved from its ancestor, there is still a great deal of wolf present in the domestic dog. Dogs are still genetically wolves, and they share seventy-eight chromosomes. The two species are still able to cross-breed, creating the wolf hybrid, which (unlike the mate of a horse and donkey, a mule) is not sterile.

Besides the physical similarities, there are many behaviour similarities between the wolf and the dog. Wolves and dogs live in pack societies. They have group rituals such as greetings, feeding, playing, mating, and hunting. Both communicate with other pack members through facial expressions and body movements; vocalizations such as growls, howls, and whines are used. Leading each pack is a dominant male or female. This dog or wolf is known as the alpha. The alpha leads by example, and other pack members show their respect by submission. You may have witnessed this in your own house if you have more than one dog. A dog may cower when faced with another dog, or its hair may stand up (the technical term for this phenomenon: piloerection).

In creating the domestic dog, humans have retained some wolf characteristics. Dogs retain much of the territorialism of wolves and the suspicion of strangers, making dogs effective guardians of our selves and property. The dog has also retained the ability to follow a creature's scent through the forest, and breeding has in some cases actually improved that--the bloodhound, for example. Most dogs are also excellent hunters, which may be a characteristic of the wolf that has stayed genetically stable in the dog.

In contrast, a wolf is unlikely to accept new pack members as well as a dog will accept them. Wolves also will generally act shyly around humans. A wolf never bonds to humans very well, even when raised by people from birth, and is not as trainable. It is true that wolves or wolf hybrids may form emotional bonds with their human companions, but they will also maintain their own autonomy and may never heed a single command given by the human owner. This is why most knowledgeable authorities recommend not buying a wolf or wolf hybrid pup.

Over the thousands of years, we have shaped dogs through breeding into dogs with floppy ears, sleek coats, and short noses--exactly the opposite of their distant ancestor. We have created dogs to suit our needs. However, if you look closely into your dog's eyes, you may realize you are looking into the eyes of a wolf.

Dog Breeding

Ever wonder how your dog evolved? There are more than 350 different breeds of dog, each one--from the Chihuahua to the Great Dane--descended from the grey wolf.

Over the thousands of years, we have shaped wolves through breeding into dogs with floppy ears, sleek coats, and short noses--exactly the opposite of their distant ancestor. We have created dogs to suit our needs. This process of breeding dogs for different useful characteristics is called **selective breeding**.

You will be given a picture of a dog. Answer these questions about the dog:

1. What useful characteristics does the dog have?
2. Write down the reasons why the dog was bred in the past e.g. hunting, companionship?
3. Give some reasons why the breed is still popular today.

Now you will do some selective breeding. As a class share your breeds of dog and decide what two dogs you will breed to create a new breed of dog that will suit these jobs:

1. Dog needed for racing. Must be very fast but medium sized (50cm tall). An enthusiastic worker and also a good hunter.
2. Very intelligent dog that has an excellent sense of smell needed. Must be a large dog (65cm tall) and live a long life (more than 12 years).
3. Large (60cm tall), strong, muscular dog wanted for large game hunting. Must be able to work in a team and be away from home for long periods of time.
4. Kind, patient, good-looking, long-haired dog wanted. Preferably light coloured fur and large (65-70cm tall). Must be easy to train, obedient and able to get on with other people including children and strangers.
5. Large dog (65-70cm tall), must like water and be a good swimmer and hunter. Must have good stamina and be an excellent guard-dog.
6. Small (35-40cm tall) very friendly dog required as a companion to children. Long white hair preferable. Needs to be welcoming to strangers and able to live outside.
7. Dog required that must be an excellent hunter (very fast) and retriever of game. Must be medium sized (around 55cm tall) with a short haired coat and definitely not slobber or smell.

Why do Animals Migrate?

Species Name	Draw the species	Why do they migrate? (choose one from list)	Interesting fact about the species migration
1. Red Crab			
2. Whooping Crane			
3. Spiny Lobster			
4. Monarch Butterfly			
5. Green Sea Turtle			
6. Penguin			
<p>Pick one: Wildebeest Grey Whale Salmon</p>			

Plant Adaptations

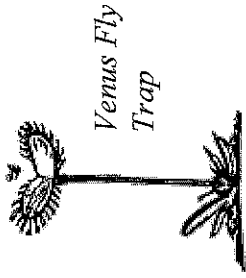
Name: _____ Per: _____

Fill in the definitions.

Adaptation = _____

Survival Adaptation = _____

Reproductive Adaptations = _____




Type of Plant:	Type of Plant:	Type of Plant:	Type of Plant:	Type of Plant:
Sketch & description of adaptation(s):	Sketch & description of adaptation(s):	Sketch & description of adaptation(s):	Sketch & description of adaptation(s):	Sketch & description of adaptation(s):

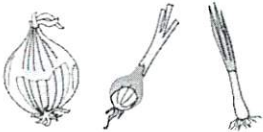
Organisms and Environments
TEKS 7.11 B
Concept: Variations Within Species

Populations of organisms have small differences, called variations, that enhance the organism's chances of survival. Read about the variations of each organism and answer the questions.


Seed dispersal is vital to successful plant survival. Which of the following seeds from the same plant is best adapted for seed dispersal by wind? Circle the seed and explain your answer choice.

	
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Bulbs provide storage for food in plants. Circle the bulb that enhances the chances of survival for an onion plant. Explain your answer choice.

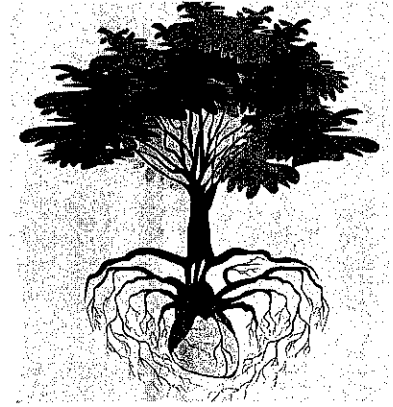
	
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The following butterflies are the same species, but each looks a little different. Circle the butterfly that will most likely survive to pass those traits to its offspring. Explain your answer choice.

	
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(26)

Xylem Investigation: Student Directions



Prediction:

Plants and trees obtain water from the soil by their roots. Photosynthesis takes place in the leaves of these plants using the water obtained by the roots. But how does the water get to the leaves from the roots? Make a prediction of how you think water travels from the roots of a plant to the leaves.

Materials:

- A cutting from a celery stalk
- Hand lens
- Red or blue food coloring
- A plastic cup
- Scissors
- Water
- Masking tape
- Permanent marker

Safety! What are the safety concerns for this investigation?

Part One – Stem Preparation

1. Obtain a cup and plant cutting from your teacher.
2. Label your cup using a piece of tape. Write your name, your partner's name and period on the cup.
3. Place approximately 2.5 cm of water in the bottom of your cup and add 3 drops of food coloring.
4. Place your cutting of a plant into your cup and let it sit overnight.

Part 2 – Xylem Investigation

1. Answer the following questions:

A. What is xylem?

2. Remove your cuttings from the colored water.

A. What has happened to the stems?

B. Are there any other observable changes in the plants?

3. Draw a diagram of your observation in the space below and write a sentence about your observations under the diagram.

Follow-up and Discussion and Demonstration:

Answer the following questions.

1. We know that the water travels up a plant through straw-like tubes called xylem. What does xylem do to help the plant survive?

2. What process occurs in the leaves that calls for water? Explain the importance of this process.

Plants are producers. They make their own food through the process of photosynthesis which produces glucose. This process takes place in the leaves where chlorophyll is present and sunlight can be absorbed. The glucose has to travel to every plant cell to keep them alive. The phloem serves a transport system to deliver the glucose to each cell. Have you ever heard of tree sap? The phloem is responsible for the transport of the sap.

3. How does the food made in the leaves travel down to the roots of the plant? _____

4. How are the xylem and phloem structural adaptations of a plant?

5. Fully submerged water plants do not have fully formed xylem. Why do you think this is so?

Name: _____

COMPARING A HUMAN AND AVIAN SKELETON

The avian (bird) skeleton has many features that resemble the human skeleton, and the majority of the bones are the same, they are only shaped different. When structures are similar in different organisms, they are called homologous. The main difference between the human and bird skeleton is that the bird's skeleton is adapted for flight. For instance, the bones of a bird are hollow which makes the skeleton lighter. The collarbone of the bird is fused for stability and is called the furculum. Color the bones as indicated below.

The arm bones of the human consist of the humerus, the radius and the ulna. These bones are also found in the bird. On both skeletons, **color the humerus (G) pink. Color the radius (F) green and the ulna (E) light green.**

The leg consists of a long femur which attaches to the pelvis and then two bones of the lower leg. In the bird, these two bones: the tibia and fibula are fused together. In humans, they are separated. You are probably familiar with the tibia of the bird, that's the part you eat called the drumstick. When you eat the thigh of the bird, the bone within it is the femur. On both skeletons, **color the pelvis (M) yellow, the femur (N) orange, and the tibia (O) light blue.** On the human only, **color the fibula (P) dark blue.** Also on the human skeleton, the patella, also called the kneecap is visible. **Color the patella (S) green.**

The head of both birds and humans is protected by a large cranium. The upper jaw of the human, and the upper beak of the bird is composed of a bone called the maxilla. The lower jaw, and lower beak is composed of a bone called the mandible. On both skeletons, **color the cranium (A) red, the maxilla (B) grey, and the mandible (C) pink.**

The differences between the bird and human skeleton are very apparent in the pectoral girdle, which is the place where the forelimbs attach to the spine. The bird's forelimbs are wings and must have a strong support system. The collarbone of the bird is fused to form the furculum, or wishbone. The "shoulderblade" of the human is actually a bone called the scapula, birds have a scapula and they also have an additional shouldblade bone called the corocoid. **On both skeletons, color the scapula (K) dark brown. On the bird, color the fuculum (J) black and the corocoid (L) light brown. On the human, color the collarbone (J) black.**

Another obvious difference between the human and bird skeleton is the shape and size of the sternum. A bird's sternum is large and positioned under the body - flight muscles attach to this bone. The ridge of the bird's sternum is called a keel. The ribs are attached to the spine and to the sternum. On both skeletons, **color the sternum (H) red and the ribs (R) blue.** On the bird, trace the edge of the sternum in **green to show the keel (I).**

The vertebrae of the bird and human is similar except for the bone where the tail feathers attach, called the pygostyle. Humans have a tailbone that is similar, but it is not pictured. **Color the vertebrae (D) yellow and the pygostyle (Q) purple.**

Questions _____

1. Define homologous.

2. Name two ways in which the bird's skeleton is adapted for flight.

3. What bone is the drumstick? _____ What bone is the wishbone?

4. What two bones make up the bird's beak? _____

5. What bones make up the bird's forelimb?

6. What bones make up the bird's hindlimb?

7. What bone in the bird is homologous to the human's collarbone?

8. The tailfeathers attach to what bone? _____

9. List two bones you will find in a bird, but not in a human.

10. List two bones you will find in a human, but not in a bird.
