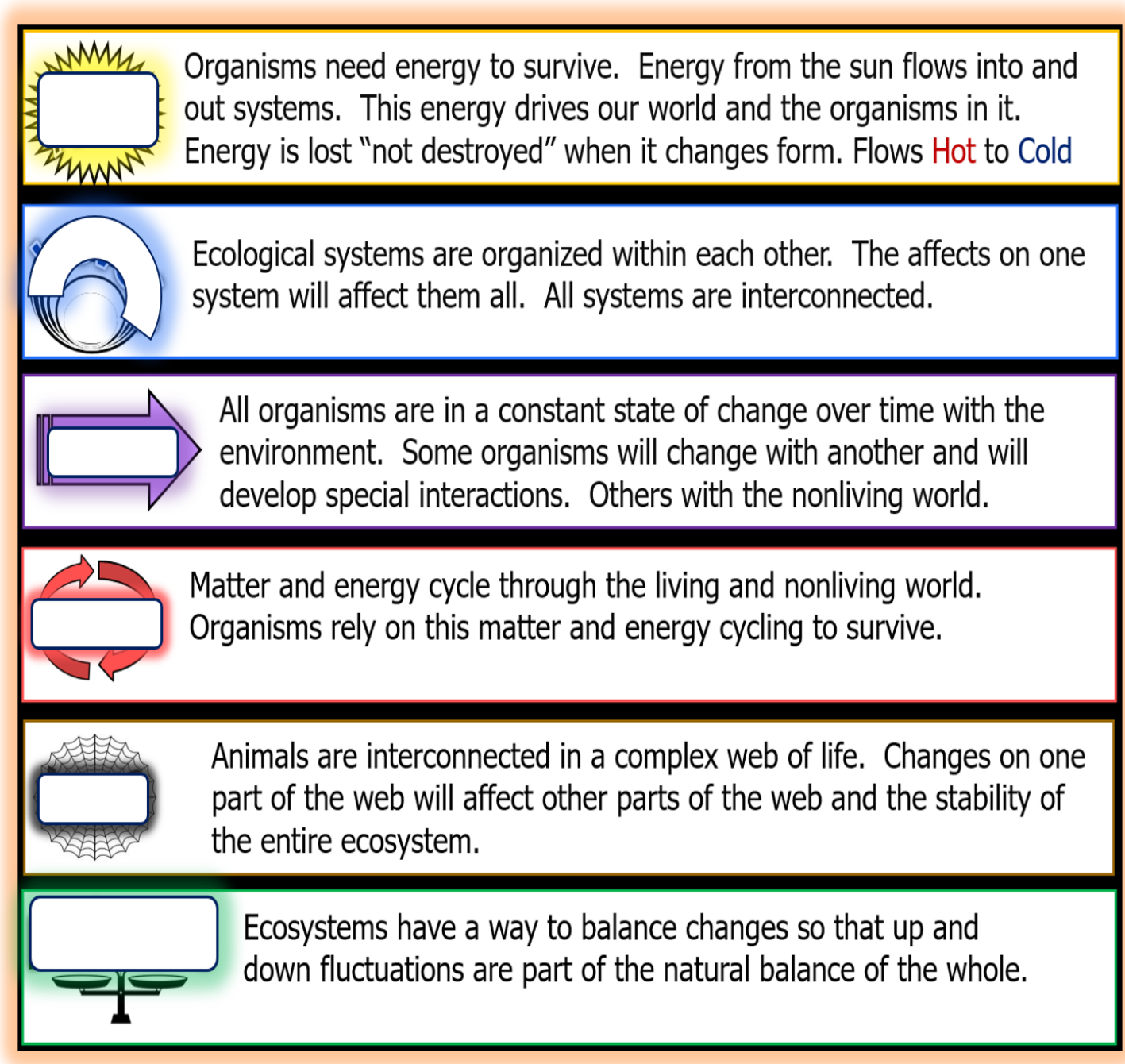
Part 1 Abiotic Factors

Name:

Part 1 Lesson 1

Ecology: A study of the relationship between _____things and the _____.

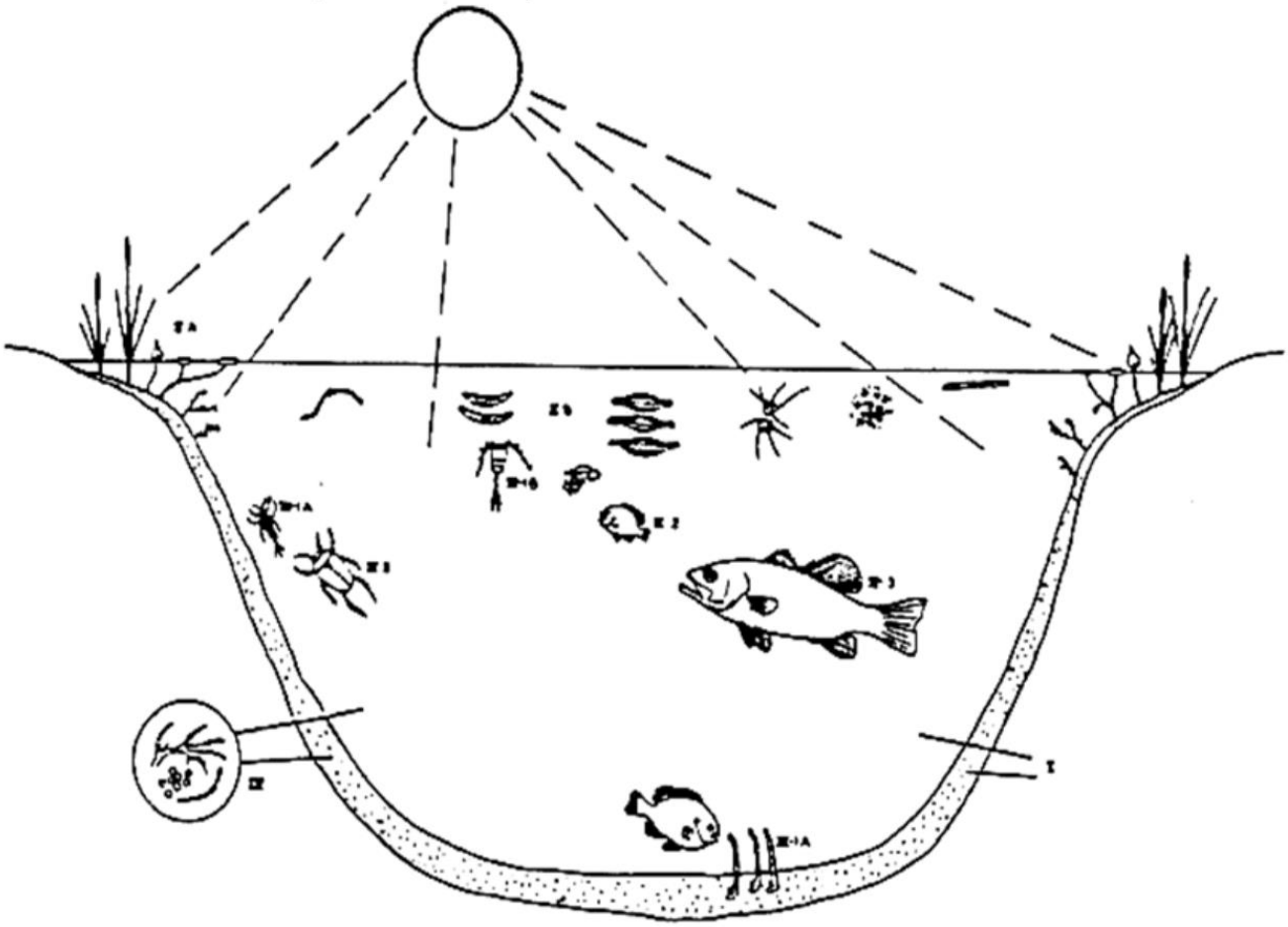


Concept: Everything is connected to the _____ environment.

_____: All non-living chemical and physical factors in the environment.

_____: Of, pertaining to, or produced by life or living organisms.

Please put red colored circles around the biotic components, and blue colored squares around the abiotic components of the picture below.



The big seven abiotic (non-living) factors that we will study include…

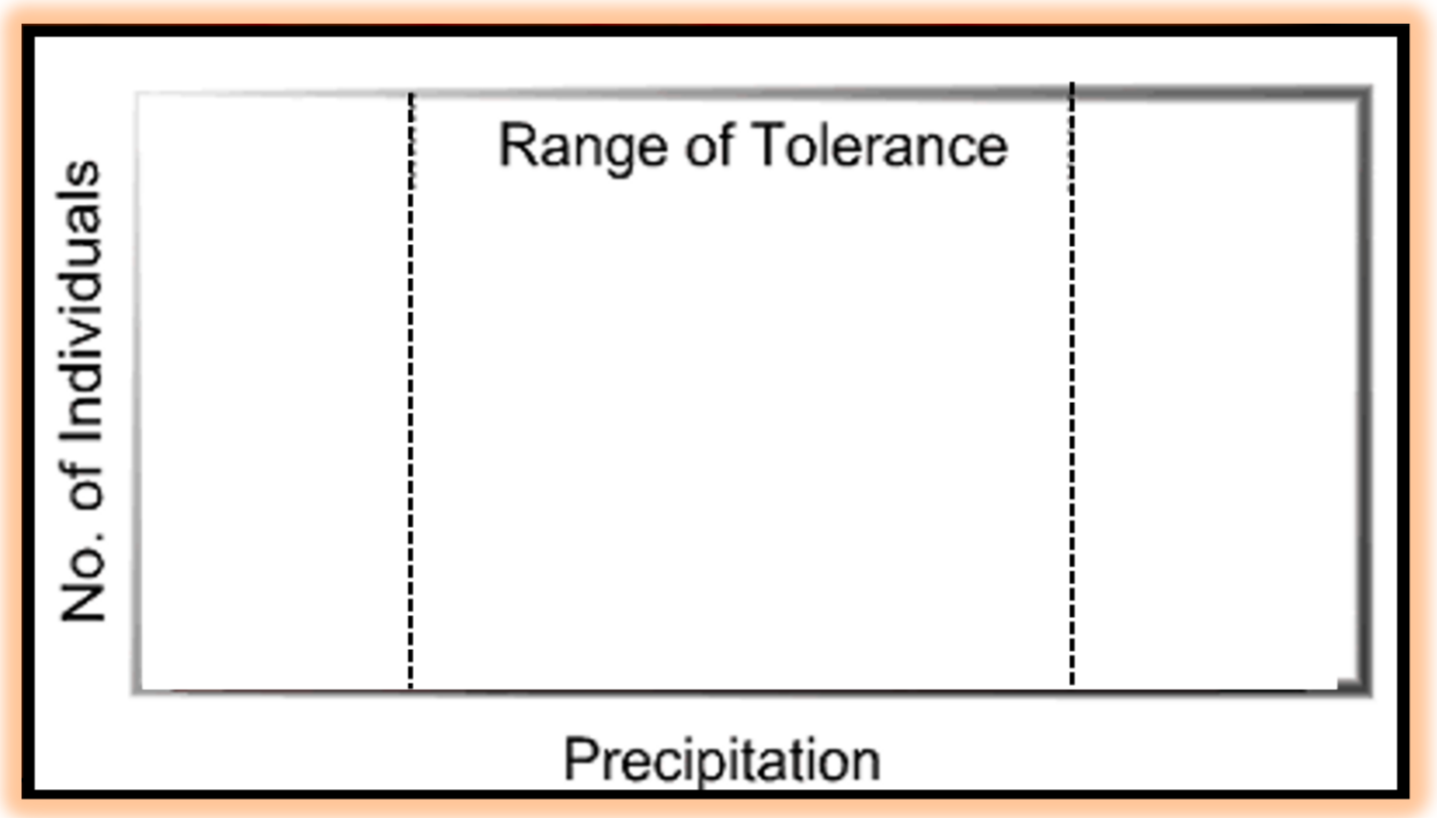
Which of the abiotic factors discussed is missing from the list below? A.) Light B.) Temperature C.) Moisture D.) Wind E.) Nutrients F.) _____	Which of the abiotic factors discussed is missing from the list below? A.) Light B.) Temperature C.) _____ D.) Wind E.) Nutrients F.) Soil

G.) Cycles / SPONCH	G.) Cycles / SPONCH

Part 1 Lesson 2 Range of Tolerance. Abiotic Factor Light

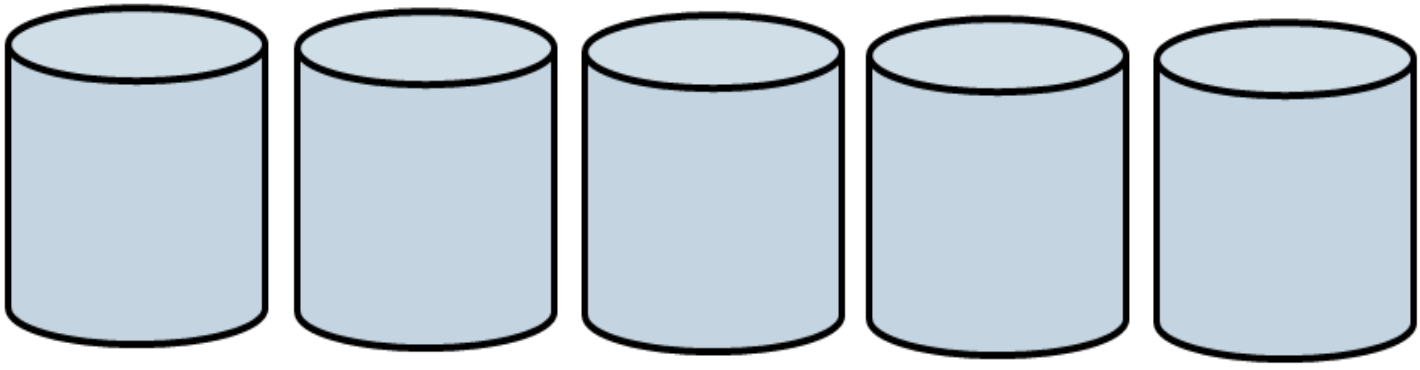
All organisms have a _____for the abiotic factors.

Please sketch the curve below that shows a species range on tolerance to rainfall as described in the slideshow.



Brine Shrimp and Salt Activity

No Salt | 1% NaCl | 2% NaCl | 10% NaCl | 10+% NaCl



Observations	Observations	Observations	Observations	Observations

What is the range of tolerance (5 of NaCl) for brine shrimp to hatch? Use data to explain....

Abiotic Factor: Light

Organisms are affected by light…

Intensity: How _____it is (lumens).

How _____ it lasts?

Length of day, seasonal changes.

_____ / type of light.

Light from the sun provides producers the energy to make sugar.

_____: Is a process that converts carbon dioxide into organic compounds, especially sugars, using the energy from sunlight.

Factors in the environment that affect the amount of light.

_____ – Time of day, morning-noon-dusk.

_____: When animals are active at dawn and at dusk.

Cloud Cover.

_____.

Location on earth

Light can also play a role in an organism's _____

Phototropism: The directional growth of _____ in response to _____.

Phototaxis: The movement of an _____ either towards or away from a source of light.

Bioluminescence: The production of _____by a living creature. Can be used to attract and avoid.

Photokinesis – Movement based on the _____ of light.

Photokinesis is described as positive if the velocity of travel is greater with an increase in light intensity and negative if the velocity is slower.

Describe how the organisms below are connected to light? Using complex vocabulary words that we have learned is encouraged.

Part 1 Lesson 3 Temperature

Temperature can affect organisms by…

Causes flowers to _____ and _____
Causing seeds to _____
Causing some trees to _____ their leaves.
Affects activity of _____ and _____ bloodedness animals.
Creating huge temperature swings in desert from day to night.
Creating seasonal changes in temperature.

_____ is the ability of an organism to keep its body temperature within certain boundaries. Remember – Range of Tolerance

Two types of thermoregulation

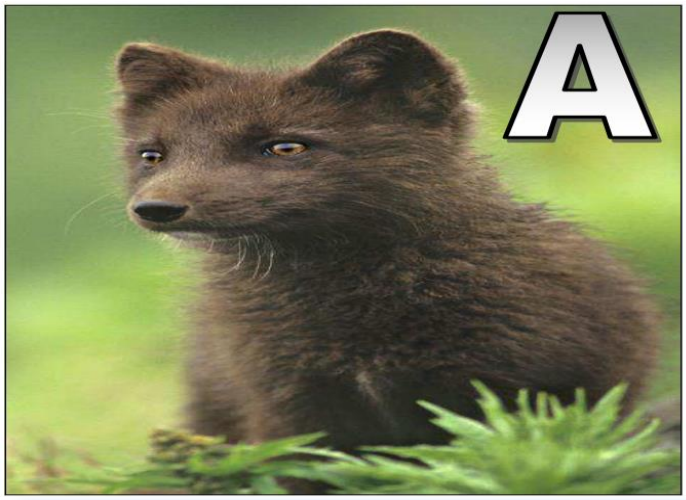
_____regulation.
_____regulation.

Please describe the difference between a physical and behavioral adaptations based on how you thermo-regulate on a cold winters day.

Behavioral	Physical

Part 1 Lesson 4 Hypothermia / Hyperthermia

Which fox lives in the warm climate, and which lives in the cold climate? Describe below.



Please record the time in seconds when the following occurs.

Thermoregulation		Time
Shivering	P	
Teeth Chattering	P	
Goosebumps	P	
Cold Dance	B	
Rubbing of Arms	B	
Hugging Yourself	B	

What physical, and behavioral adaptations to cold temperatures occurred in your body?

What did you learn about yourself and thermoregulation?

Behavioral: Actions or reactions of an organism to the environment.

Behavioral thermoregulation examples.

_____ to a warmer or cooler place.
Change _____ in one place.
Expand your cells when you want to be warmer.
Reptiles / Amphibians.
_____: Being inactive during winter, and lower metabolism
Decreasing heart rate, blood flow.
Adding layers

_____: A process whereby an organism becomes better suited to its habitat.
Characteristic which aids survival.

Physiological: The functions of the _____

Physiological adaptations to temperature.

-These you generally _____ control, your body does them automatically.
-Utilize evaporation.
-Changes in circulation of _____
-Growing or losing insulation.
-Have thermal windows (_____)

Blubber Hands Optional

Type of Hands	Times of each student added together and then divide by the number of students who participated.
Bare Skin	
Blubber	

Thermoregulation is the ability of an organism to keep its _____ within certain boundaries, even when the surrounding temperature is very different.

_____: Muscles contract and relax when it is cold, this generates heat.
Teeth chattering: A form of localized shivering. It means your cold.

_____: Skin muscles tighten, forming bumps, which cause your hairs to raise, trapping more air and keeping you warmer.

This is my best handwriting before I go outside into the cold.
-Your signature

_____: A decrease in the core body temperature to a level at which normal muscular and brain functions are impaired.

Mild Hypothermia Core temperature 98.6 - 96 degrees F Shivering - not under voluntary control. Trouble with complex motor functions (set-up tent, make a fire, zip parka, cell phone-call for help) **Conditions Leading to Hypothermia** Cold temperatures + wind chills. Improper clothing and equipment. Wetness. Fatigue, exhaustion. Dehydration. Poor food intake. No knowledge of hypothermia. Alcohol intake - causes blood flow problems leading to increased heat loss.	**Moderate Hypothermia** – Core temperature 95 - 93 degrees F Dazed consciousness. Loss of fine motor coordination - particularly in hands - Can't zip up parka, due to restricted peripheral blood flow. Slurred speech. Violent shivering. Irrational behavior - Person starts to take off clothing, unaware she/he is cold.	**Severe Hypothermia** - core temperature 92 - 86 degrees and below *(immediately life threatening)* Shivering occurs in waves, violent then pause, pauses get longer until shivering finally ceases. Person falls to the ground, can't walk, curls up into a fetal position to conserve heat. Muscle rigidity develops - because peripheral blood flow is reduced and due to lactic acid and CO2 buildup in the muscles. Skin is pale. Pupils dilate. Pulse rate decreases. At 90 degrees the body tries to move into hibernation, shutting down all peripheral blood flow and reducing breathing rate and heart rate. at 86 degrees the body is in a state of "metabolic icebox." The person looks dead but is still alive.

Which is not true of mild hypothermia? A.) Shivering - not under voluntary control. B.) You can still do complex motor functions. C.) Impaired Judgement. D.) You can still walk and talk.	**Which is not true of moderate hypothermia?** A.) Dazed consciousness. B.) Loss of fine motor coordination - particularly in hands - can't zip up parka, due to restricted peripheral blood flow. C.) Slurred speech. D.) Mild shivering. E.) Irrational behavior - Person starts to take off clothing, unaware she/he is cold.

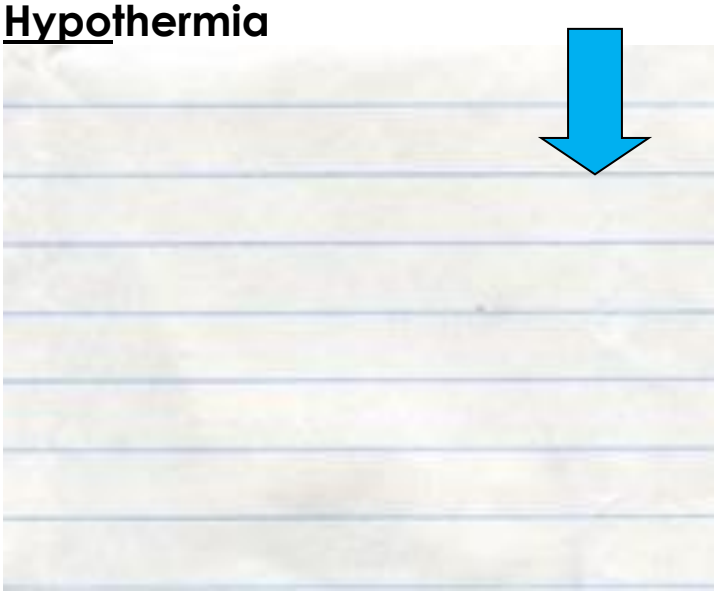
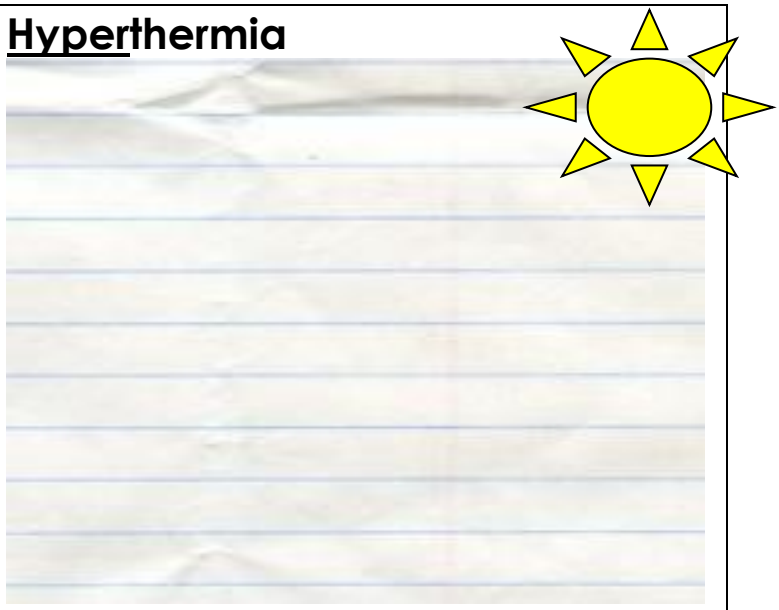
Which is not true of severe hypothermia? A.) Shivering occurs in waves, violent then pause, pauses get longer until shivering finally ceases. B.) Person falls to the ground, can't walk, curls up into a fetal position to conserve heat. C.) Muscle rigidity develops - because peripheral blood flow is reduced and due to lactic acid and CO2 buildup in the muscles. D.) Skin is pale. E.) Pupils dilate. F.) Pulse rate increases. G,) At 90 degrees the body tries to move into hibernation, shutting down all peripheral blood flow and reducing breathing rate and heart rate. H.) at 86 degrees the body is in a state of "metabolic icebox." The person looks dead but is still alive.	**Which is not a condition leading to Hypothermia?** A.) Cold temperatures + wind chills. B.) Improper clothing and equipment. C.) Wetness. D.) Fatigue, exhaustion. E.) Dehydration. F.) Good food intake. G.) No knowledge of hypothermia. H.) Alcohol intake - causes blood flow problems leading to increased heat loss.
Which is not a condition leading to Hypothermia? A.) Warm temperatures + Sun light B.) Improper clothing and equipment C.) Wetness D.) Fatigue, exhaustion E.) Dehydration F.) Poor food intake G.) No knowledge of hypothermia H.) Alcohol intake - causes blood flow problems leading to increased heat loss.	**Which is not a condition leading to Hypothermia?** A.) Cold temperatures + wind chills. B.) Improper clothing and equipment. C.) Wetness. D.) Fatigue, exhaustion. E.) Dehydration. F.) Poor food intake. G.) No knowledge of hypothermia. H.) Warm fluid intake - causes blood flow problems leading to increased heat loss.

_____: Having a body temperature that is too high, causes heart failure, among other problems and death.

What are some conditions that lead to hyperthermia? Please describe next to each picture.

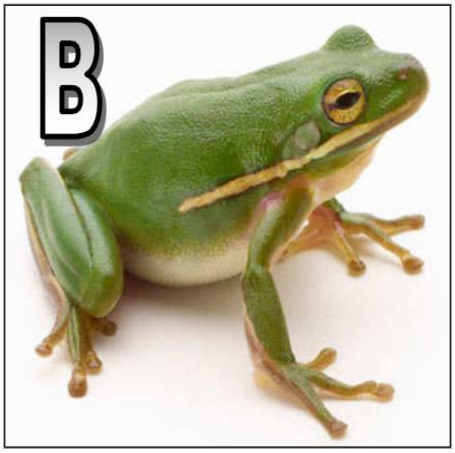
Which two are not heat exhaustion warning signs? A.) Abnormally high temperature. B.) So hot you might collapse. C.) Pale Appearance. D.) So dehydrated you can't sweat. E.) Hyperactivity	Which tip is bogus from the list below to avoid heat exhaustion and heat stroke. A.) Be smart about when you are going to be active, high noon on the hottest day ☹. B.) Know the weather and heat index. C.) Limit your water and rehydrating fluids. D.) Seek shade, and wear loose fitting clothing. E.) Take rest breaks (rehydrate) F.) Place cool damp towels on forehead. G.) Don't drink alcohol.
Which tip is bogus from the list below to avoid heat exhaustion and heat stroke. A) Be smart about when you are going to be active, high noon on the hottest day ☹. B) Know the weather and heat index. C) Drink plenty of water and rehydrating fluids. D) Avoid shade, and wear tight fitting clothing. E) Take rest breaks (rehydrate) F) Place cool damp towels on forehead. G) Don't drink alcohol.	Which tip is bogus from the list below to avoid heat exhaustion and heat stroke. A) Be smart about when you are going to be active, high noon on the hottest day ☹. B) Know the weather and heat index. C) Drink plenty of water and rehydrating fluids. D) Seek shade, and wear loose fitting clothing. E) Avoid rest breaks. F) Place cool damp towels on forehead. G) Don't drink alcohol.

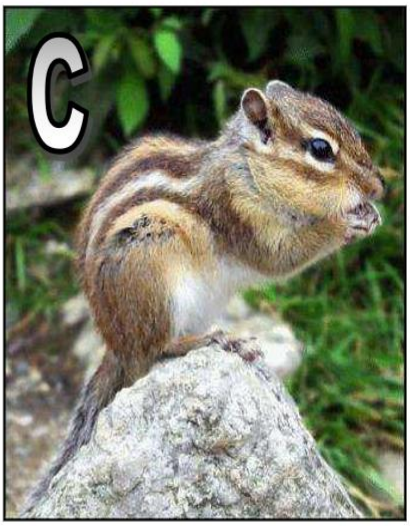
Describe how you have a range of tolerance when it comes to temperature. Please use the words below in your discussion of this topic.

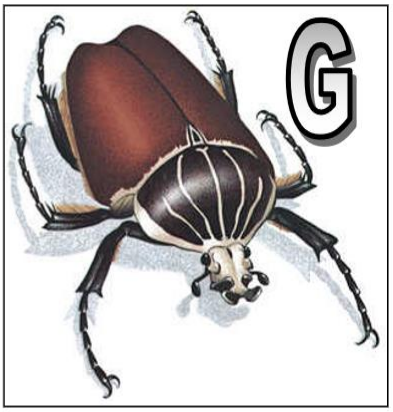
Hypothermia	**Hyperthermia**
	

Part 1 Lesson 5 Warm and Cold Bloodedness

Which from the pictures below has general warm and cold-bloodedness?







_____-bloodedness (endothermy): Maintaining a _____ temperature independent of environmental conditions.

Advantage: Warm-blooded animals can remain _____ in cold environments.

Disadvantage: Is that warm-blooded bodies provide a nice warm environment for _____, bacteria and parasites to live in.

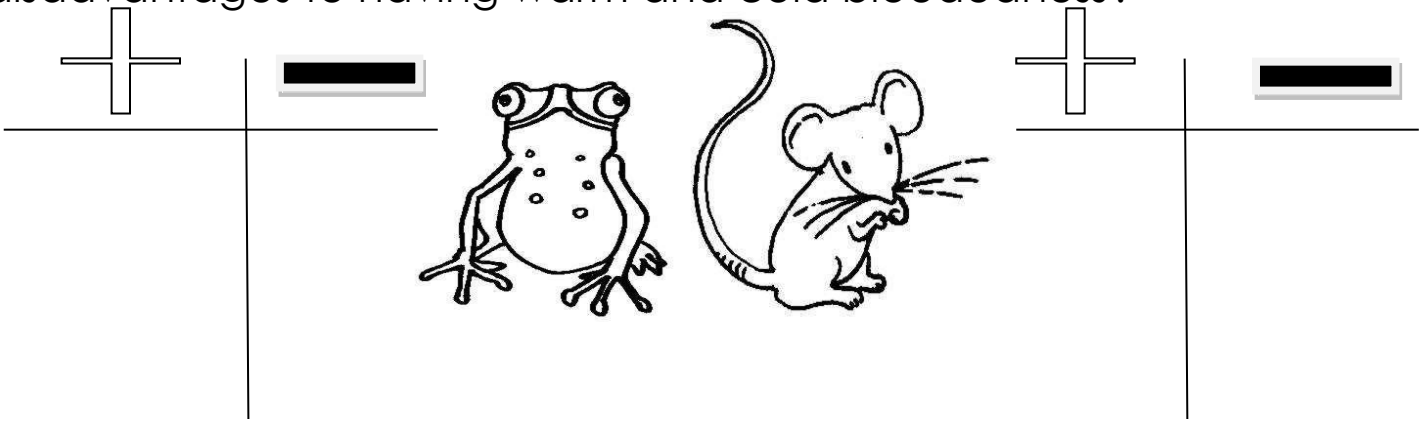
_____-Bloodedness: When organisms can't regulate their internal temperature. When it's cold they _____ when it's warm they're more active.

Why is this turtle sitting on a log? Explain using some terms discussed in class.

_____ / torpor: A state of inactivity and metabolic depression in animals.
(Slow breathing, lower body temp)

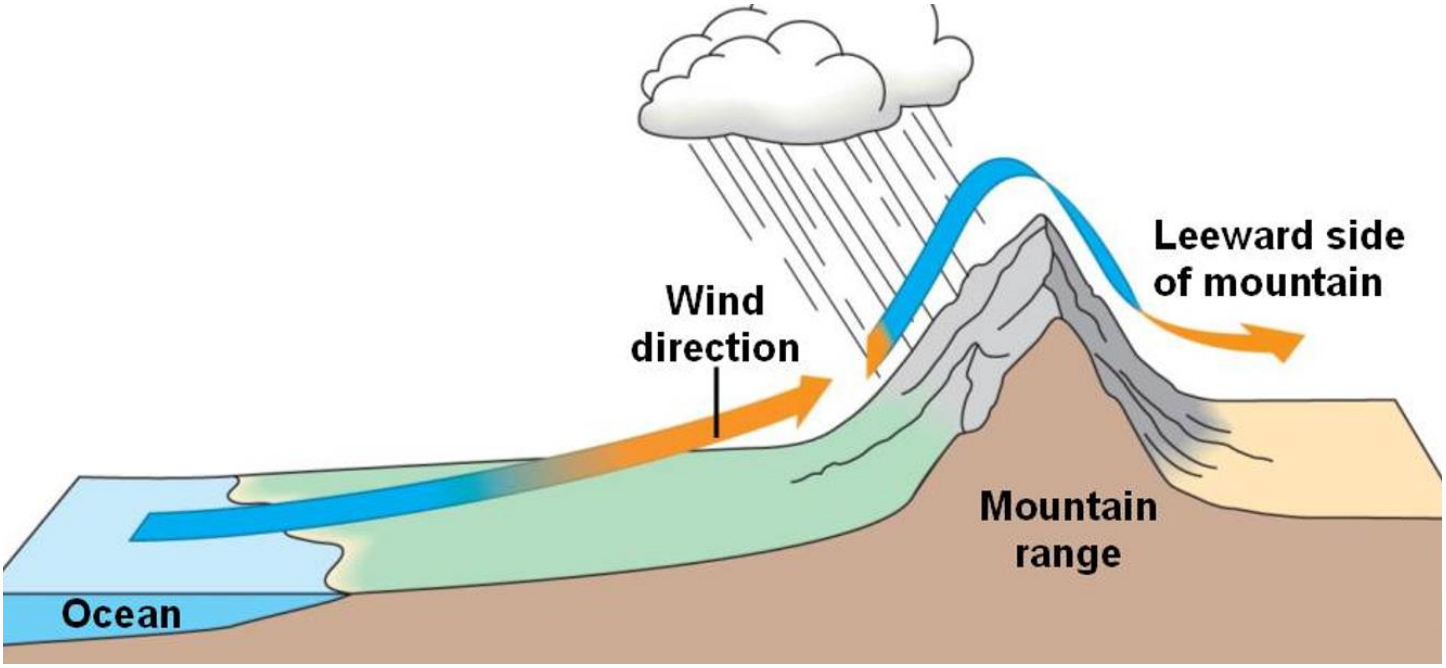
Advantage: Cold-blooded animals require _____ energy to survive than warm-blooded animals do.
Disadvantage… They can't _____ in cold places during the winter.

Use the picture below to describe some of the advantages and disadvantages to having warm and cold bloodedness?



Part 1 Lesson 6 Abiotic Factor: Water
Water availability varies greatly on this planet.

What is Mtn Rain Shadow Effect?



Water is essential for life, and all organisms depend on it.

Water requirements and plants.

Hydrophytes: Plants which_____.
Mesophytes: Plants with _____ water needs.
Xerophytes: Plants which grow in _____ environments.

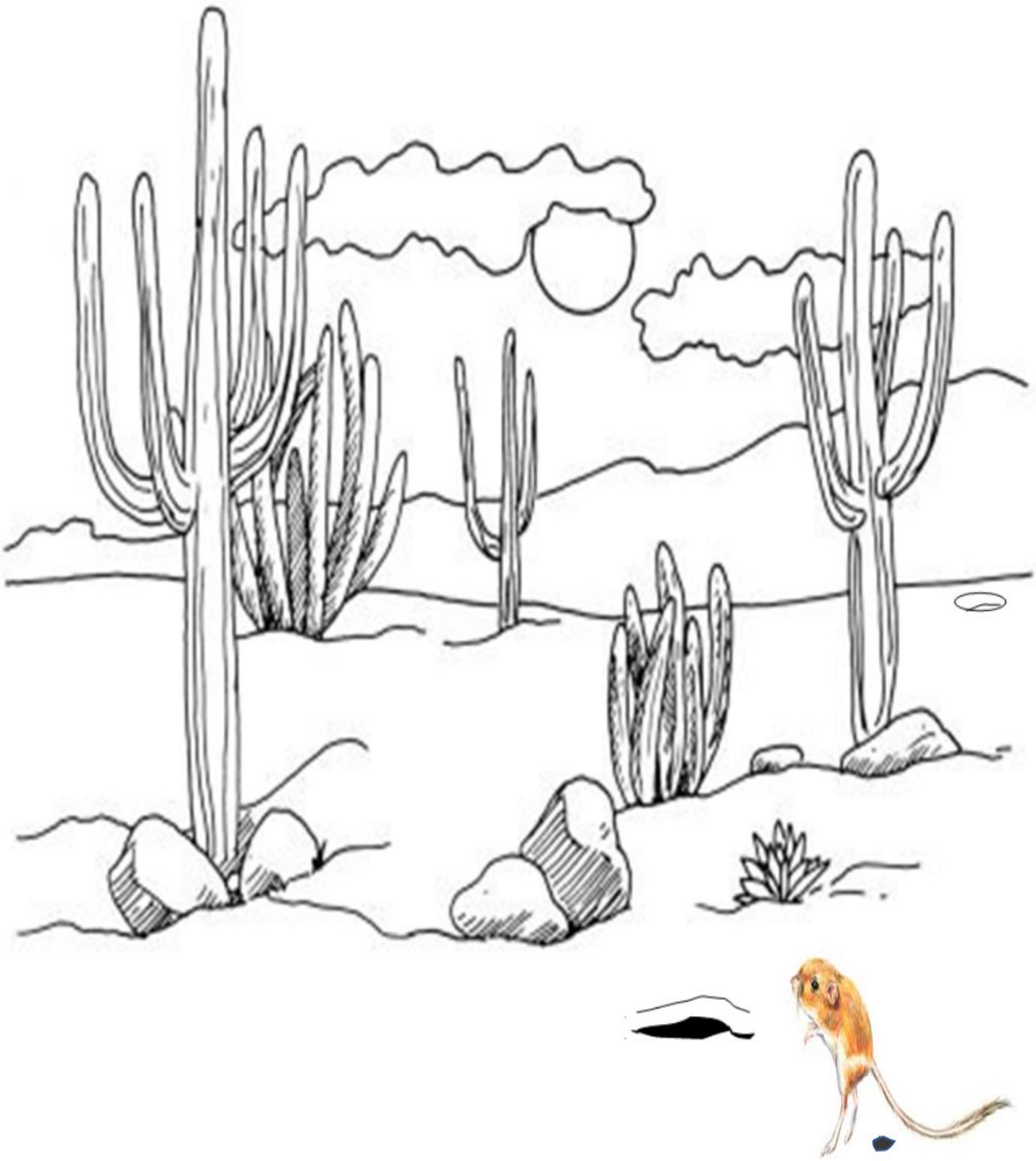
Adaptations of plants to survive with minimal water include.

Using stomata: Structures that can _____ to keep water in when dry.
Thick waxy cuticles to keep water _____ (_____)
_____ leaves, or absence of leaves.
Water _____ tissues.
Deep _____

How animals have adapted to low water availability?

Body covering can limit water _____.
Insect chitin can keep in water.
Body tissue that _____ water.
Some small animals can absorb water from the air in morning (_____), then go _____.
-Rare desert frogs and some insects.
-Eat prey items that are full of water and have really _____ feces.

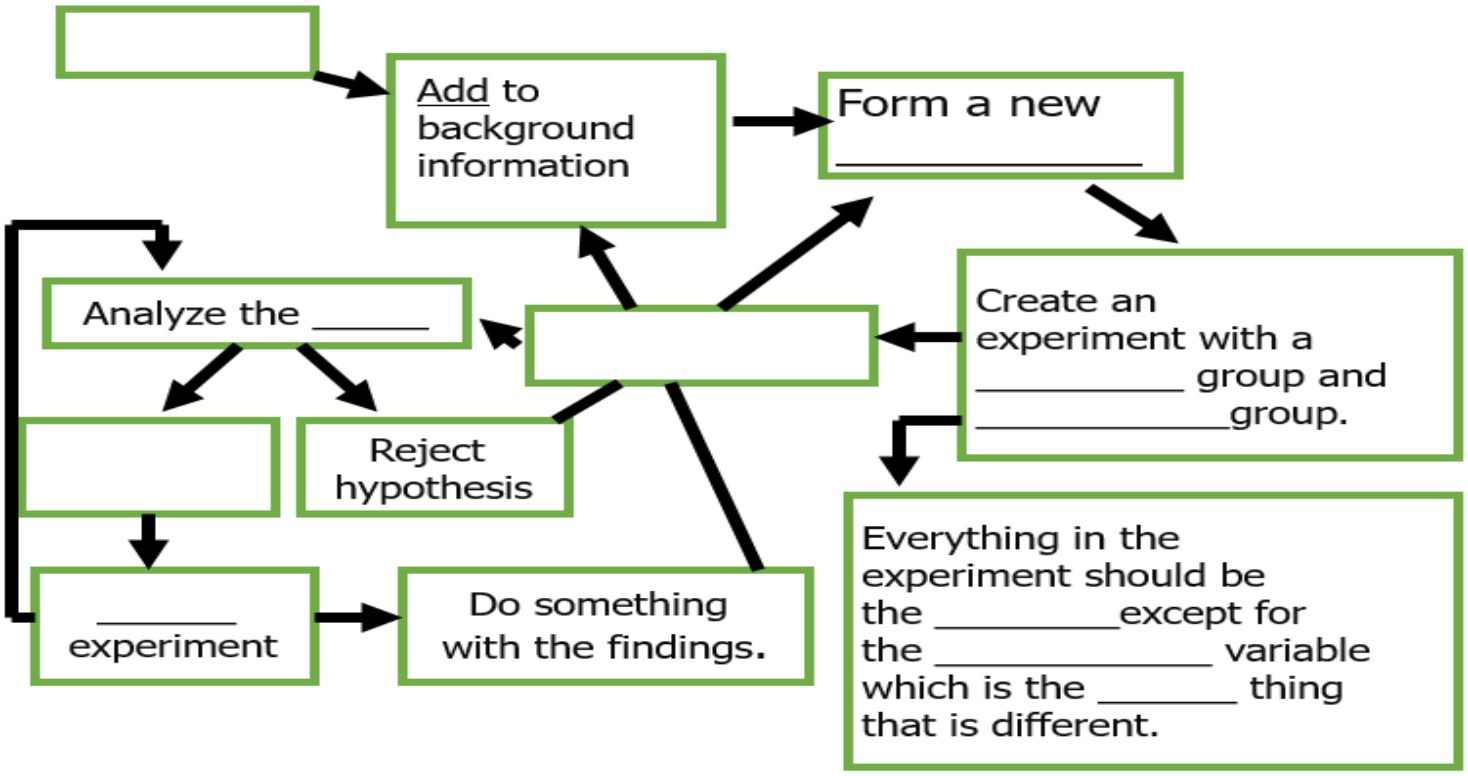
Warning! Two Part Question. Please add desert plants and animals to the scene below. Provide text around your sketches that describe how these organisms are adapted to survive the high <u>temperatures</u>, and low <u>moisture</u>.



Part 1 Lesson 7 Isopod Lab

Make a detailed observation of a terrestrial Isopod. Try and put some accurate information near your drawing as you learn more about this species.

Scientific _____: A process that is the basis for scientific inquiry (questioning and experimenting).



Variable: _____ quantity of something.

Independent: (Change) The variable you have control over, what you can choose and _____.

Dependent: (Observe) What you _____ in the experiment and what is affected during the experiment.) (Ex, color change, change in mass)
Control: (Same) Quantities that a scientist wants to remain _____ so it a fair test.

A student wants to determine if varying levels of fertilizer will increase the fitness of a plant. She sprays each plant every day with low, medium, and high levels of fertilizer. The plants are given the same soil, water, and light for one month. At the end she measures the number of leaves, plant height, and number of flowers. Problem? =_____ _____ Independent Variable = _____ Dependent Variable = _____ _____ Control =_____ _____	A student wants to find out how cigarette smoke blown into a small greenhouse of plants damages the plant. The student grows two small plants in separate clear plastic soda bottles. The student injects one with cigarette smoke periodically. Both are watered and given the same light conditions. The student records the height, number of leaves, and flowers of both plants every day for one month. Problem? =_____ _____ Independent Variable = _____ Dependent Variable = _____ _____ Control =_____ _____
A student wants to find out if worms help plants grow. The student uses four containers. The first container only contains soil. The remaining containers are given increasing numbers of worms. The same numbers of small plants are placed in each and given the same soil and growing conditions. Problem? =_____ _____ Independent Variable = _____ Dependent Variable = _____ _____ Control =_____ _____	A student wants to find out if Sow Bugs prefer a wet environment over a dry one. The student creates a chamber with two rooms and one door. One environment has a moist floor and the other is dry. Sowbugs are placed into the chamber and their location recorded every minute for an extended time period. Problem? =_____ _____ Independent Variable = _____ Dependent Variable = _____ _____ Control =_____ _____

Isopod Research for Lab Report

Place Isopod in small container with a piece of wet paper towel laid evenly on the floor.

General information about the species:

Website: Title:

Author: Year:

Where are they found? / How are they connected to the non-living environment?

Website: Title:

Author: Year:

Please record some additional information from a third source in the space below.

Website: Title:

Author: Year:

Isopod Lab Set-up / Q's

Partner:_____

Please complete the four terms below as they relate to the project you have selected.

Problem:_____

_____

Independent Variable:_____

_____

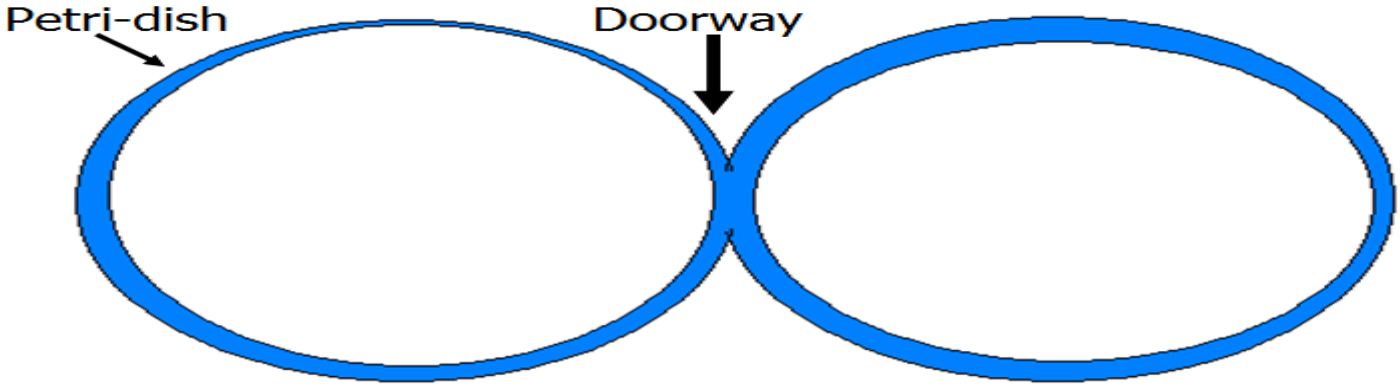
Dependent Variable:_____

_____

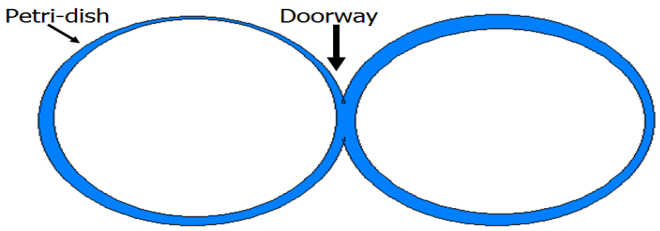
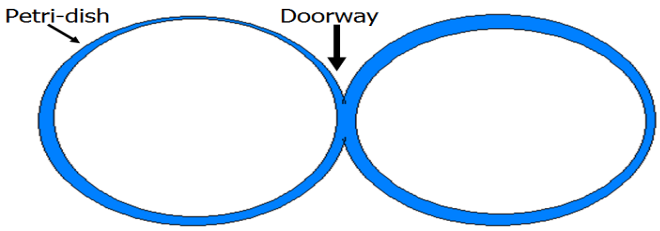
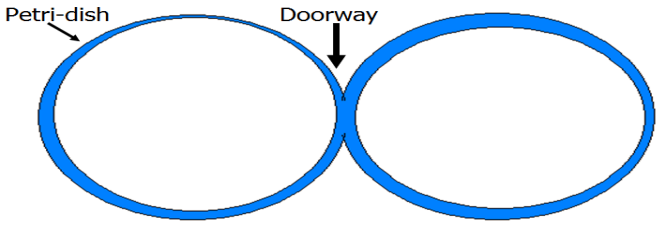
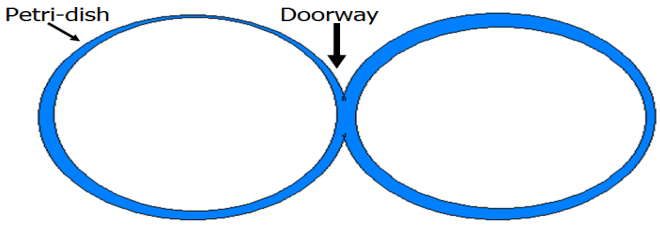
Control:_____

_____

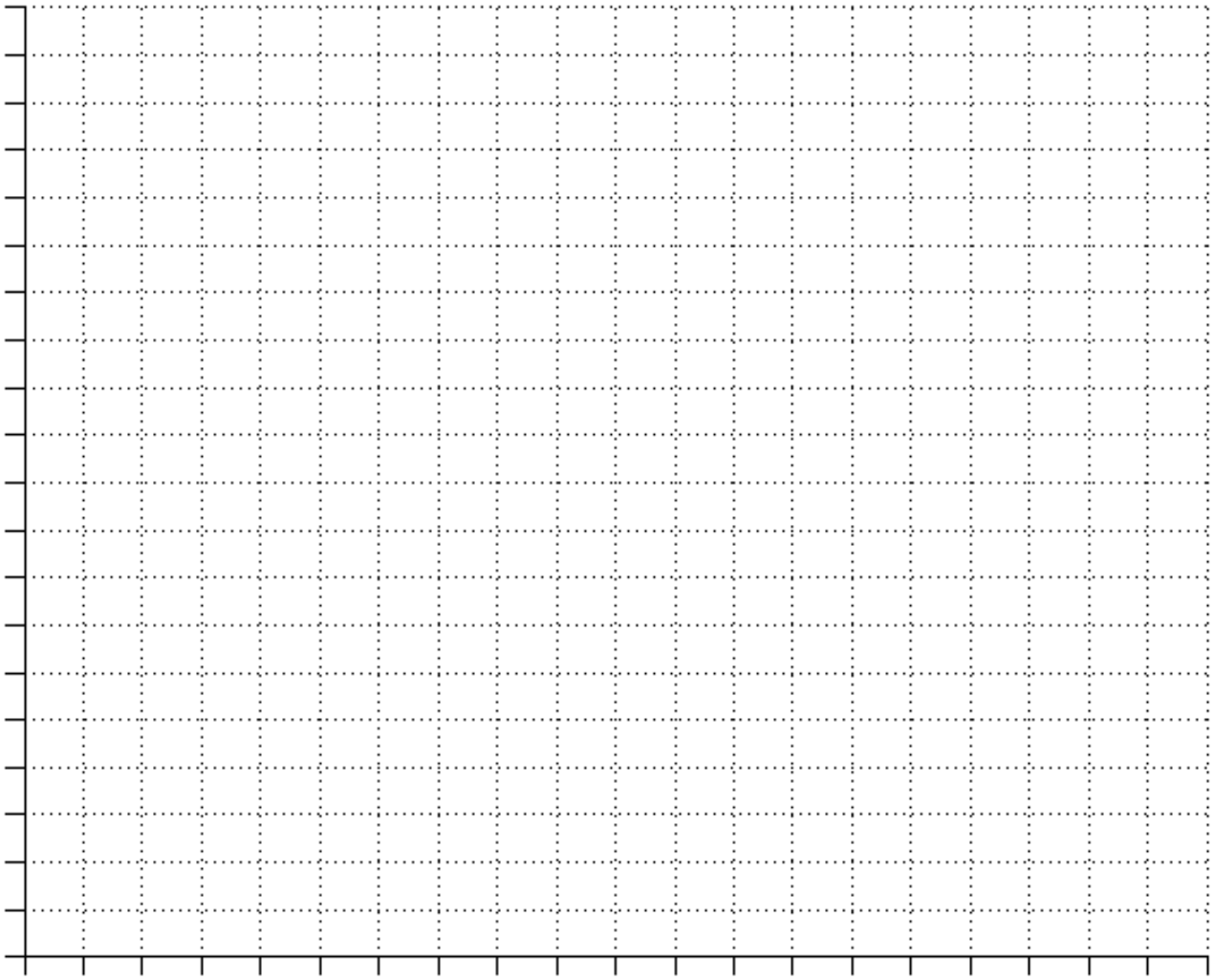
Please describe your set-up with visuals.



Please record what you are testing each day by writing or sketching in the pictures. (Control Day?)

Test Day #1 	Test Day #2 
Test Day #3 	Test Day #4 

Please graph your data for total Isopods. (Ex. - Can add up all of your light and Dark for all four days).



Part 1 Lesson 8 Wind

What are some of the positives and negatives of wind?

Animals use wind…

To _____.

Water, prey items, predators, etc.

To _____ with minimal effort.

To move.

To dry out and also to _____ down.

Plants use wind

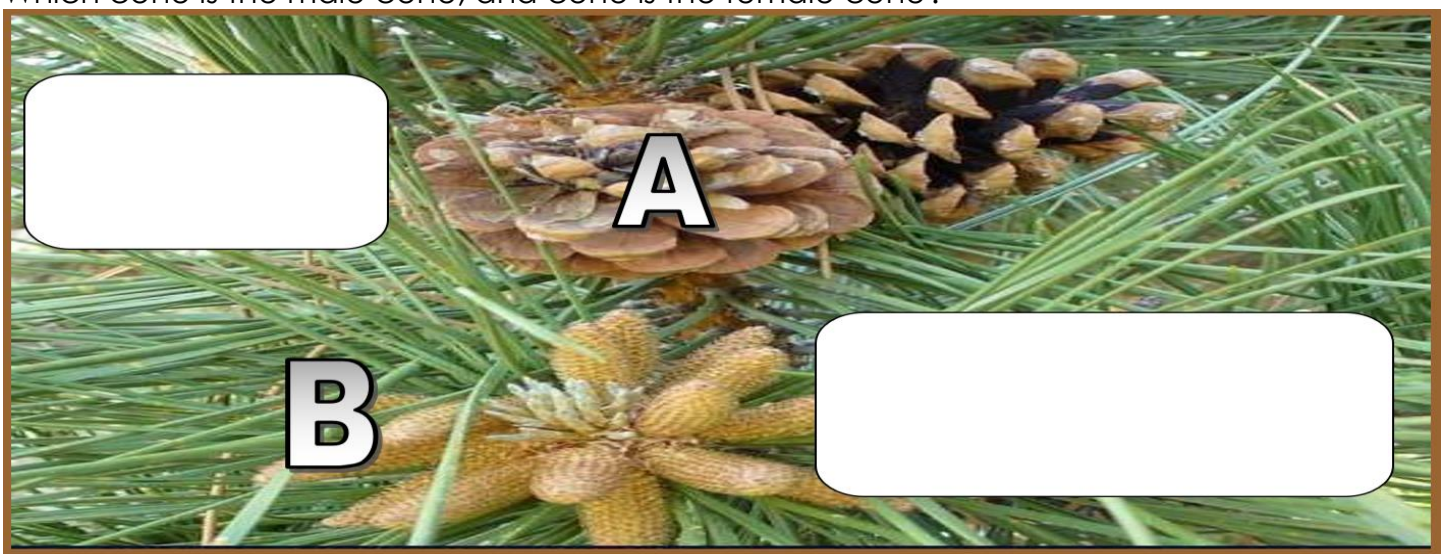
To_____.

Pollination: The transferring of pollen (_____) from one plant to another.

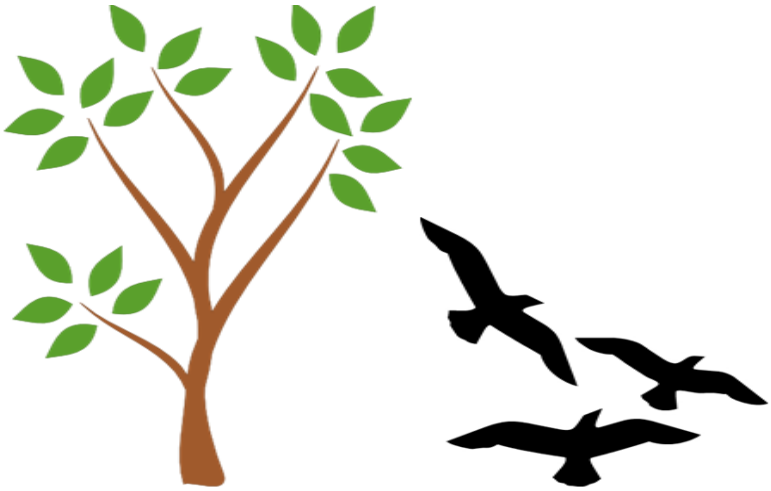
To disperse _____.

Which flower uses wind to pollinate, and which uses insects? Why?

Which cone is the male cone, and cone is the female cone?



Please describe some ways that plants and animals utilize wind using the pictures below.



Why is it so important to disperse your seeds a great distance from your mother?

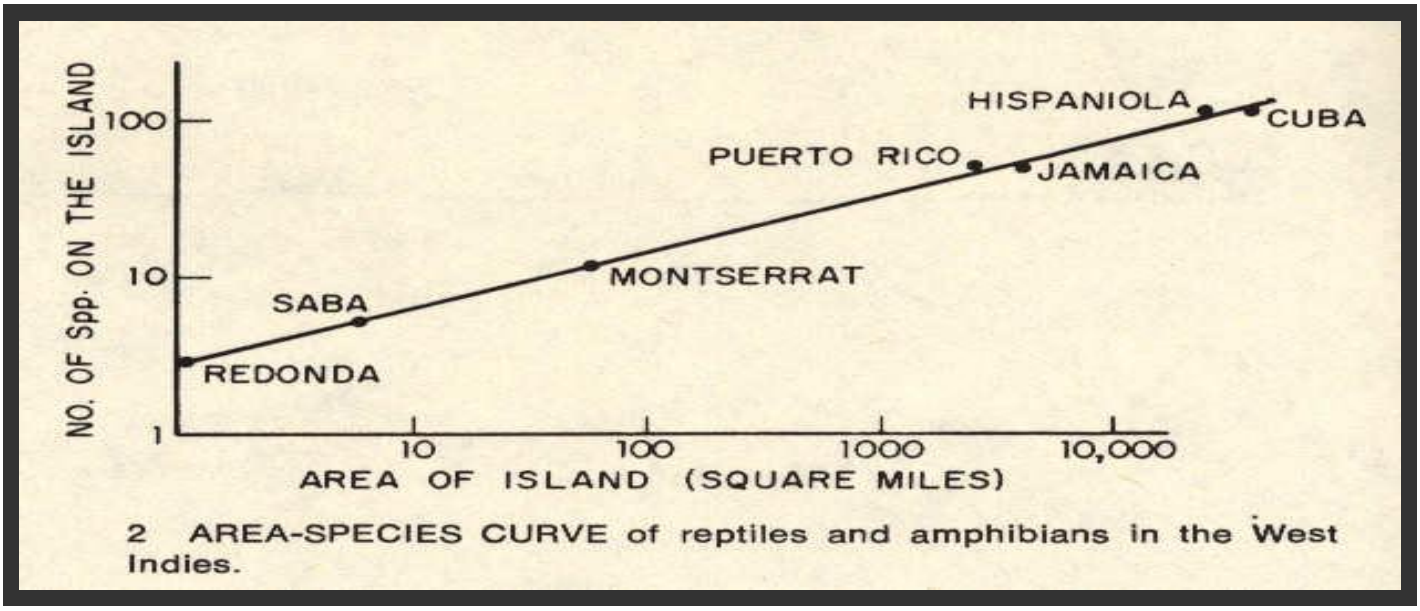
_____ Dispersal: When wind is used to disperse either _____ or _____.
Most common dispersal mechanism.

Sketch out your wind dispersed seed that you are going to build for the wind dispersal challenge. What materials is made of? Does it mimic a particular wind dispersed seed?

Part 1 Lesson 9 Water Dispersal, Island Biogeography

_____Dispersal: The seeds or fruits are dropped from the plant into rivers, lakes or seas. The seeds _____ then wash up and germinate.

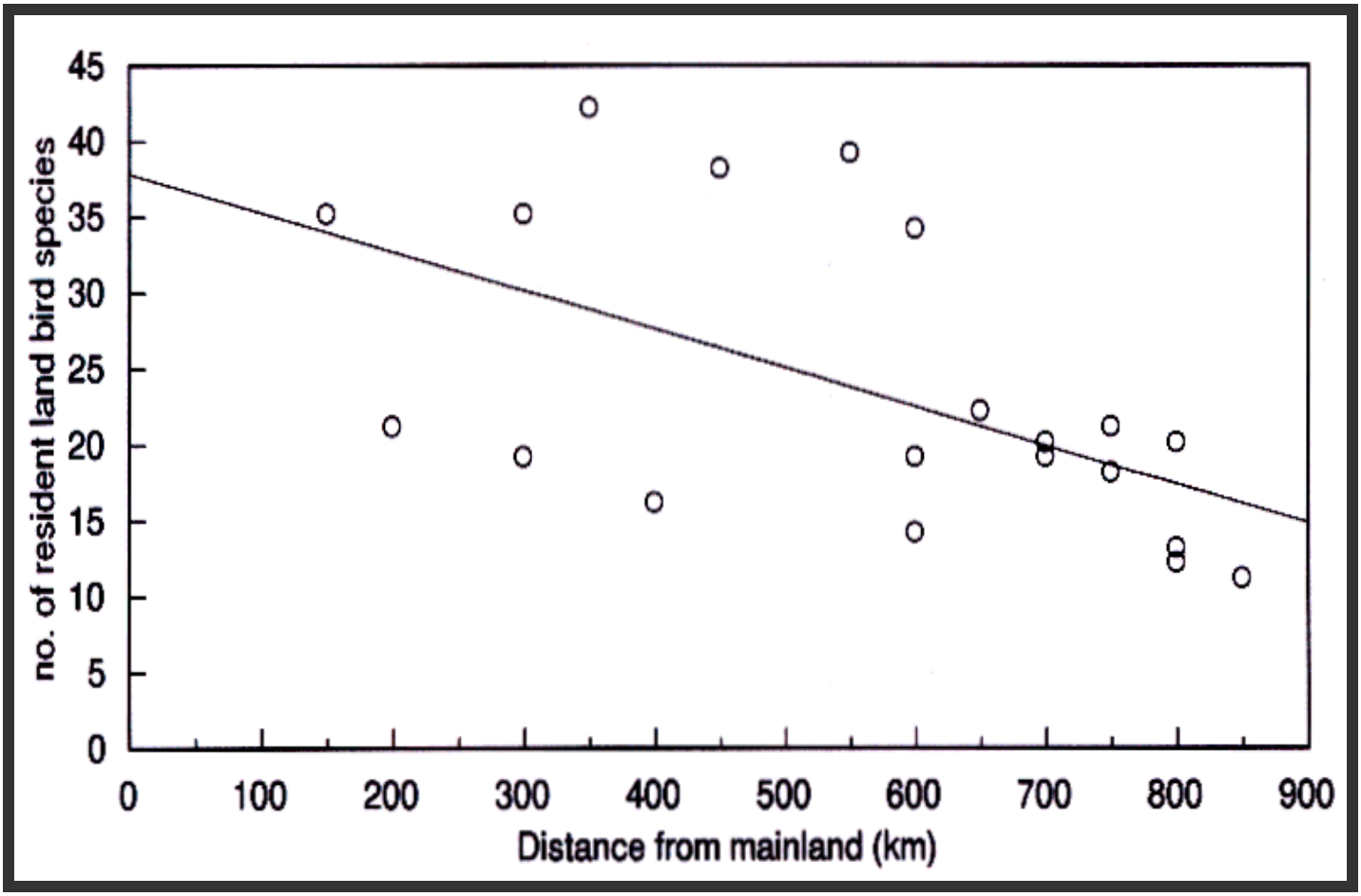
Island Biogeography: The study of rates of _____ and _____ of species on islands.



2 AREA-SPECIES CURVE of reptiles and amphibians in the West Indies.

Which Islands are the largest?_____
Which Islands are the smallest?_____
Which islands have the greatest number of species of reptiles and amphibians?_____

Which island has the fewest number of reptiles and amphibians?_____
How does the size of the island (area) relate to the number of species that can live there?



How many bird species can be found on islands that are 850 kilometers (km) from the mainland? Use data in your response.

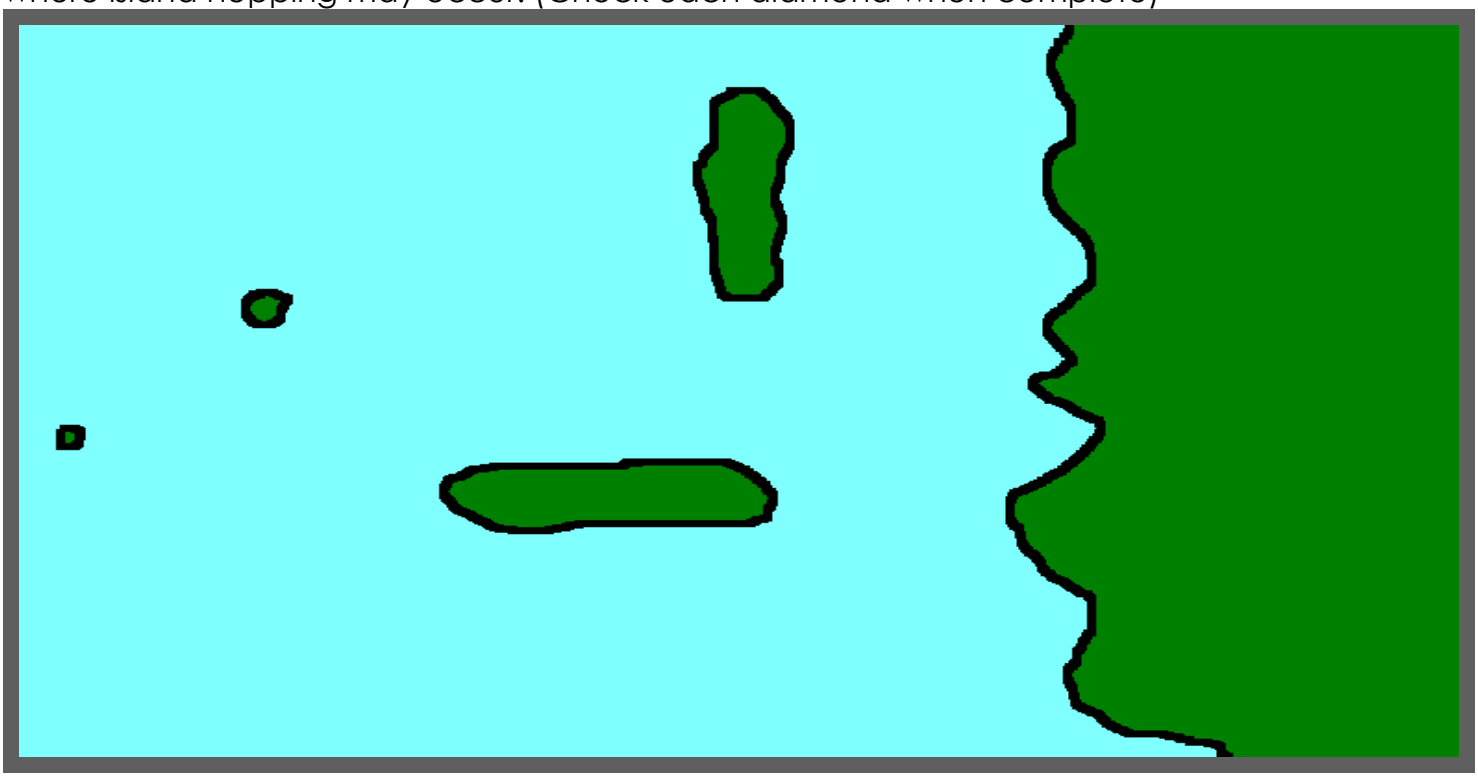
How many bird species can be found on islands that are 150 kilometers (km) from the mainland? Use data in your response.

What's the correlation between the number of bird species and the distance an island is from the mainland?

MacArthur-Wilson Equilibrium Theory

Island _____ and _____ from mainland determine level of _____ and the rate of _____ on the island.

Please describe Island Biogeography theory based on the map below. Please describe using text which Island will most likely exhibit the following. ◊ 1) Most migrations and fewest extinctions. ◊ 2) Fewest migrations and most extinctions, ◊ 3) Describing using multiple arrows where island hopping may occur. (Check each diamond when complete)



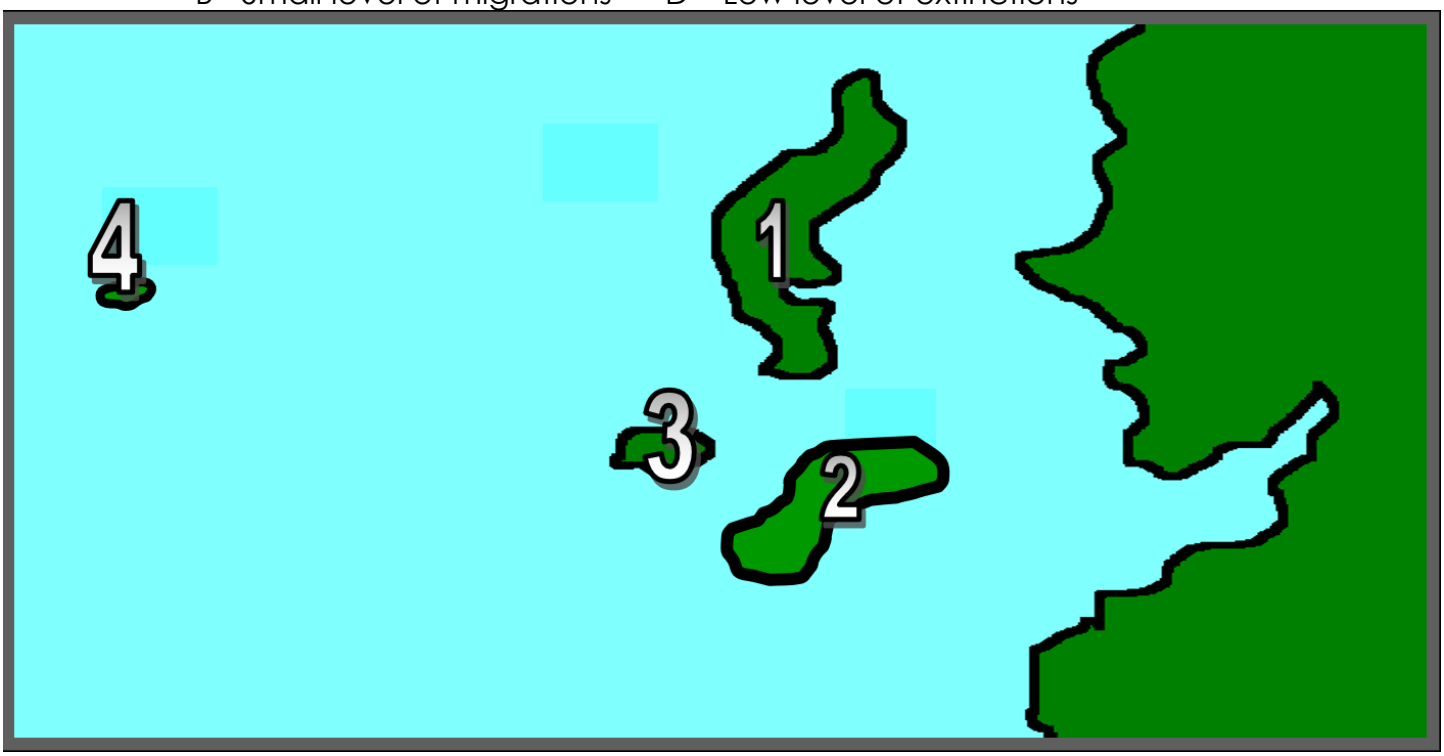
Keep track of the number of migrations that hit the Island using the check system

Island	Number of migrations
A	
B	
C	
D	

Why did each island get that amount of migrations? (A,B,C,D)

Place the following words next to the correct yellow / red Island. Green = mainland

- A - High level of migrations
- B - Small level of migrations
- C - High level of extinctions
- D – Low level of extinctions



Part 1 Lesson 10 Animal Dispersal

Animal _____ dispersal: When animals aid _____seeds.

Animal dispersal.

- Animals help disperse _____ to _____plants.
-They _____ and drop seeds.
-Seeds sometimes _____ to an animal and hitch a ride to fall off later and in a new location.
-Animals _____ stashes of seeds and then forget where.
-Animals eat fruits that contain seeds. They then _____the seeds many hours later into a nutrient rich, moisture retaining, pile of feces far from plant.
-_____ spread seed crops.

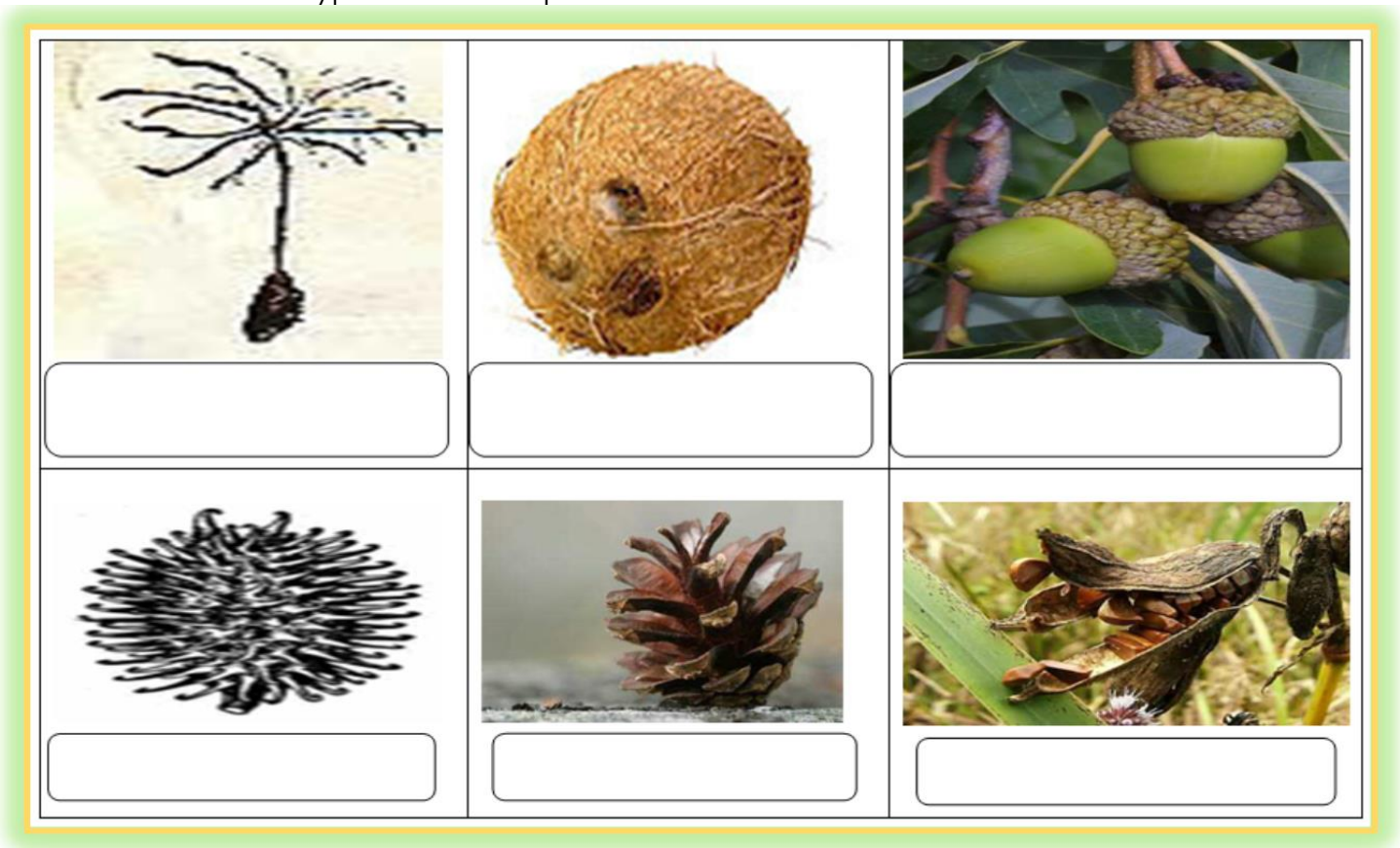
Tension dispersal. Abiotic – _____
Tension builds and seeds are ejected a short distance

Activity! Quiz 1-10 – Name that seed dispersal mechanism.

- Wind, Water, Animals, Tension,

1)	2)	3)	4)
5)	6)	7)	8)
9)	10)	*11)	Score =

Please describe the type of seed dispersal below.



Part 1 Lesson 11 Fire Ecology

Are Forest Fires Good or Bad? Start Question

Fire _____: A branch of ecology that focuses on the origins of wildland fire and its _____to the environment that surrounds it, both living and non-living.

Does a forest fire help create plant growth?
Dominating plants are substantially _____by fire which provide room for the less dominating and sometimes more palatable species.

Fire: Some _____a fire event or very hot temperature after they have been dispersed to germinate.

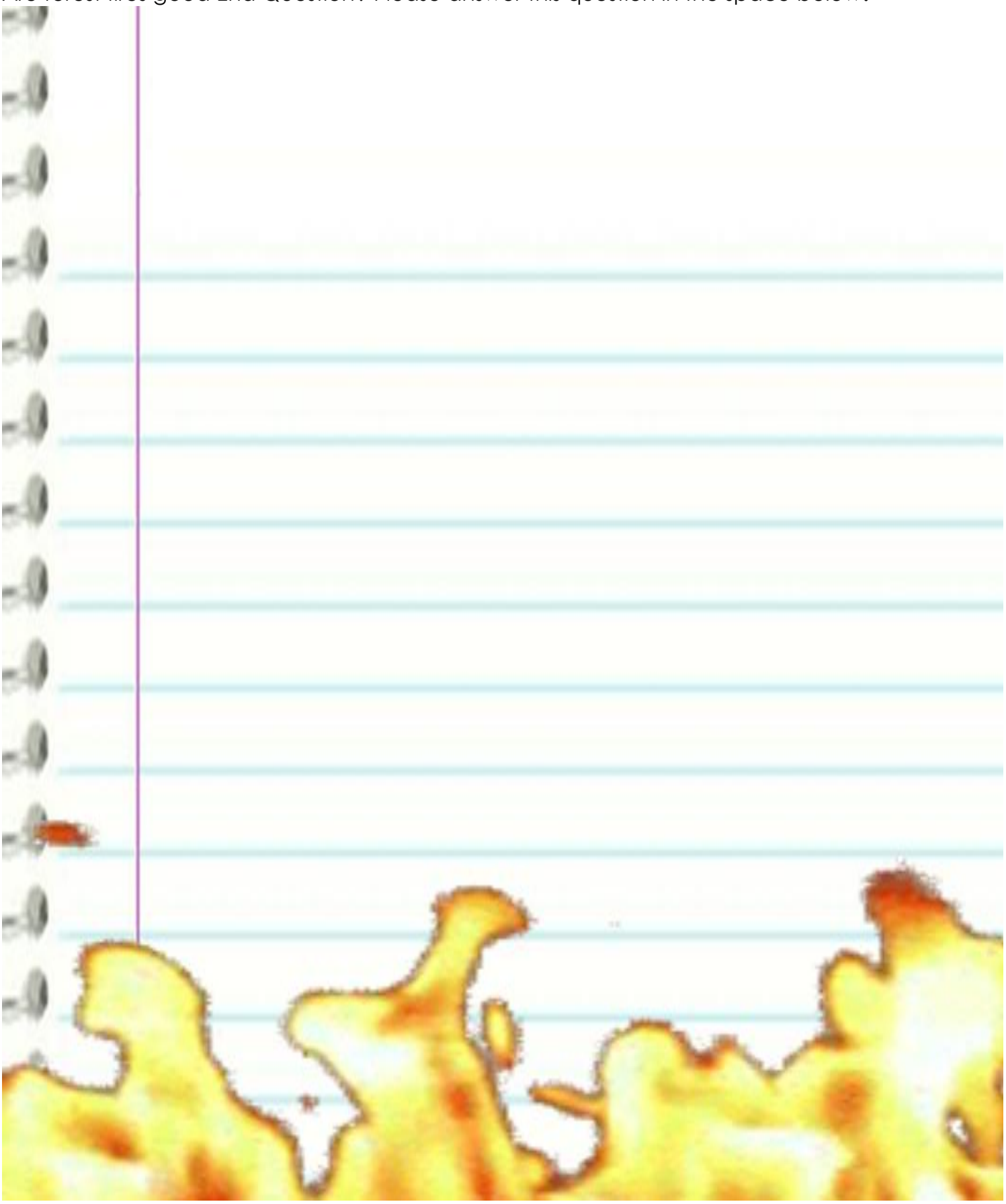
Fire Dependence: This concept applies to species of plants that _____ on the effects of fire to make the _____ more hospitable for their regeneration and growth.

Fire Adaptation: Plants have _____ with special traits contributing to successful abilities to survive fires at various stages in their life cycles.

Which is not part of the "Let it Burn Philosophy." and the answer is... A.) Large destructive fires result from fuel accumulations above historic levels. B.) Both firefighters and the public risk loss of life or serious injury. C.) Fire poses a serious risk to the ecology of a forest and should be suppressed. D.) Intense or long-lasting smoke caused by large uncontrolled fire can impact air quality and seriously affect respiratory health. E.)The costs of controlling larger and more damaging wildland fires have risen dramatically.	Summary – -Fire is an important and inevitable part of America's Wild Lands. -It's now widely recognized that we must restore fire to many areas from which it has been excluded. -Wild Land fires can produce both benefits and damages - to the environment and to people's interests. -By working together, people can maximize the benefits of Wild Land fire and minimize the damages, including threats to public health.

Which is not part of the "Let it Burn Philosophy." A.) Large destructive fires result from fuel accumulations above historic levels. B.) Forest fires do not have any risks associated with them. D.) Intense or long-lasting smoke caused by large uncontrolled fire can impact air quality and seriously affect respiratory health. E.)The costs of controlling larger and more damaging wildland fires have risen dramatically.	Which is a bogus statement from the summary below? A.) Fire is an important and inevitable part of America's Wild Lands. B.) It's now widely recognized that we must restore fire to many areas from which it has been excluded. C.) Wild Land fires only produce damages to the environment and to people's interests. D.) By working together, people can maximize the benefits of Wild Land fire and minimize the damages, including threats to public health.

Are forest fires good End Question? Please answer this question in the space below.



Across

2. Having a body temperature that is too high, causes heart failure, among other problems and death.
4. Water _____: The seeds or fruits are dropped from the plant into rivers, lakes or seas. The seeds float then wash up and germinate.
5. _____-Bloodedness: When organisms can't regulate their internal temperature. When it's cold they can't move, when it's warm they're more active.
6. A process whereby an organism becomes better suited to its habitat. Characteristic which aids survival.
10. A decrease in the core body temperature to a level at which normal muscular and brain functions are impaired.
11. The directional growth of plants in response to light.
12. _____ Biogeography: The study of rates of colonization and extinction of species on islands.
15. All non-living chemical and physical factors in the environment.
17. _____ / torpor: A state of inactivity and metabolic depression in animals. (Slow breathing, lower body temp)
19. The ability of an organism to keep its body temperature within certain boundaries. Remember – Range of Tolerance
21. _____ Dispersal: When wind is used to disperse either pollen or seeds
22. Two types of thermoregulation Physiological regulation. _____regulation.
23. Of, pertaining to, or produced by life or living organisms.

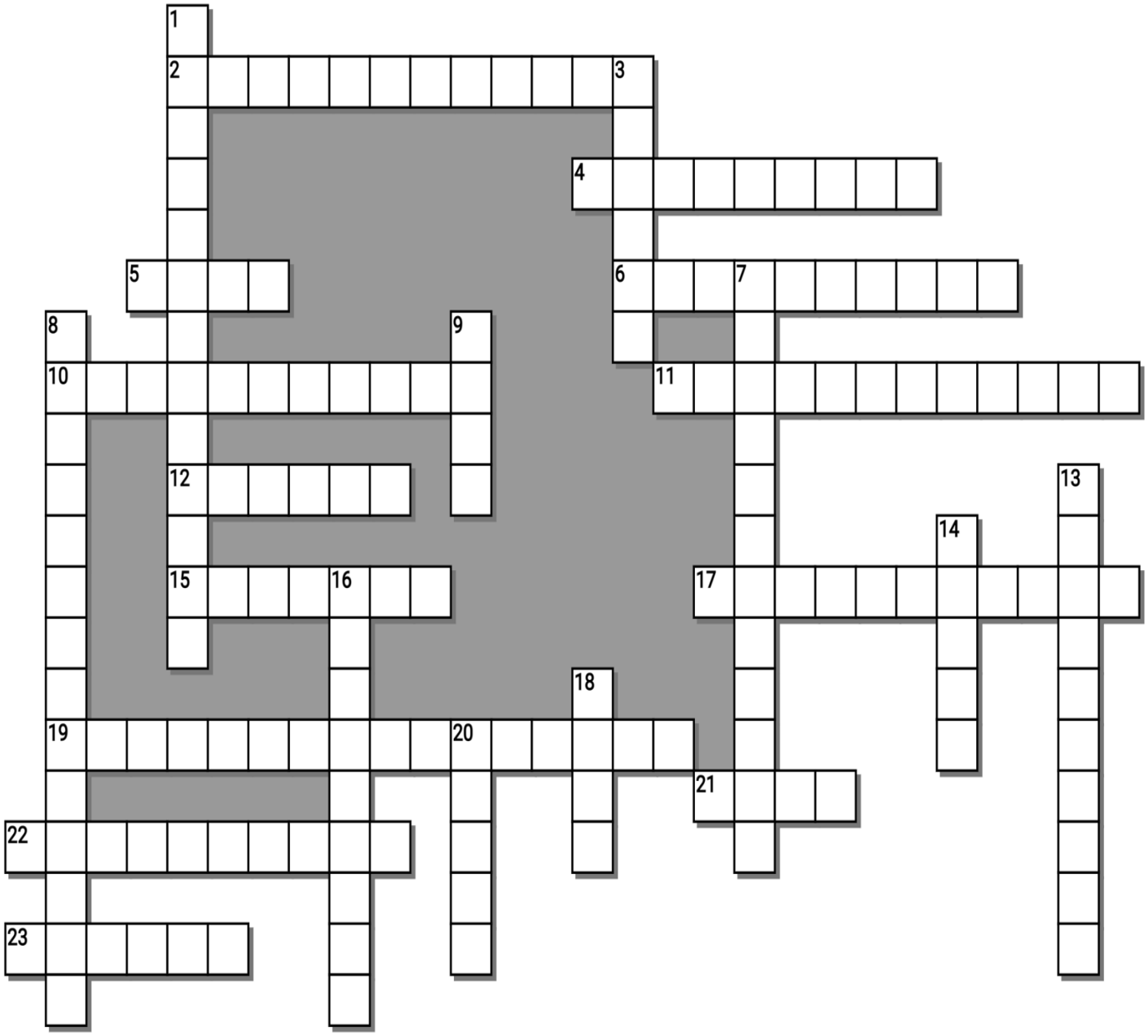
Down

1. Two types of thermoregulation _____ regulation. Behavioral regulation.
3. _____ seed dispersal: When animals aid carrying away seeds.
7. Movement based on the intensity of light
8. Is a process that converts carbon dioxide into organic compounds, especially sugars, using the energy from sunlight.
9. _____-bloodedness (endothermy): Maintaining a warm body temperature independent of environmental conditions.
13. The movement of an organism either towards or away from a source of light.
14. _____ is essential for life, and all organisms depend on it.
16. All organisms have a range of _____ for the abiotic factors.
18. _____ ecology: A branch of ecology that focuses on the origins of wildland fire and its relationship to the environment that surrounds it, both living and non-living
20. Organisms are affected by _____… Intensity: How bright it is (lumens). How long it lasts? Length of day, seasonal changes. Quality / type of light.

----------teacher can remove this word bank to make puzzle more challenging------

Possible Answers

PHYSIOLOGICAL, ABIOTIC, ADAPTATION, ANIMAL, BEHAVIORAL, BIOTIC, COLD, DISPERSAL, FIRE, HIBERNATION, HYPERTHERMIA, HYPOTHERMIA, ISLAND, LIGHT, PHOTOKINESIS, PHOTOSYNTHESIS, PHOTOTAXIS, PHOTOTROPISM, THERMOREGULATION, WARM, WATER , WIND, TOLERANCE



Unit Notes

Part 1 Review Game Lesson 12

Name:

1-10 = 5 pts * = Bonus + 1 pt,
(Secretly write owl in correct space +1 pt)
Final Question = 5 pt wager

Due: Today
Score ____ / 100

SUNNY SIDE UP	HOT SHOT	ALL WET	ON THE MOVE	ABIOTIC FACTORS Bonus round 1 pt each
1)	6)	11)	16)	*21)
2)	7)	12)	17)	*22)
3)	8)	13)	18)	*23)
4)	9)	14)	19)	*24)
5)	10)	15)	20)	*25)

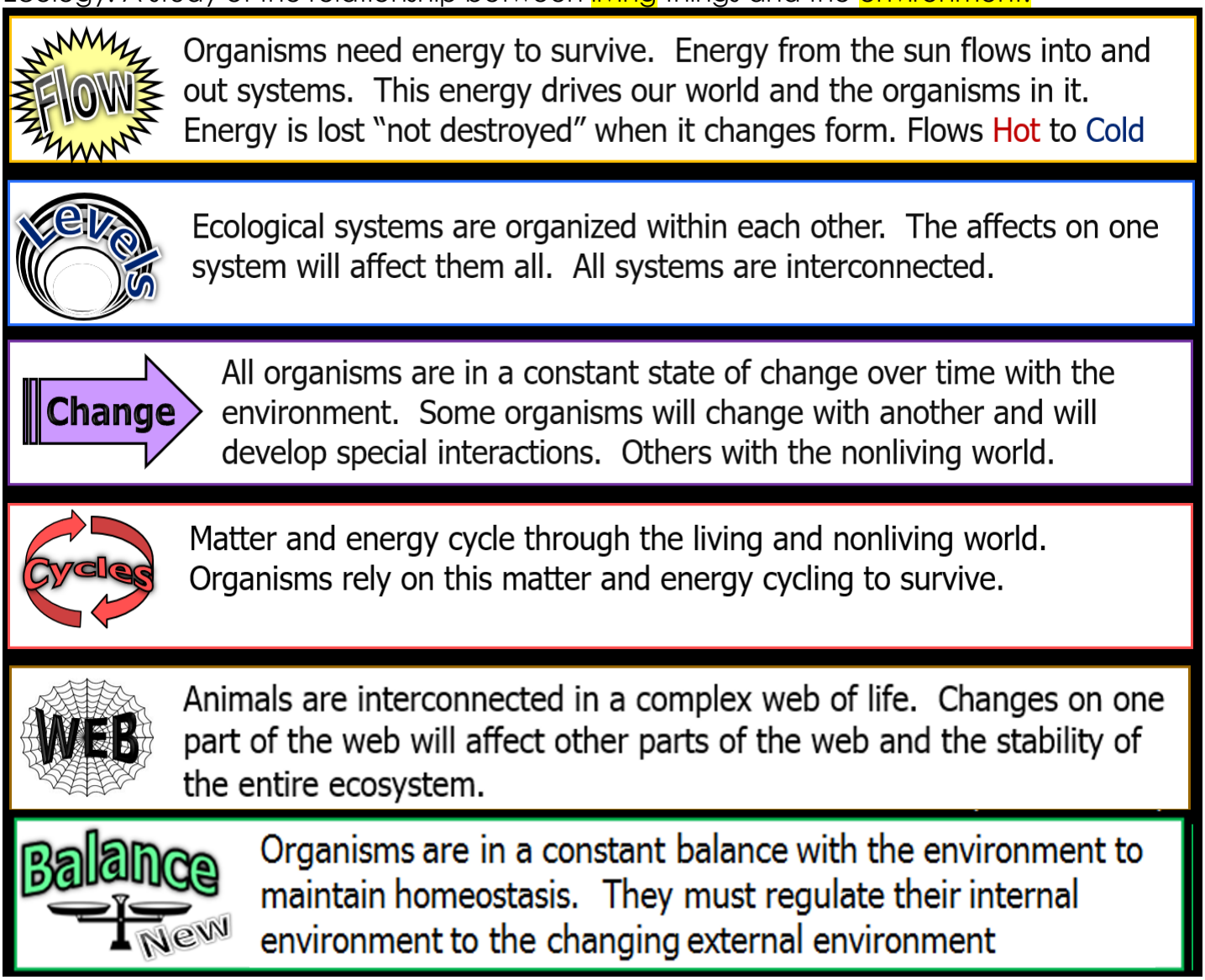
Final Question Wager ___ /5 Answer: _____

Part 1 Abiotic Factors

Name:

Part 1 Lesson 1

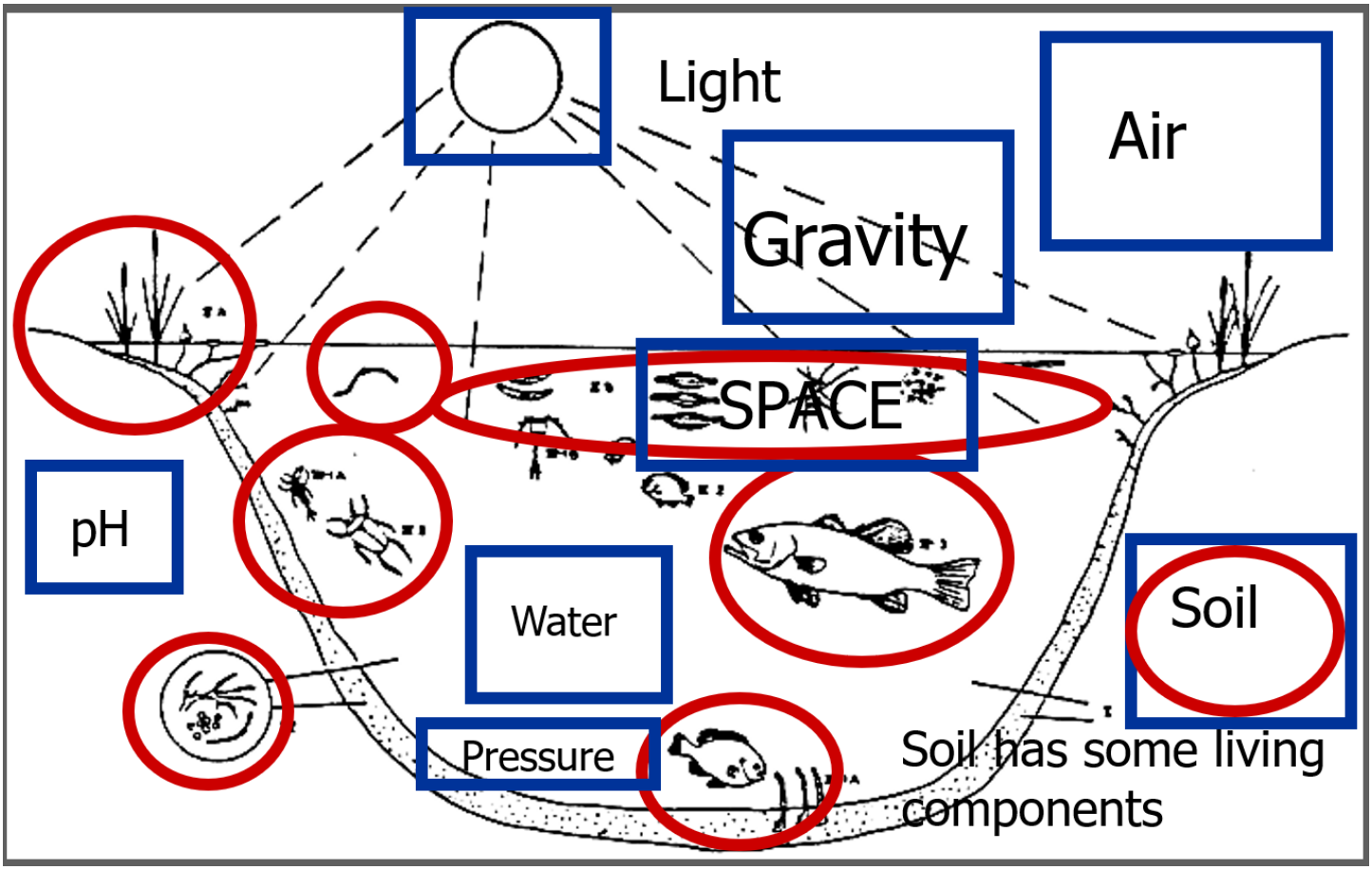
Ecology: A study of the relationship between living things and the environment.



Concept: Everything is connected to the non-living environment.

Abiotic: All non-living chemical and physical factors in the environment.

Biotic: Of, pertaining to, or produced by life or living organisms.



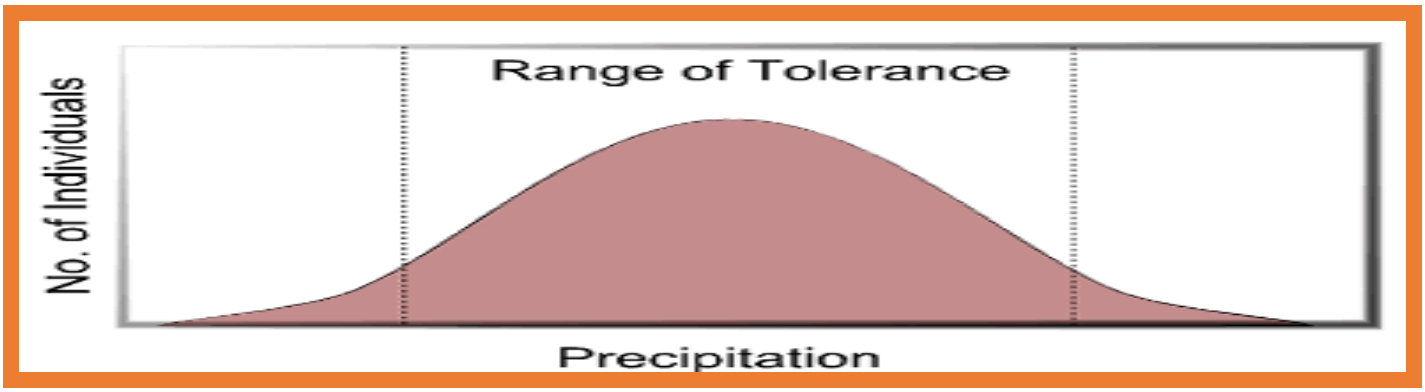
The big seven abiotic (non-living) factors that we will study include…
Moisture, Temperature, Wind, Light, Soil, Nutrients / SPONCH molecules

Which of the abiotic factors discussed is missing from the list below? A.) Light B.) Temperature C.) Moisture D.) Wind E.) Nutrients F.) Soil G.) Cycles / SPONCH	Which of the abiotic factors discussed is missing from the list below? A.) Light B.) Temperature C.) Moisture D.) Wind E.) Nutrients F.) Soil G.) Cycles / SPONCH

Part 1 Lesson 2 Range of Tolerance. Abiotic Factor Light

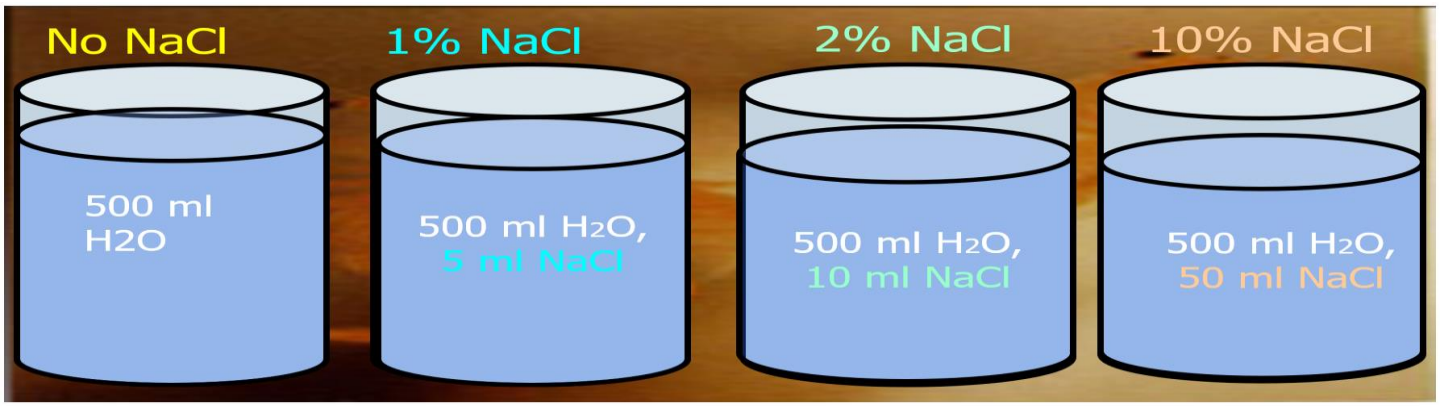
All organisms have a range of tolerance for the abiotic factors.

Please sketch the curve below that shows a species range on tolerance to rainfall as described in the slideshow.



Brine Shrimp and Salt Activity

No Salt 1% NaCl 2% NaCl 10% NaCl 10+% NaCl



What is the range of tolerance (5 of NaCl) for brine shrimp to hatch? Use data to explain.... 10 ml of Salt weighs about 12 grams. The ideal range is the 2% Salt Solution. The 1% is not enough, and the 10% may be a bit too much salt. Brine Shrimp can tolerate a vast range of salinity from 25 to 250 grams per liter, with an optimal range of 60 to 100 grams per liter. They prefer a range from 30 to 35 grams per liter,

Abiotic Factor: Light

Organisms are affected by light…

- Intensity: How bright it is (lumens).
- How long it lasts?
  - Length of day, seasonal changes.
- Quality / type of light.

Light from the sun provides producers the energy to make sugar.

Photosynthesis: Is a process that converts carbon dioxide into organic compounds, especially sugars, using the energy from sunlight.

Factors in the environment that affect the amount of light.

- Aspect– Time of day, morning-noon-dusk.
  - Crepuscular: When animals are active at dawn and at dusk.
- Cloud Cover.
- Seasons.
- Location on earth

Light can also play a role in an organism's movement

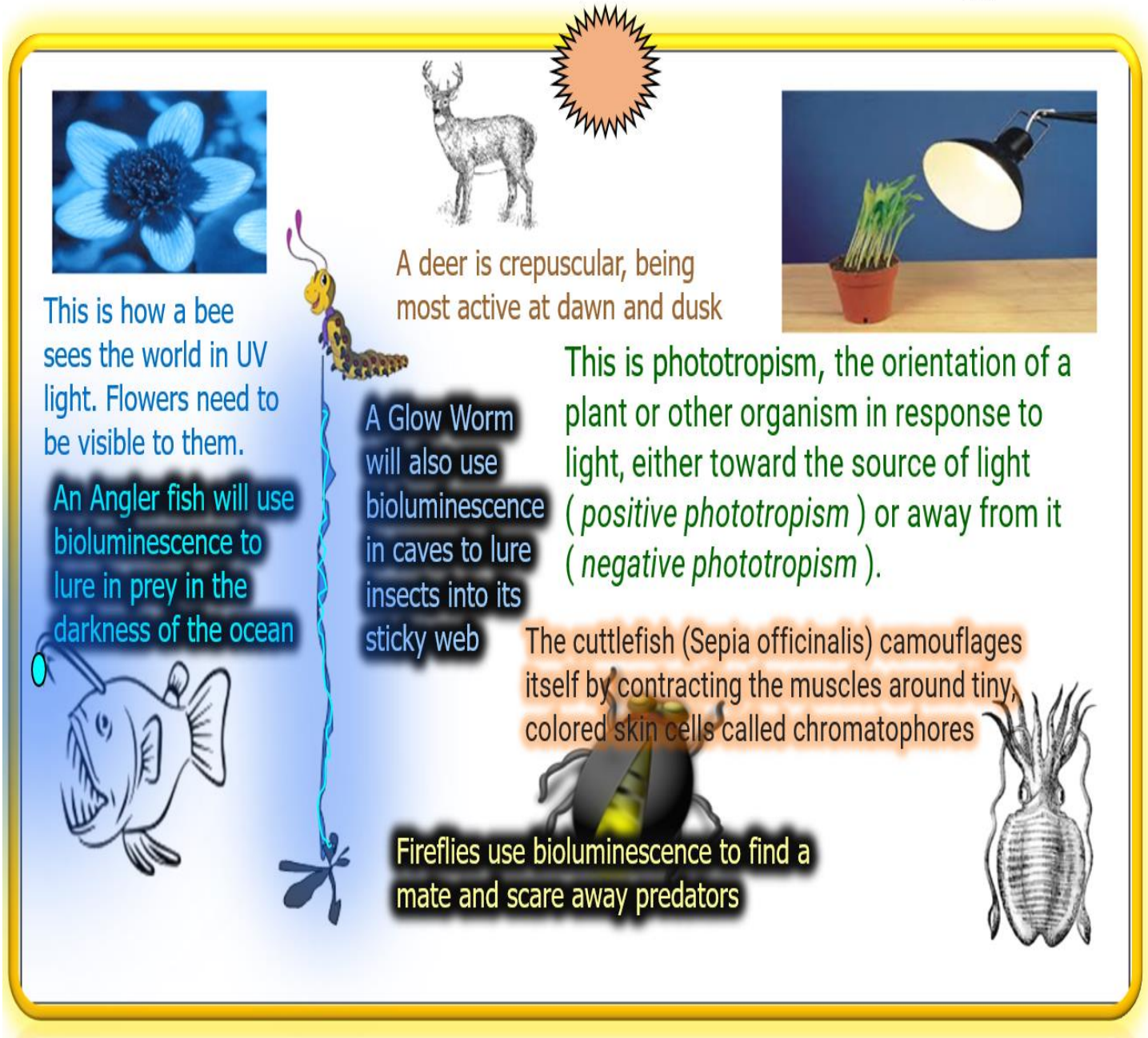
Phototropism: The directional growth of plants in response to light.

Phototaxis: The movement of an organism either towards or away from a source of light.

Bioluminescence: The production of light by a living creature. Can be used to attract and avoid.

Photokinesis – Movement based on the direction of light. Photokinesis is described as positive if the velocity of travel is greater with an increase in light intensity and negative if the velocity is slower.

Describe how the organisms below are connected to light? Using complex vocabulary words that we have learned is encouraged.



Part 1 Lesson 3 Temperature

Temperature can affect organisms by…

- Causes flowers to open and close
- Causing seeds to germinate
- Causing some trees to drop their leaves.
- Affects activity of warm and cold bloodedness animals.
- Creating huge temperature swings in desert from day to night.
- Creating seasonal changes in temperature.

Thermoregulation is the ability of an organism to keep its body temperature within certain boundaries. Remember – Range of Tolerance

Two types of thermoregulation

- Physiological regulation.
- Behavorial regulation.

Please describe the difference between a physical and behavioral adaptations based on how you thermo-regulate on a cold winters day.

Behavioral	Physical
Rubbing hands, putting hands into armpits.	Goosebumps on skin Shivering / Teeth Chattering which is localized shivering.
Moving around, jumping up and down.	Blood vessels will narrow at the surface which reduces heat loss
Holding my "bestie" to stay warm.	Cold temps can cause heart to beat faster and increase blood flow.

Part 1 Lesson 4 Hypothermia / Hyperthermia

Which fox lives in the warm climate, and which lives in the cold climate?

Please record the time in seconds when the following occurs.

Thermoregulation		Time
Shivering	P	
Teeth Chattering	P	
Goosebumps	P	
Cold Dance	B	
Rubbing of Arms	B	
Hugging Yourself	B	

Answers / Times and student will vary. Some students may get goosebumps immediately while others will not. Just stress that our range of tolerance may be a little different per each student but we all need warmth to survive.

What physical, and behavioral adaptations to cold temperatures occurred in your body?
See Chart to the left

What did you learn about yourself and thermoregulation?
How did you compare to everyone else?
Behavioral: Actions or reactions of an organism to the environment.

Behavioral thermoregulation examples.

Move to a warmer or cooler place.
Change posture in one place.
Expand your cells when you want to be warmer.
Reptiles / Amphibians.
Hibernation: Being inactive during winter, and lower metabolism
Decreasing heart rate, blood flow.
Adding layers

Adaptation: A process whereby an organism becomes better suited to its habitat.
Characteristic which aids survival.

Physiological: The functions of the body

Physiological adaptations to temperature.

-These you generally cannot control, your body does them automatically.
-Utilize evaporation.
-Changes in circulation of bloodflow
-Growing or losing insulation.
-Have thermal windows (ears)

Blubber Hands Optional Times will vary

Type of Hands	Times of each student added together and then divide by the number of students who participated.
Bare Skin	
Blubber	

Part 1 Lesson 4 Thermoregulation, Hypothermia and Hyperthermia

Thermoregulation is the ability of an organism to keep its internal body temperature within certain boundaries, even when the surrounding temperature is very different.

Shivering: Muscles contract and relax when it is cold, this generates heat.
Teeth chattering: A form of localized shivering. It means your cold.

Goosebumps: Skin muscles tighten, forming bumps, which cause your hairs to raise, trapping more air and keeping you warmer.

Hypothermia: A decrease in the core body temperature to a level at which normal muscular and brain functions are impaired.

Which is not true of mild hypothermia? A.) Shivering - not under voluntary control. B.) You can still do complex motor functions. C.) Impaired Judgement. D.) You can still walk and talk.	**Which is not true of moderate hypothermia?** A.) Dazed consciousness. B.) Loss of fine motor coordination - particularly in hands - can't zip up parka, due to restricted peripheral blood flow. C.) Slurred speech. D.) Mild shivering. It's uncontrollable at this point E.) Irrational behavior - Person starts to take off clothing, unaware she/he is cold.
Which is not true of severe hypothermia? A.) Shivering occurs in waves, violent then pause, pauses get longer until shivering finally ceases. B.) Person falls to the ground, can't walk, curls up into a fetal position to conserve heat. C.) Muscle rigidity develops - because peripheral blood flow is reduced and due to lactic acid and CO2 buildup in the muscles. D.) Skin is pale. E.) Pupils dilate. F.) Pulse rate increases. G,) At 90 degrees the body tries to move into hibernation, shutting down all peripheral blood flow and reducing breathing rate and heart rate. H.) at 86 degrees the body is in a state of "metabolic icebox." The person looks dead but is still alive.	**Which is not a condition leading to Hypothermia?** A.) Cold temperatures + wind chills. B.) Improper clothing and equipment. C.) Wetness. D.) Fatigue, exhaustion. E.) Dehydration. F.) Good food intake. G.) No knowledge of hypothermia. H.) Alcohol intake - causes blood flow problems leading to increased heat loss.

Which is not a condition leading to Hypothermia? A.) Warm temperatures + Sun light B.) Improper clothing and equipment C.) Wetness D.) Fatigue, exhaustion E.) Dehydration F.) Poor food intake G.) No knowledge of hypothermia H.) Alcohol intake - causes blood flow problems leading to increased heat loss.	**Which is not a condition leading to Hypothermia?** A.) Cold temperatures + wind chills. B.) Improper clothing and equipment. C.) Wetness. D.) Fatigue, exhaustion. E.) Dehydration. F.) Poor food intake. G.) No knowledge of hypothermia. H.) Warm fluid intake - causes blood flow problems leading to increased heat loss.

Mild Hypothermia Core temperature 98.6 - 96 degrees F Shivering - not under voluntary control. Trouble with complex motor functions (set-up tent, make a fire, zip parka, cell phone-call for help) **Conditions Leading to Hypothermia** Cold temperatures + wind chills. Improper clothing and equipment. Wetness. Fatigue, exhaustion. Dehydration. Poor food intake. No knowledge of hypothermia. Alcohol intake - causes blood flow problems leading to increased heat loss.	**Moderate Hypothermia** – Core temperature 95 - 93 degrees F Dazed consciousness. Loss of fine motor coordination - particularly in hands - Can't zip up parka, due to restricted peripheral blood flow. Slurred speech. Violent shivering. Irrational behavior - Person starts to take off clothing, unaware she/he is cold.	**Severe Hypothermia** - core temperature 92 - 86 degrees and below *(immediately life threatening)* Shivering occurs in waves, violent then pause, pauses get longer until shivering finally ceases. Person falls to the ground, can't walk, curls up into a fetal position to conserve heat. Muscle rigidity develops - because peripheral blood flow is reduced and due to lactic acid and CO2 buildup in the muscles. Skin is pale. Pupils dilate. Pulse rate decreases. At 90 degrees the body tries to move into hibernation, shutting down all peripheral blood flow and reducing breathing rate and heart rate. at 86 degrees the body is in a state of "metabolic icebox." The person looks dead but is still alive.

Hyperthermia: Having a body temperature that is too high, causes heart failure, among other problems and death.

What are some conditions that lead to hyperthermia? Please describe next to each picture.

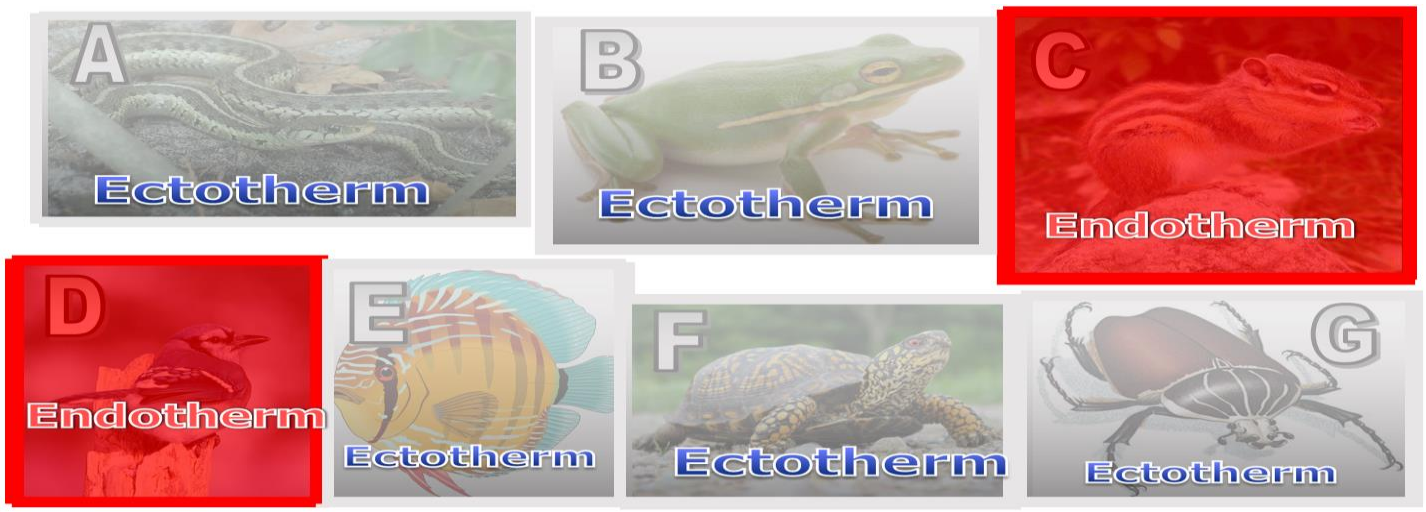
Which two are not heat exhaustion warning signs? A.) Abnormally high temperature. B.) So hot you might collapse. C.) Pale Appearance. D.) So dehydrated you can't sweat. E.) Hyperactivity	Which tip is bogus from the list below to avoid heat exhaustion and heat stroke. A.) Be smart about when you are going to be active, high noon on the hottest day ☹. B.) Know the weather and heat index. C.) Limit your water and rehydrating fluids. D.) Seek shade, and wear loose fitting clothing. E.) Take rest breaks (rehydrate) F.) Place cool damp towels on forehead. G.) Don't drink alcohol.
Which tip is bogus from the list below to avoid heat exhaustion and heat stroke. A) Be smart about when you are going to be active, high noon on the hottest day ☹. B) Know the weather and heat index. C) Drink plenty of water and rehydrating fluids. D) Avoid shade, and wear tight fitting clothing. E) Take rest breaks (rehydrate) F) Place cool damp towels on forehead. G) Don't drink alcohol.	Which tip is bogus from the list below to avoid heat exhaustion and heat stroke. A) Be smart about when you are going to be active, high noon on the hottest day ☹. B) Know the weather and heat index. C) Drink plenty of water and rehydrating fluids. D) Seek shade, and wear loose fitting clothing. E) Avoid rest breaks. F) Place cool damp towels on forehead. G) Don't drink alcohol.

Describe how you have a range of tolerance when it comes to temperature. Please use the words below in your discussion of this topic.

Hypothermia	**Hyperthermia**
A humans body temperature should be close to 98.6F. Hypothermia is a real and serious problem. If you core body temperature drops below 98 degrees than you can start to experience hypothermia. Shivering, goosebumps and changes in blood flow can happen, but being prepared, and getting warm are most important. We're not very well adapted to survive in extreme cold weather without preparedness.	We're equally challenged when it comes to warm temperatures. We need to maintain a core temperature of 98.6 F. We can sweat to cool down, but seeking shade and cooler temperatures, drinking water, and being aware of conditions is most important to stay safe when its extremely hot.

Part 1 Lesson 5 Warm and Cold Bloodedness

Which from the pictures below has general warm and cold-bloodedness?



Warm-bloodedness (endothermy): Maintaining a warm body temperature independent of environmental conditions.

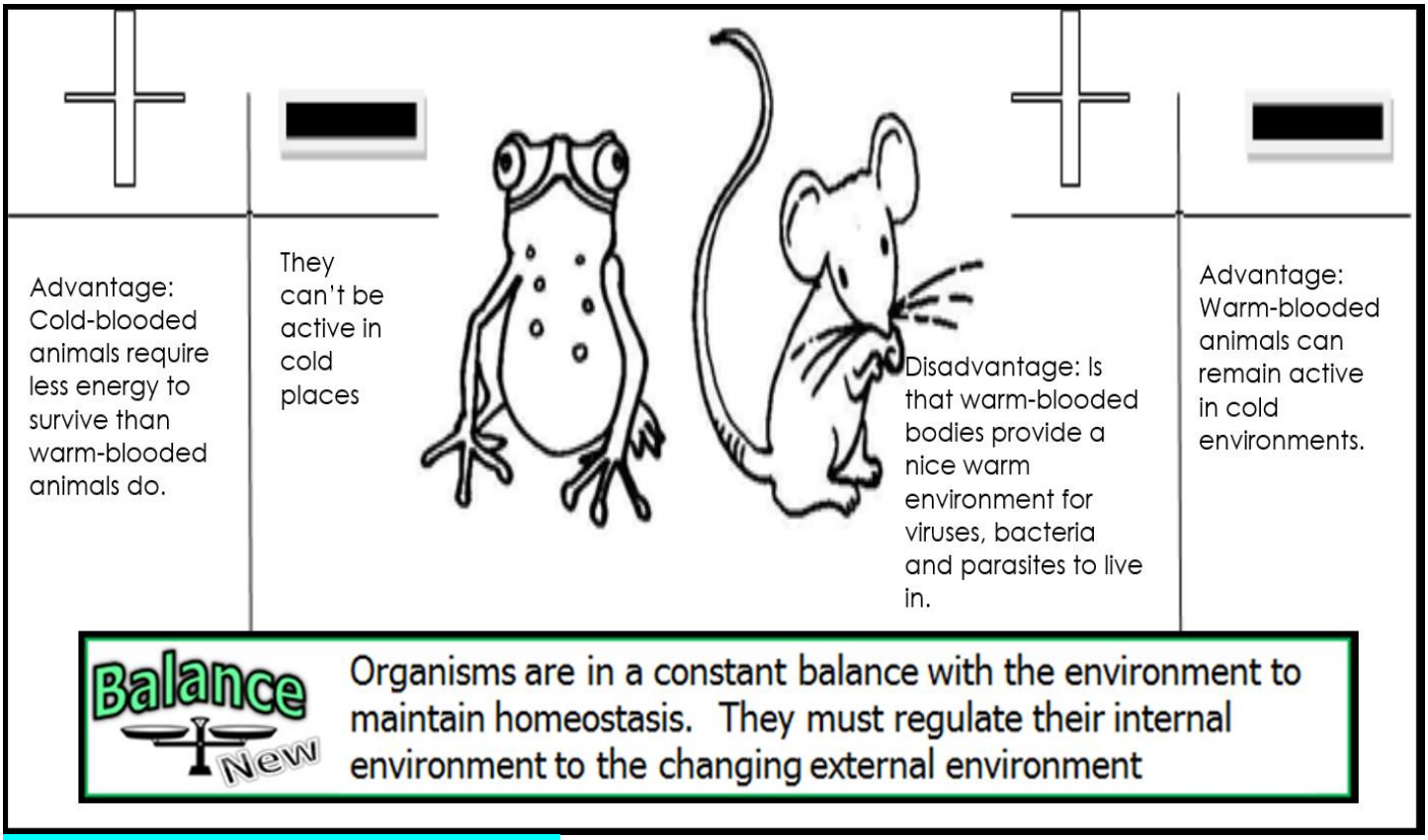
Advantage: Warm-blooded animals can remain active in cold environments.
Disadvantage: Is that warm-blooded bodies provide a nice warm environment for viruses, bacteria and parasites to live in.

Cold-Bloodedness: When organisms can't regulate their internal temperature. When it's cold they can't be active, when it's warm they're more active.

Why is this turtle sitting on a log? Explain using some terms discussed in class. Turtles are cold-blooded animals, so they cannot control their body temperature internally. The only way they have to raise their body temperature is to bask to absorb warmth and vital UV rays	

Hibernation/ torpor: A state of inactivity and metabolic depression in animals.
(Slow breathing, lower body temp)

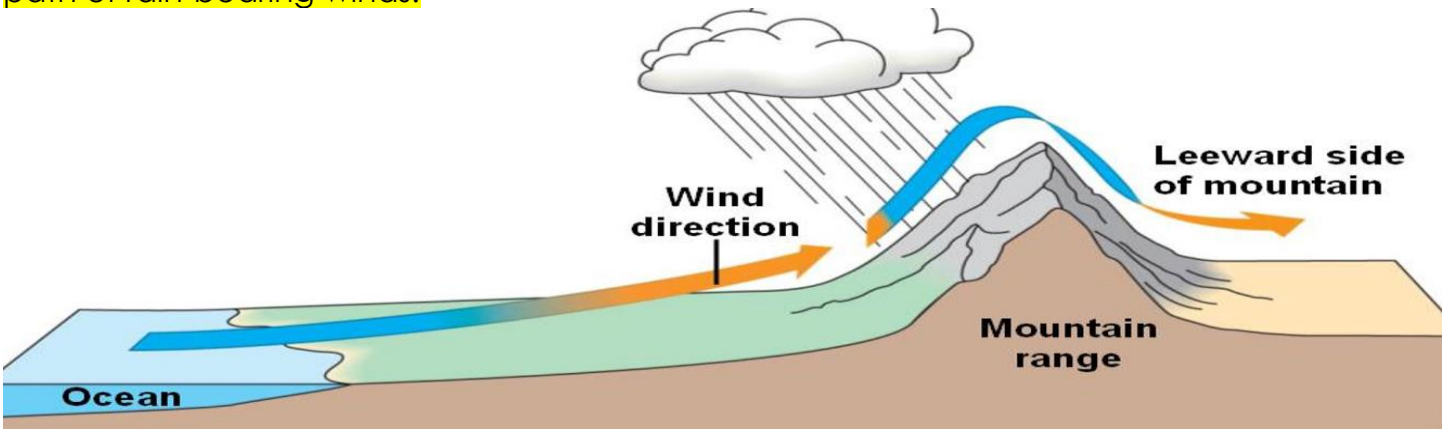
Advantage: Cold-blooded animals require less energy to survive than warm-blooded animals do.
Disadvantage… They can't be active in cold places during the winter.



Part 1 Lesson 6 Abiotic Factor: Water
Water availability varies greatly on this planet.

What is Mtn Rain Shadow Effect?

Mtn. Rain Shadow Effect: The relatively dry area on the leeward side of high ground in the path of rain-bearing winds.



Water is essential for life, and all organisms depend on it.

Water requirements and plants.

- Hydrophytes: Plants which live in water.
- Mesophytes: Plants with average water needs.
- Xerophytes: Plants which grow in dry environments.

Adaptations of plants to survive with minimal water include.

- Using stomata: Structures that can open and close to keep water in when dry.
- Thick waxy cuticles to keep water in (succulents, cacti)
- Small leaves, or absence of leaves.
- Water storage tissues.
- Deep roots

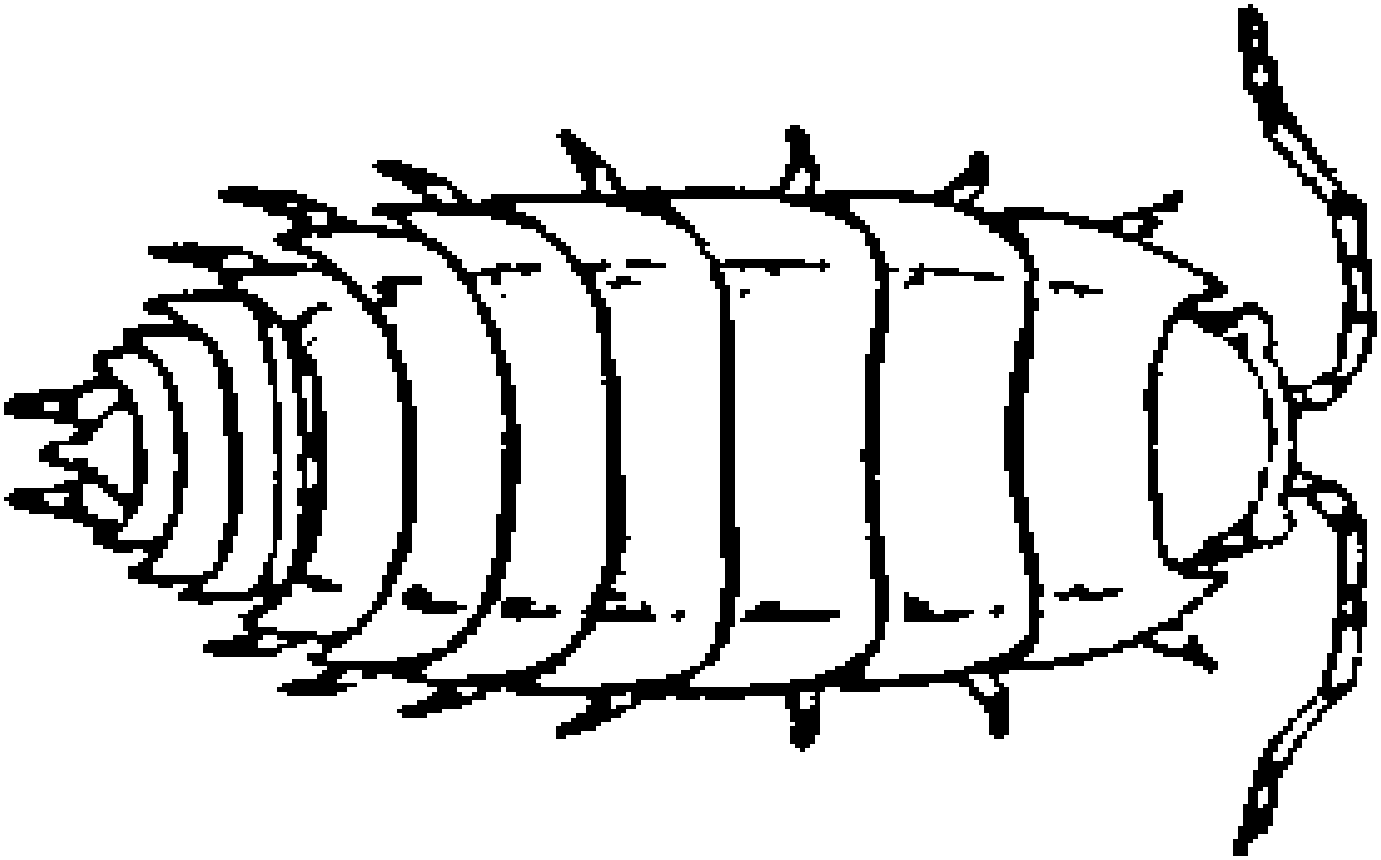
How animals have adapted to low water availability?

- Body covering can limit water loss.
  - Insect chitin can keep in water.
- Body tissue that retain water.
- Some small animals can absorb water from the air in morning (dew), then go underground.
  - -Rare desert frogs and some insects.
  - -Eat prey items that are full of water and have really dry feces.

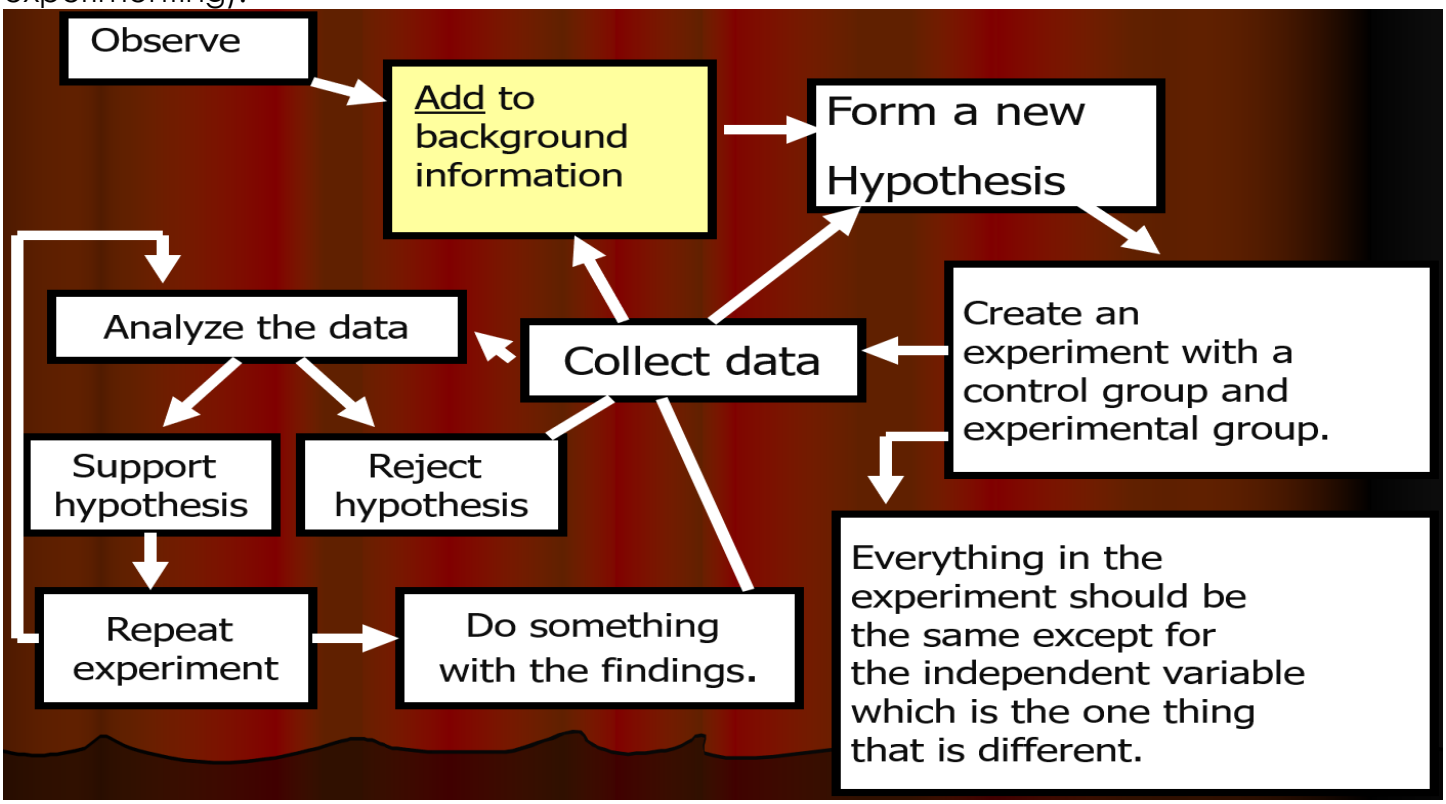
Warning! Two Part Question. Please add desert plants and animals to the scene below. Provide text around your sketches that describe how these organisms are adapted to survive the high temperatures, and low moisture.

Part 1 Lesson 7 Isopod Lab

Make a detailed observation of a terrestrial Isopod. Try and put some accurate information near your drawing as you learn more about this species.



Scientific Method: A process that is the basis for scientific inquiry (questioning and experimenting).



Variable: Changing quantity of something.

Independent: (Change) The variable you have control over, what you can choose and manipulate.

Dependent: (Observe) What you measure in the experiment and what is affected during the experiment.) (Ex, color change, change in mass)

Control: (Same) Quantities that a scientist wants to remain constant so it a fair test.

A student wants to determine if varying levels of fertilizer will increase the fitness of a plant. She sprays each plant every day with low, medium, and high levels of fertilizer. The plants are given the same soil, water, and light for one month. At the end she measures the number of leaves, plant height, and number of flowers. Problem? Does fertilizer help a plant to grow? Independent Variable? Amount of fertilizer (grams) Dependent Variable? Growth of the plant, Height, number of leaves, flowers, etc Control? Same amount of soil, light, water, space, all the same.	A student wants to find out how cigarette smoke blown into a small greenhouse of plants damages the plant. The student grows two small plants in separate clear plastic soda bottles. The student injects one with cigarette smoke periodically. Both are watered and given the same light conditions. The student records the height, number of leaves, and flowers of both plants every day for one month. Problem? = Does cigarette smoke damage plants? Independent Variable = Cigarette Smoke Dependent Variable = Height of plants, leaves, flowers. Control = Both containers were identical except one was given cigarette smoke (independent variable).

A student wants to find out if worms help plants grow. The student uses four containers. The first container only contains soil. The remaining containers are given increasing numbers of worms. The same numbers of small plants are placed in each and given the same soil and growing conditions. Problem? = Do worms help plants grow? Independent Variable = Worms Dependent Variable = Fitness of Plants Control = Same soil, sunlight, water, etc.	A student wants to find out if Sow Bugs prefer a wet environment over a dry one. The student creates a chamber with two rooms and one door. One environment has a moist floor and the other is dry. Sowbugs are placed into the chamber and their location recorded every minute for an extended time period. Problem? = Do Sow Bugs prefer a moist environment? Independent Variable = Moisture Dependent Variable = Number of Sow Bugs in each room. Control = Same light, chamber, no food etc.

Isopod Research for Lab Report

Place Isopod in small container with a piece of wet paper towel laid evenly on the floor.

General information about the species:
Terrestrial isopods comprise a group of crustaceans that have evolved a terrestrial lifestyle and represent keystone species in terrestrial ecosystems, contributing to the decomposition of organic matter and regulating the microbial food web.

Website: Title:

Author: Year:

Where are they found? / How are they connected to the non-living environment?
They are found in cool, damp places under rocks, rotting wood, and decaying vegetation. The female carries up to 200 eggs in a brood pouch located underneath her body.

Website: Title:

Author: Year:

Please record some additional information from a third source in the space below.
Land isopods have special adaptations allowing them to live on land. They will drown if submerged in water too long. They have gills, however, which must be kept moist. This is why they live in damp, humid places such as under rocks and logs, have nocturnal habits, and some can roll up in a ball (as pillbugs do).

Website: Title:

Author: Year:

Isopod Lab Set-up / Q's

Partner:_____

Please complete the four terms below as they relate to the project you have selected.

Problem:_____

_____

Independent Variable:_____

_____

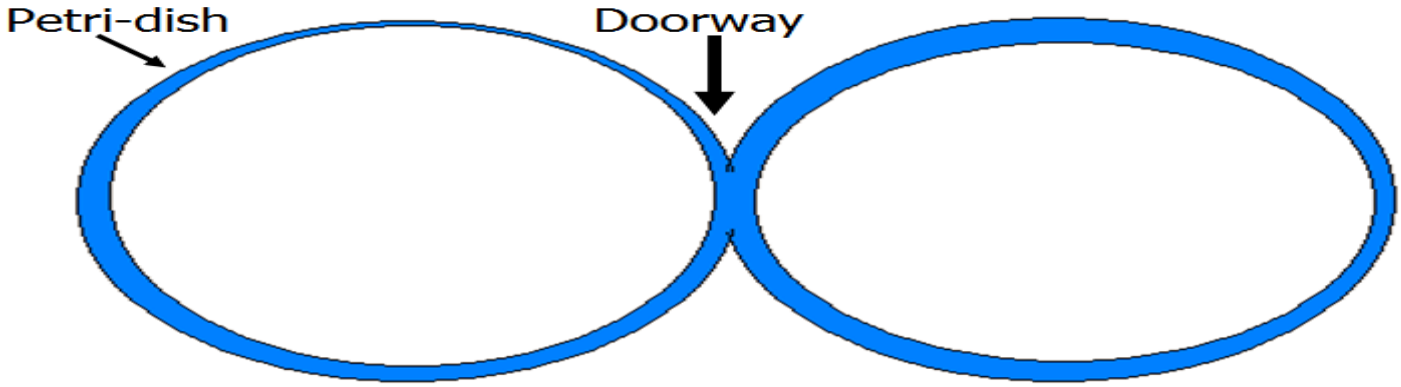
Dependent Variable:_____

_____

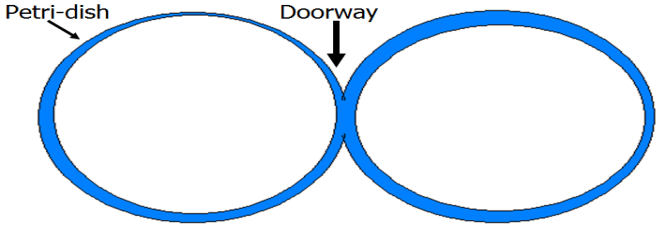
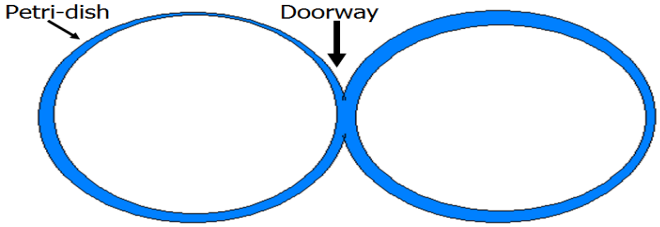
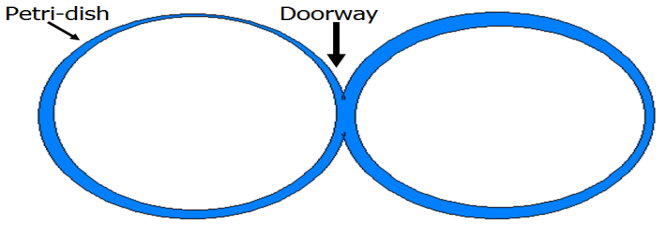
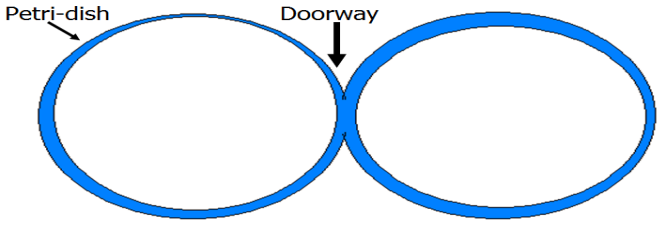
Control:_____

_____

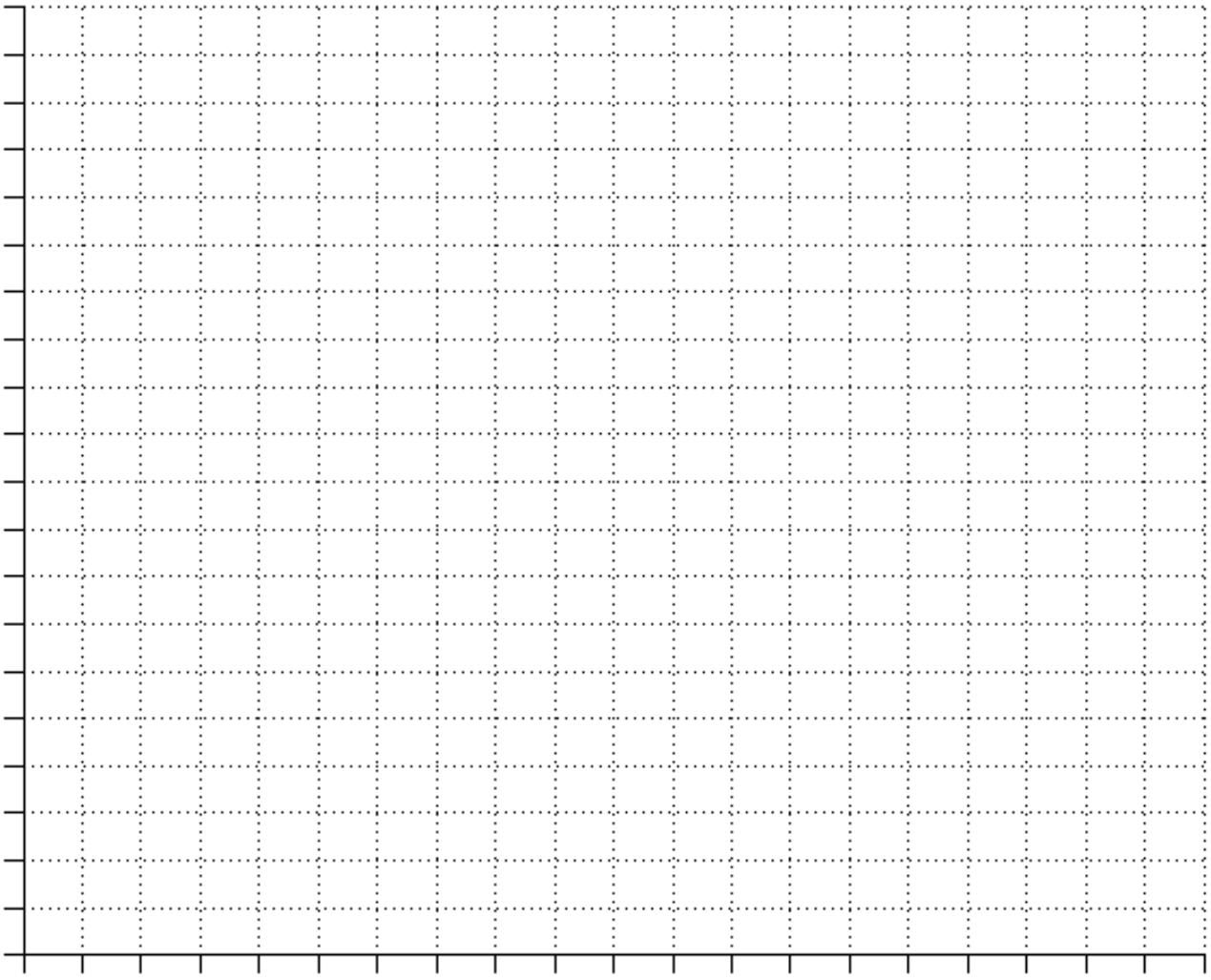
Please describe your set-up with visuals.



Please record what you are testing each day by writing or sketching in the pictures. (Control Day?)

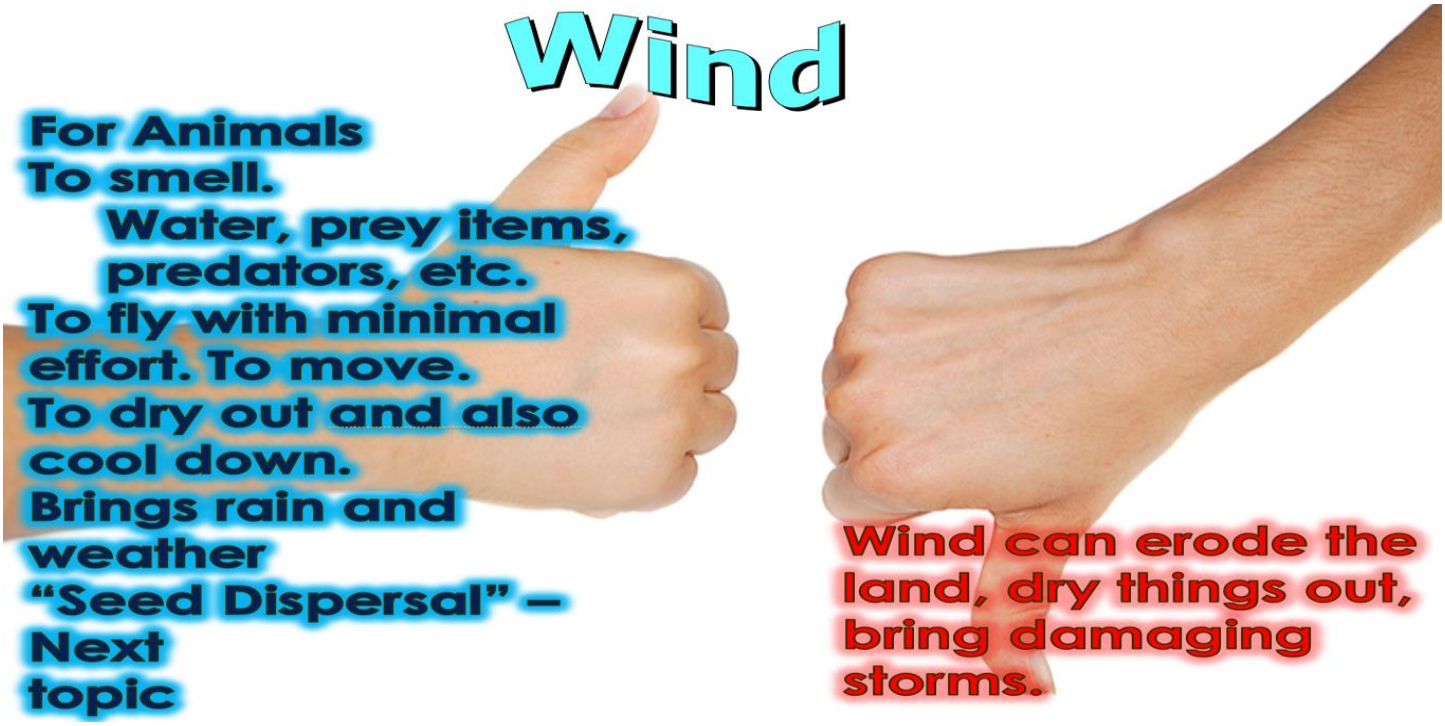
Test Day #1 	Test Day #2 
Test Day #3 	Test Day #4 

Please graph your data for total Isopods. (Ex. - Can add up all of your light and Dark for all four days).



Part 1 Lesson 8 Wind

What are some of the positives and negatives of wind?



Animals use wind…

To smell.

Water, prey items, predators, etc.

To fly with minimal effort.

To move.

To dry out and also to cool down.

Plants use wind

To pollinate.

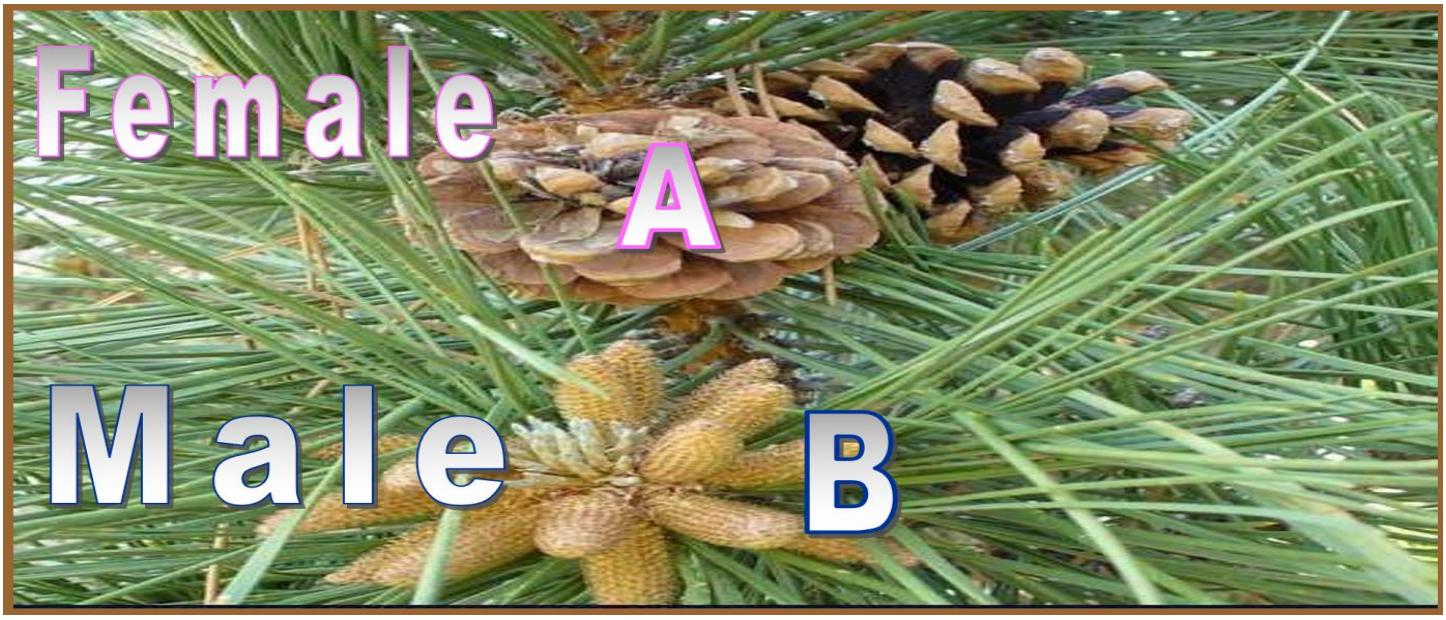
Pollination: The transferring of pollen (plants sex cells) from one plant to another.

To disperse seeds.

Which flower uses wind to pollinate, and which uses insects? Why?

Letter A is attracting insects with nectar, colorful flow displays, and adaptations in the flower to disperse pollen on to visiting pollinators. Letter B uses wind. It is hanging in the wind for the pollen to be dispersed. It doesn't invest energy into nectar or colorful flowers.

Which cone is the male cone, and cone is the female cone?



Please describe some ways that plants and animals utilize wind using the pictures below.

Plants can disperse seeds by…

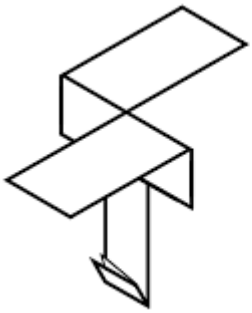
Wind.
Water.
Animal.
Tension.
Fire.

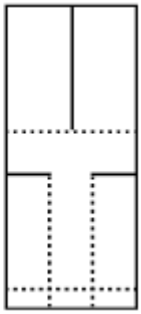
Why is it so important to disperse your seeds a great distance from your mother?
By getting the seeds far away from mother…

- Competition between the parent plant and the offspring for food and water is reduced.
- It reduces overcrowding.
- It provides opportunities to spread the plant to new localities.

Wind Dispersal: When wind is used to disperse either pollen or seeds.
Most common dispersal mechanism.

Sketch out your wind dispersed seed that you are going to build for the wind dispersal challenge. What materials is made of? Does it mimic a particular wind dispersed seed?

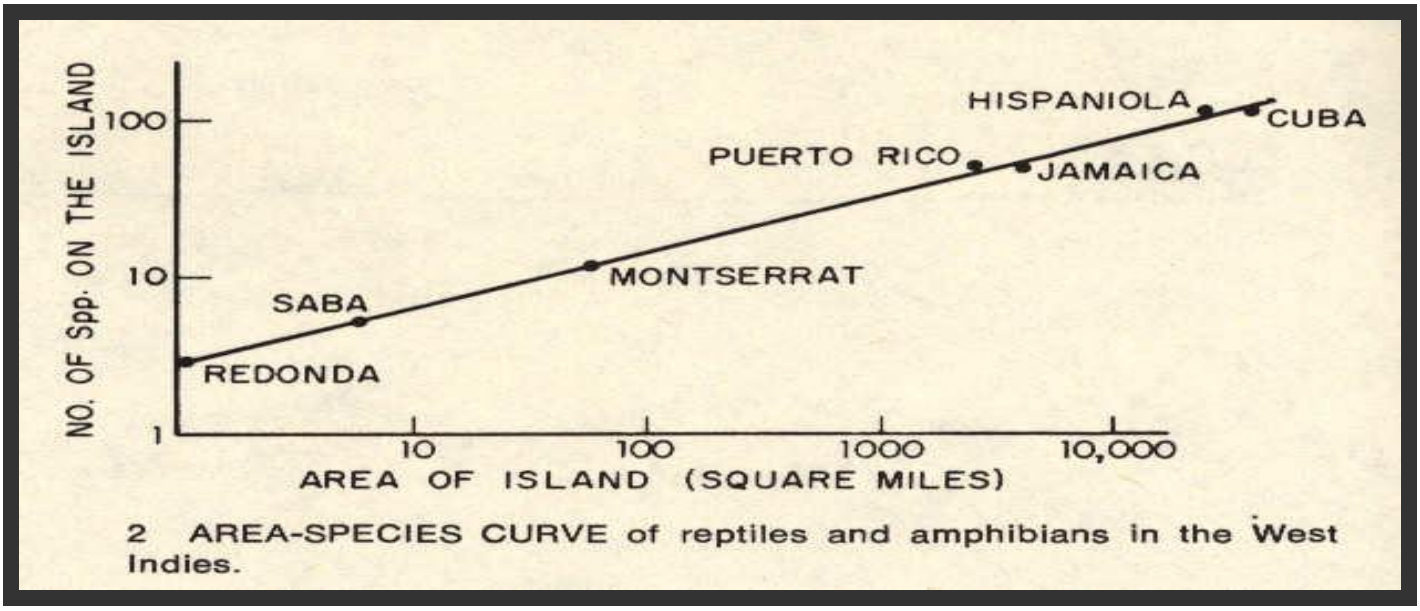




Part 1 Lesson 9 Water Dispersal, Island Biogeography

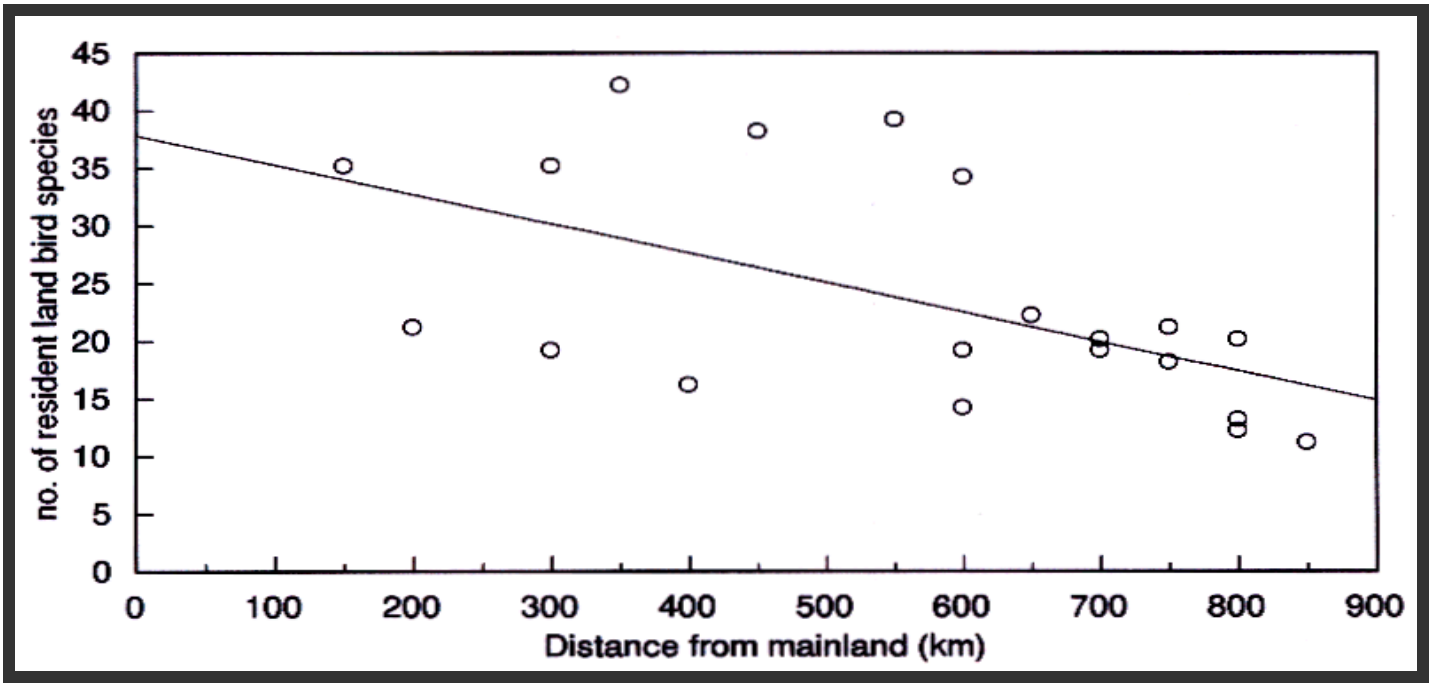
Water Dispersal: The seeds or fruits are dropped from the plant into rivers, lakes or seas. The seeds float then wash up and germinate.

Island Biogeography: The study of rates of colonization and extinction of species on islands.



2 AREA-SPECIES CURVE of reptiles and amphibians in the West Indies.

Which Islands are the largest? Cuba and Hisponal
Which Islands are the smallest? Redonda and Saba
Which islands have the greatest number of species of reptiles and amphibians? The Largest Islands such as Cuba
Which island has the fewest number of reptiles and amphibians? The smallest islands such as Redonda and Saba
How does the size of the island (area) relate to the number of species that can live there?
There are more resources on a large island. That means that there are few extinctions. It's large size also increases migrations to the island. Small islands are the opposite they have an increase in competition for a small amount of resources.
Small islands have small populations.
Small isolated populations can become extinct more easily.



How many bird species can be found on islands that are 850 kilometers (km) from the mainland? Use data in your response.
Roughly 13 bird species can found on Islands 850 km from the mainland.

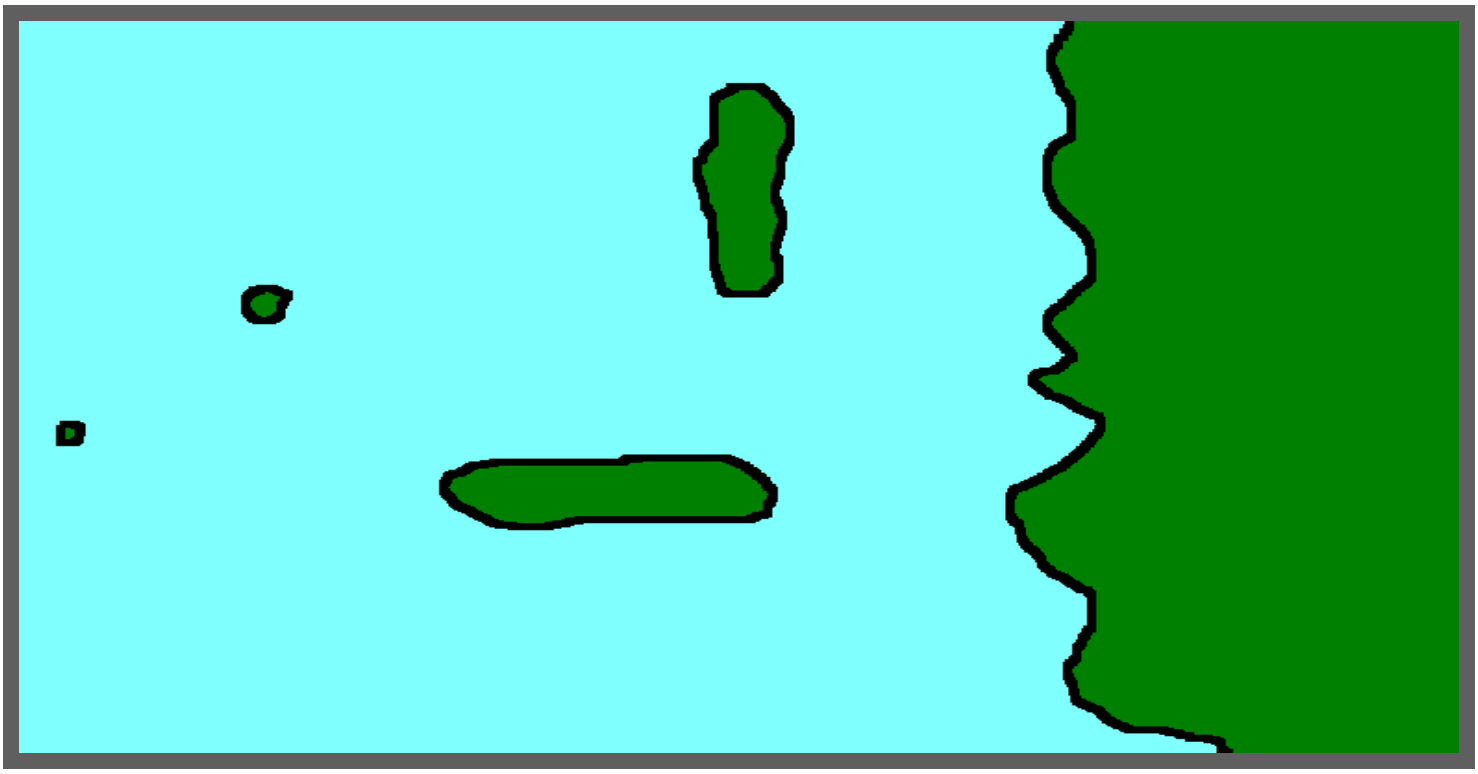
How many bird species can be found on islands that are 150 kilometers (km) from the mainland? Use data in your response.
Roughly 35 bird species can be found on islands that are closest to the mainland.

What's the correlation between the number of bird species and the distance an island is from the mainland?
The further an island is away from the mainland, the fewer number of bird species can be found on it.

MacArthur-Wilson Equilibrium Theory

Island size and distance from mainland determine level of migrations and the rate of extinctions on the island.

Please describe Island Biogeography theory based on the map below. Please describe using text which Island will most likely exhibit the following. ◊ 1) Most migrations and fewest extinctions. ◊ 2) Fewest migrations and most extinctions, ◊ 3) Describing using multiple arrows where island hopping may occur. (Check each diamond when complete)



The Islands closest to the mainland will have the most migrations and fewest extinctions. They are both larger islands. The upper large island faces the mainland and may receive more migrations. The Islands far away will have more extinctions because they're small. They all also have fewer migrations because they're distant from the mainland.

Keep track of the number of migrations that hit the Island using the check system
Answers will vary but Island A usually gets the most "coconuts" landing on its shores, then Island B in a close second. Island C and D are last.

Island	Number of migrations
A	
B	
C	
D	

Why did each island get that amount of migrations? (A,B,C,D)
See Above Answer

Place the following words next to the correct yellow / red Island. Green = mainland

- A - High level of migrations C - High level of extinctions
- B - Small level of migrations D – Low level of extinctions

ISLAND #1 – Most migrations and fewest extinctions
ISLANDS #2 – Second most migrations
ISLAND #3 -Island Hopping may happen here
ISLAND #4 -Most Extinctions and fewest migrations

Part 1 Lesson 10 Animal Dispersal

Animal seed dispersal: When animals aid carrying away seeds.

Animal dispersal.

- Animals help disperse pollen to fertilize plants.
-They carry and drop seeds.
-Seeds sometimes stick to an animal and hitch a ride to fall off later and in a new location.
-Animals hide stashes of seeds and then forget where.
-Animals eat fruits that contain seeds. They then pass out the seeds many hours later into a nutrient rich, moisture retaining, pile of feces far from plant.
-Humans spread seed crops.

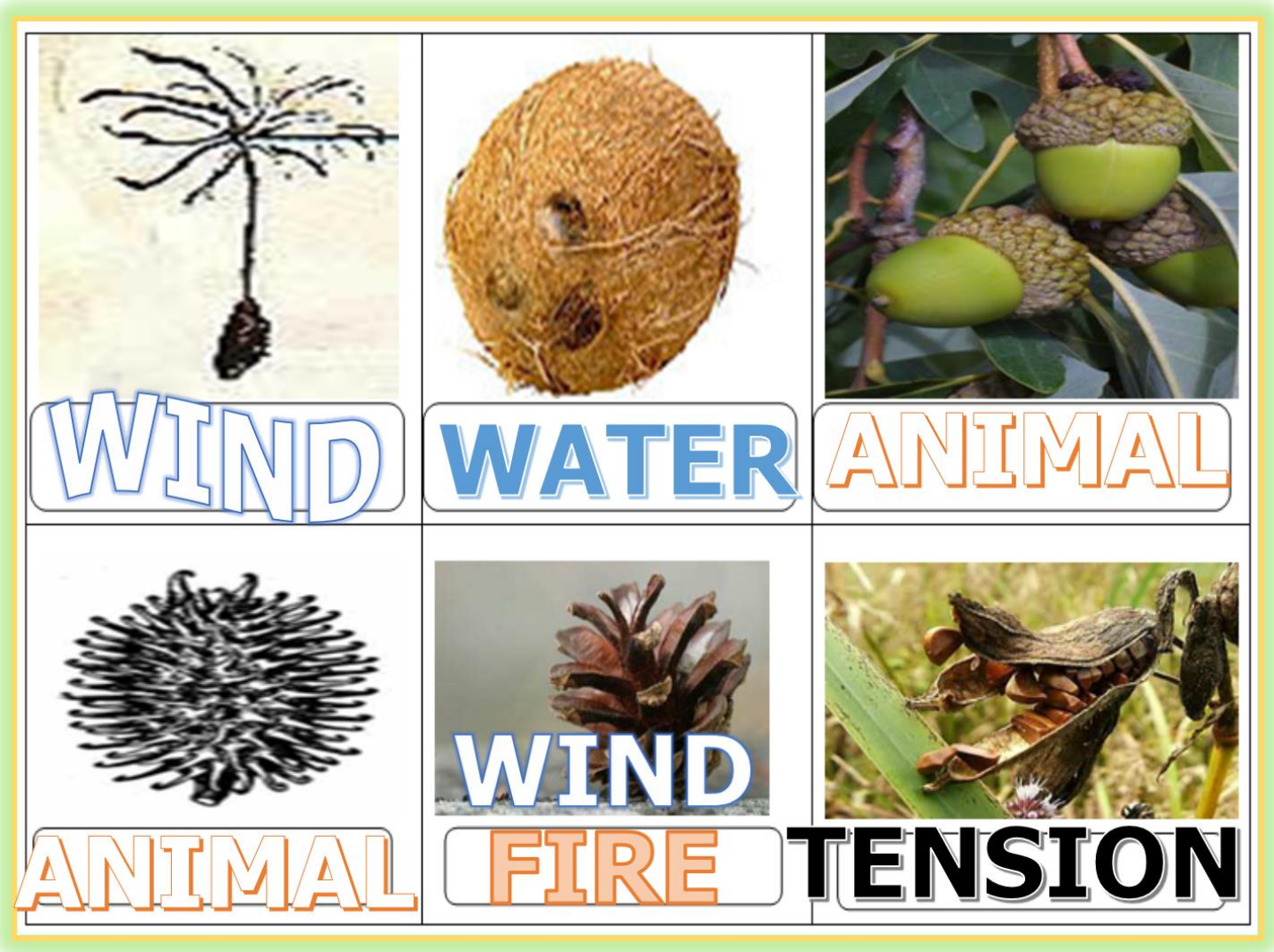
Tension dispersal. Abiotic – doesn't involve animals.
Tension builds and seeds are ejected a short distance

Activity! Quiz 1-10 – Name that seed dispersal mechanism.

- Wind, Water, Animals, Tension,

1) ANIMAL DISPERSAL	2) ANIMAL DISPERSAL	3) WIND DISPERSAL	4) TENSION DISPERSAL
5) WATER DISPERSAL	6) ANIMAL DISPERSAL	7) WIND DISPERSAL	8) WATER DISPERSAL
9) ANIMAL DISPERSAL	10) WIND DISPERSAL	*11) PLANTERS PEANUTS	Score =

Please describe the type of seed dispersal below.



Part 1 Lesson 11 Fire Ecology

Are Forest Fires Good or Bad? Start Question

Fire ecology: A branch of ecology that focuses on the origins of wildland fire and its relationship to the environment that surrounds it, both living and non-living.

Does a forest fire help create plant growth?

Dominating plants are substantially reduced by fire which provide room for the less dominating and sometimes more palatable species.

Fire: Some seeds require a fire event or very hot temperature after they have been dispersed to germinate.

Fire Dependence: This concept applies to species of plants that rely on the effects of fire to make the environment more hospitable for their regeneration and growth.

Fire Adaptation: Plants have evolved with special traits contributing to successful abilities to survive fires at various stages in their life cycles.

Which is not part of the "Let it Burn Philosophy." and the answer is... A.) Large destructive fires result from fuel accumulations above historic levels. B.) Both firefighters and the public risk loss of life or serious injury. C.) Fire poses a serious risk to the ecology of a forest and should be suppressed. D.) Intense or long-lasting smoke caused by large uncontrolled fire can impact air quality and seriously affect respiratory health. E.)The costs of controlling larger and more damaging wildland fires have risen dramatically.	Summary – -Fire is an important and inevitable part of America's Wild Lands. -It's now widely recognized that we must restore fire to many areas from which it has been excluded. -Wild Land fires can produce both benefits and damages - to the environment and to people's interests. -By working together, people can maximize the benefits of Wild Land fire and minimize the damages, including threats to public health.

Which is not part of the "Let it Burn Philosophy." A.) Large destructive fires result from fuel accumulations above historic levels. B.) Forest fires do not have any risks associated with them. D.) Intense or long-lasting smoke caused by large uncontrolled fire can impact air quality and seriously affect respiratory health. E.)The costs of controlling larger and more damaging wildland fires have risen dramatically.	Which is a bogus statement from the summary below? A.) Fire is an important and inevitable part of America's Wild Lands. B.) It's now widely recognized that we must restore fire to many areas from which it has been excluded. C.) Wild Land fires only produce damages to the environment and to people's interests. D.) By working together, people can maximize the benefits of Wild Land fire and minimize the damages, including threats to public health.

Are forest fires good End Question? Please answer this question in the space below.

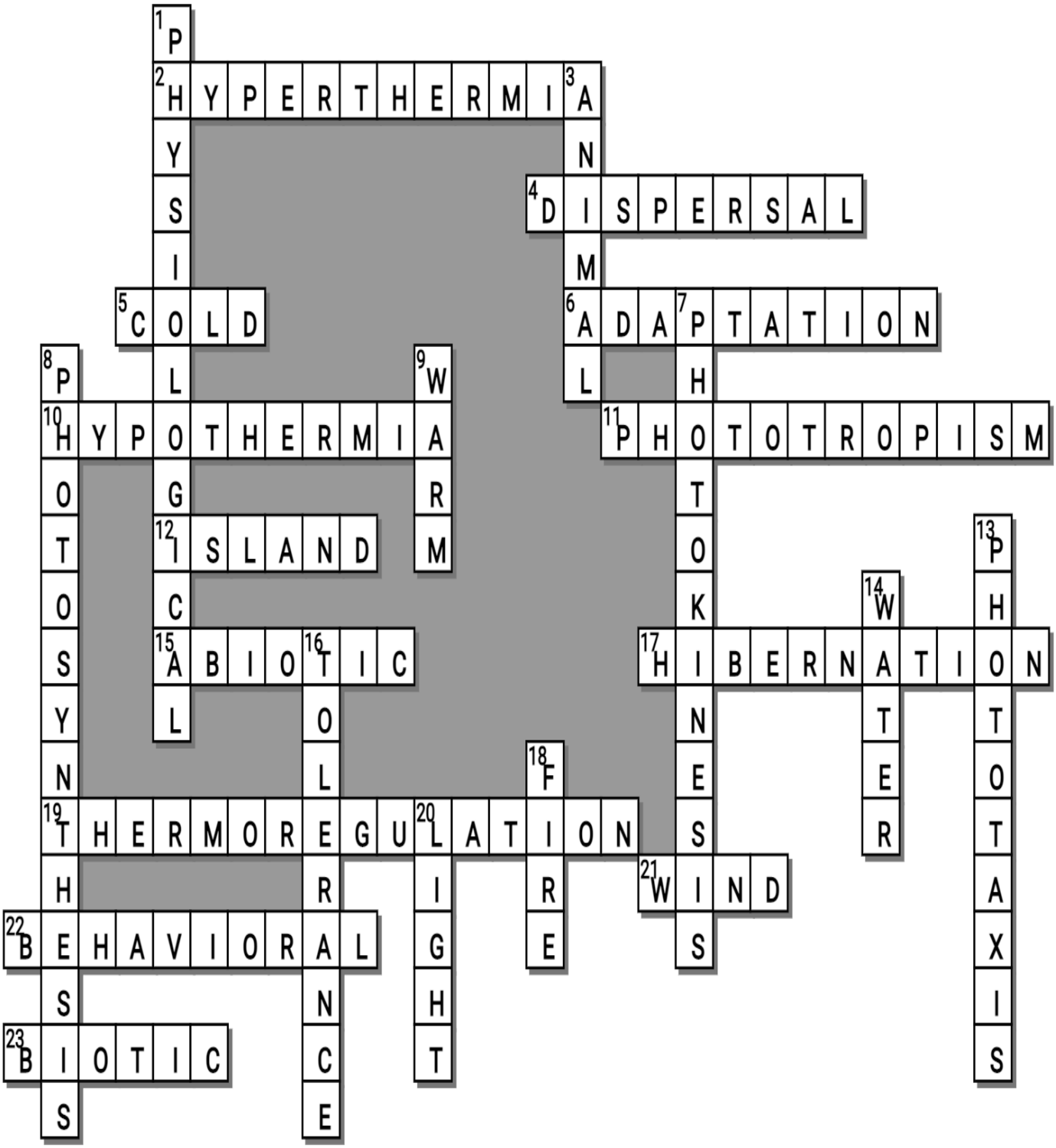
- Summary –
  - Fire is an important and inevitable part of America's Wild Lands.
  - It's now widely recognized that we must restore fire to many areas from which it has been excluded.
  - Wild Land fires can produce both benefits and damages - to the environment and to people's interests.
  - By working together, people can maximize the benefits of Wild Land fire and minimize the damages, including threats to public health.

Across

2. Having a body temperature that is too high, causes heart failure, among other problems and death.
4. Water _____: The seeds or fruits are dropped from the plant into rivers, lakes or seas. The seeds float then wash up and germinate.
5. _____-Bloodedness: When organisms can't regulate their internal temperature. When it's cold they can't move, when it's warm they're more active.
6. A process whereby an organism becomes better suited to its habitat. Characteristic which aids survival.
10. A decrease in the core body temperature to a level at which normal muscular and brain functions are impaired.
11. The directional growth of plants in response to light.
12. _____ Biogeography: The study of rates of colonization and extinction of species on islands.
15. All non-living chemical and physical factors in the environment.
17. _____ / torpor: A state of inactivity and metabolic depression in animals. (Slow breathing, lower body temp)
19. The ability of an organism to keep its body temperature within certain boundaries. Remember – Range of Tolerance
21. _____ Dispersal: When wind is used to disperse either pollen or seeds
22. Two types of thermoregulation Physiological regulation. _____regulation.
23. Of, pertaining to, or produced by life or living organisms.

Down

1. Two types of thermoregulation _____ regulation. Behavioral regulation.
3. _____ seed dispersal: When animals aid carrying away seeds.
7. Movement based on the intensity of light
8. Is a process that converts carbon dioxide into organic compounds, especially sugars, using the energy from sunlight.
9. _____-bloodedness (endothermy): Maintaining a warm body temperature independent of environmental conditions.
13. The movement of an organism either towards or away from a source of light.
14. _____ is essential for life, and all organisms depend on it.
16. All organisms have a range of _____ for the abiotic factors.
18. _____ ecology: A branch of ecology that focuses on the origins of wildland fire and its relationship to the environment that surrounds it, both living and non-living
20. Organisms are affected by _____… Intensity: How bright it is (lumens). How long it lasts? Length of day, seasonal changes. Quality / type of light.



Possible Answers

PHYSIOLOGICAL, ABIOTIC, ADAPTATION, ANIMAL, BEHAVIORAL, BIOTIC, COLD, DISPERSAL, FIRE, HIBERNATION, HYPERTHERMIA, HYPOTHERMIA, ISLAND, LIGHT, PHOTOKINESIS, PHOTOSYNTHESIS, PHOTOTAXIS, PHOTOTROPISM, THERMOREGULATION, WARM, WATER , WIND, TOLERANCE

Part 1 Review Game Lesson 12

Name:

1-10 = 5 pts * = Bonus + 1 pt,
(Secretly write owl in correct space +1 pt)
Final Question = 5 pt wager

Due: Today
Score ____ / 100

SUNNY SIDE UP	HOT SHOT	ALL WET	ON THE MOVE	ABIOTIC FACTORS Bonus round 1 pt each
1) THE SUN	6) THERMO-REGULATION	11) WATER	16) WIND	*21) PERCY
2) CREPUSCULAR (Comes out Dawn and Dusk)	7) ADAPTATION	12) LETTER B HYDROPHYTES	17) WIND DISPERSAL	*22) OPTIMUS PRIME
3) PHOTOTROPISM	8) HYPOTHERMIA	13) ISOPODS	18) ANIMAL DISPERSAL	*23) MY LITTLE PONY
4) LETTER B	9) WARM-BLOODEDNESS (ENDOTHERMY)	14) WATER DISPERSAL	19) FIRE	*24) ANDY
5) BIO-LUMINESCENCE	10) COLD-BLOODEDNESS (Ecothermy)	15) ISLAND HOPPING	20) TENSION EXPLOSION	*25) C3-PO R2-D2

Final Question Wager ___ /5 Answer: HYPERTHERMIA