Part 1 Levels of Organization

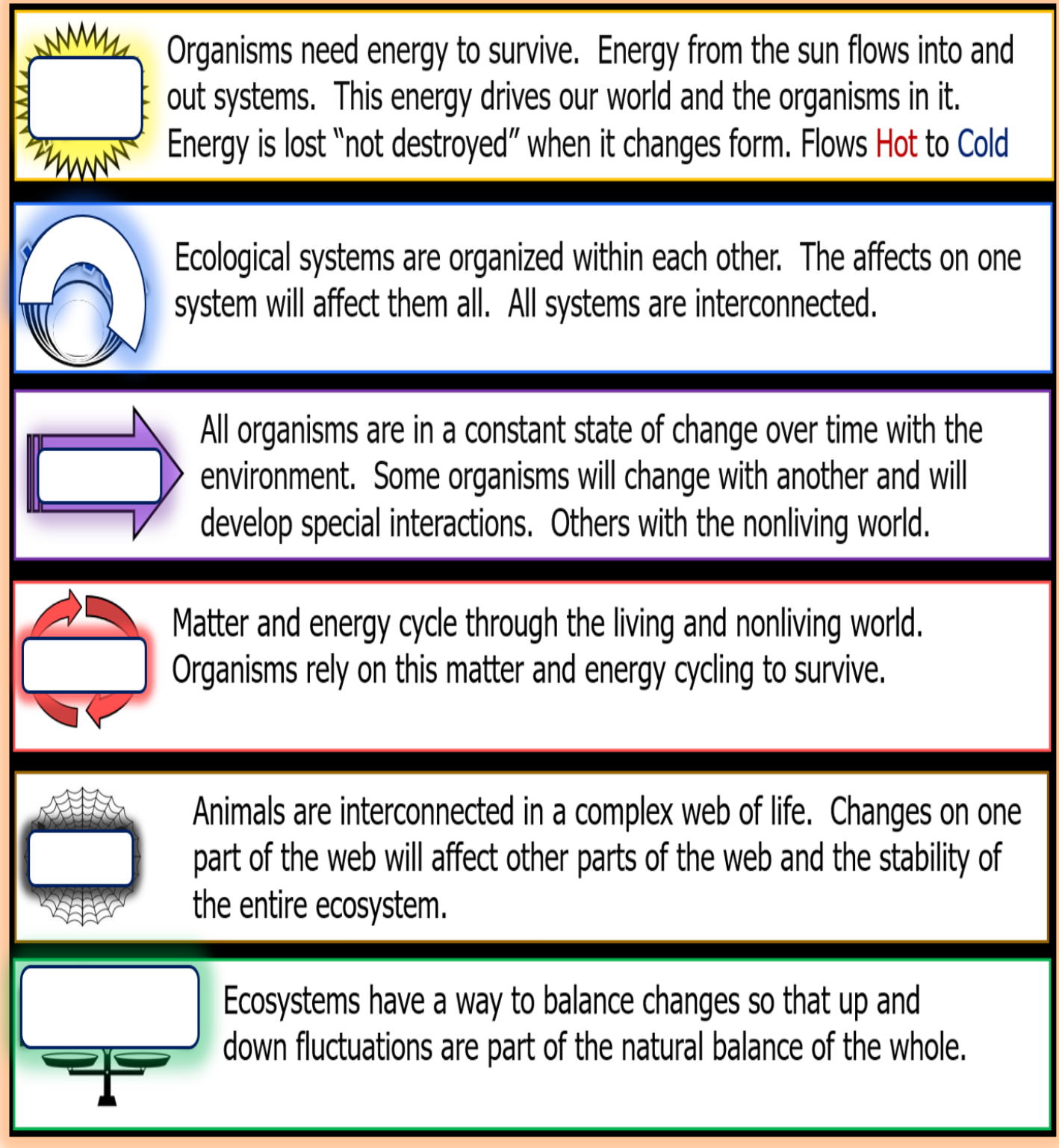
Name:

Part 1 Lesson 1 Levels of Biological Organization

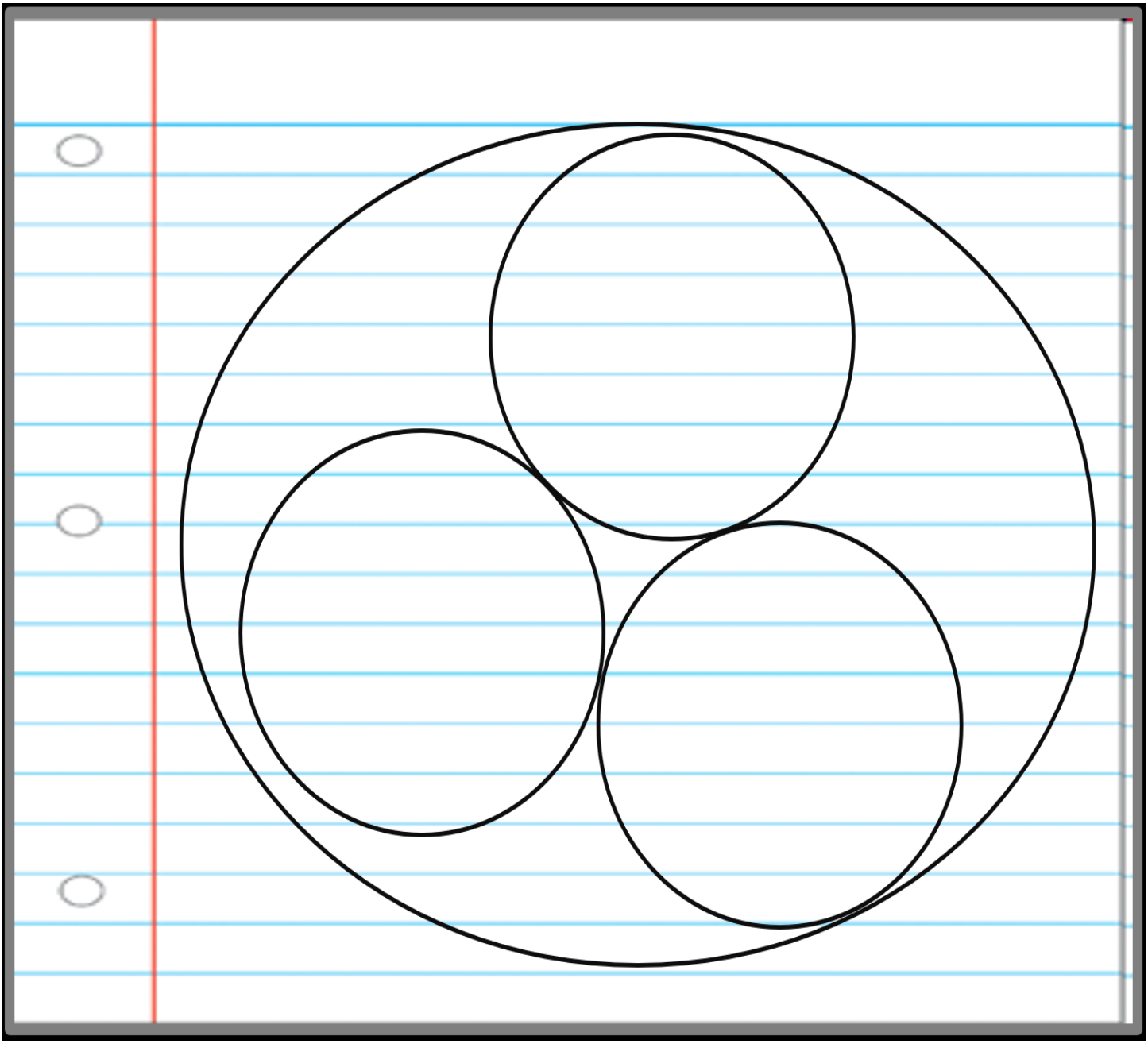
Everything is connected to _____

Ecology: A study of the relationship between _____and the _____.

Please fill-in the correct key word for the big concepts in eco-literacy.



Please complete the diagram as described in the slideshow with the correct labels.



Individual: Organism with unique _____ and _____

Population: Groups of _____ individuals who tend to mate with each other in a limited geographic area.

Ecosystem: The relationships of populations with each other and their _____.

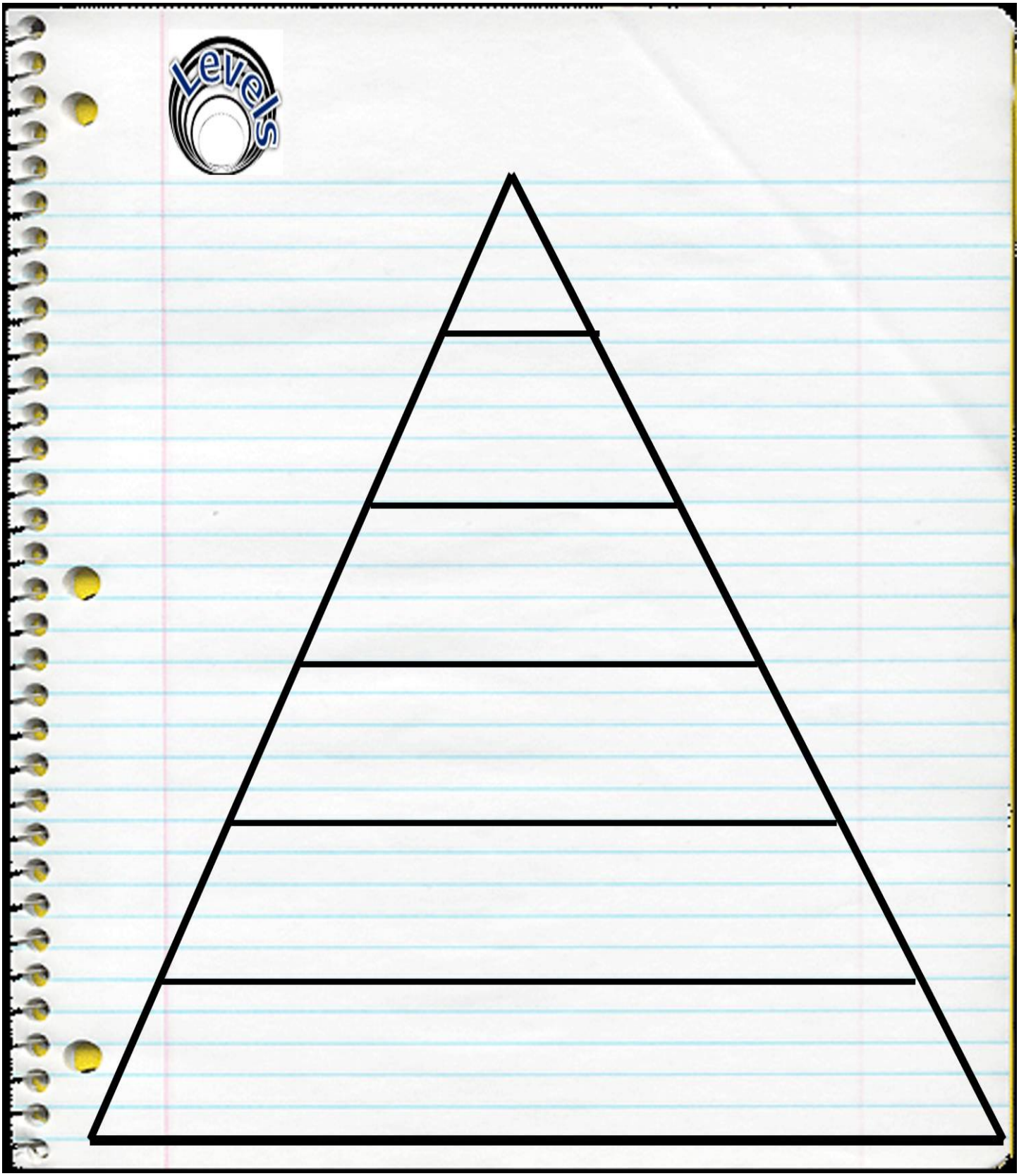
Community: The relationships between groups of _____.

Biome: A regional ecosystem characterized by distinct types of _____, animals. Determined by _____ and _____

Biosphere: The part of the _____ and its _____ in which living organisms exist.

Activity! Making a pyramid of the levels of biological organization.

- Choose an individual organism of your choice.
- Make a population of those organisms.
- Then community, ecosystem, and biome.



Part 1 Lesson 2 Earth's Spheres

Earth consists of…

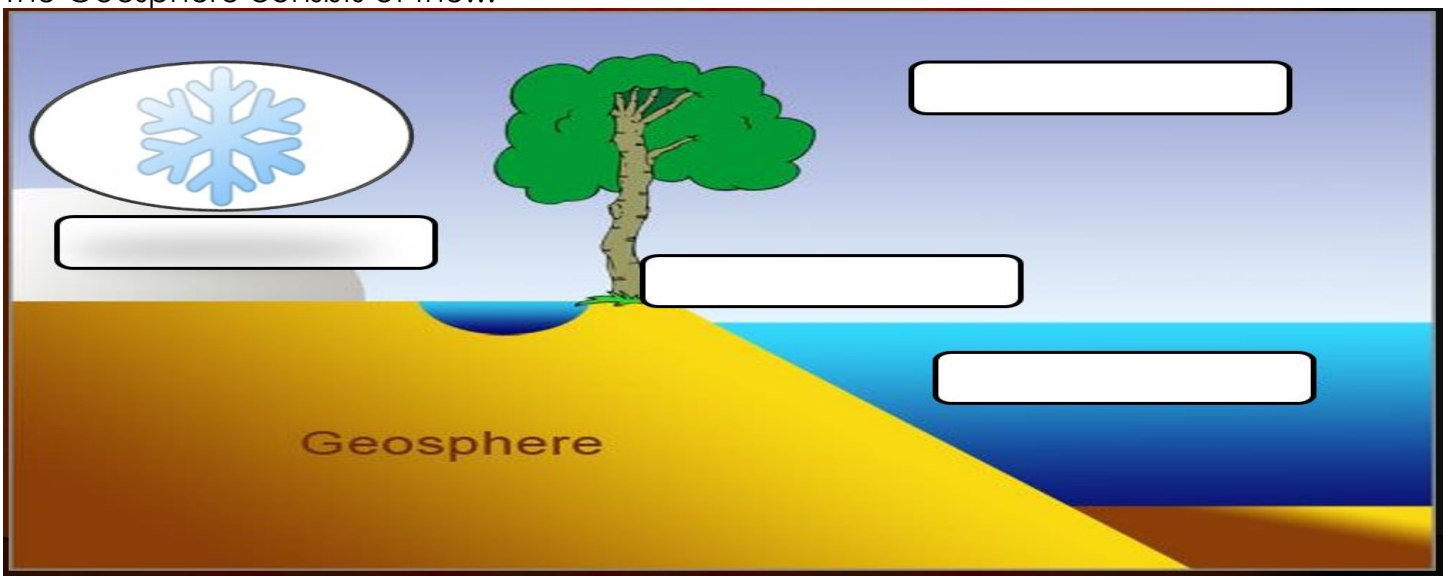
Biosphere: The regions of the earth's surface occupied by l_____ organisms. (Biotic=Living)

Geosphere: refers to the _____ parts of the Earth; it is used along with atmosphere, hydrosphere, cryosphere to describe the systems of the Earth (Abiotic=non-living)

The geosphere consists of…

_____sphere: Below the surface, in the crust and mantle.
_____sphere: A region of space surrounding an astronomical object in which charged particles are affected by that object's magnetic field.
_____sphere: All waters not in atmosphere and lithosphere.
_____sphere: The area of gases that surround the planet.
_____sphere: The frozen water part of our planet.

The Geosphere consists of the…



Name the Spheres below?

A

-Water, Water Cycle, Oceans, Lakes and Rivers, Sea Ice, Glaciers, Snow Cover, Soil Moisture, Aquifers

B

-Plants, animals, fungi, Bacteria, protists, coral reefs, evolution and adaptations

C

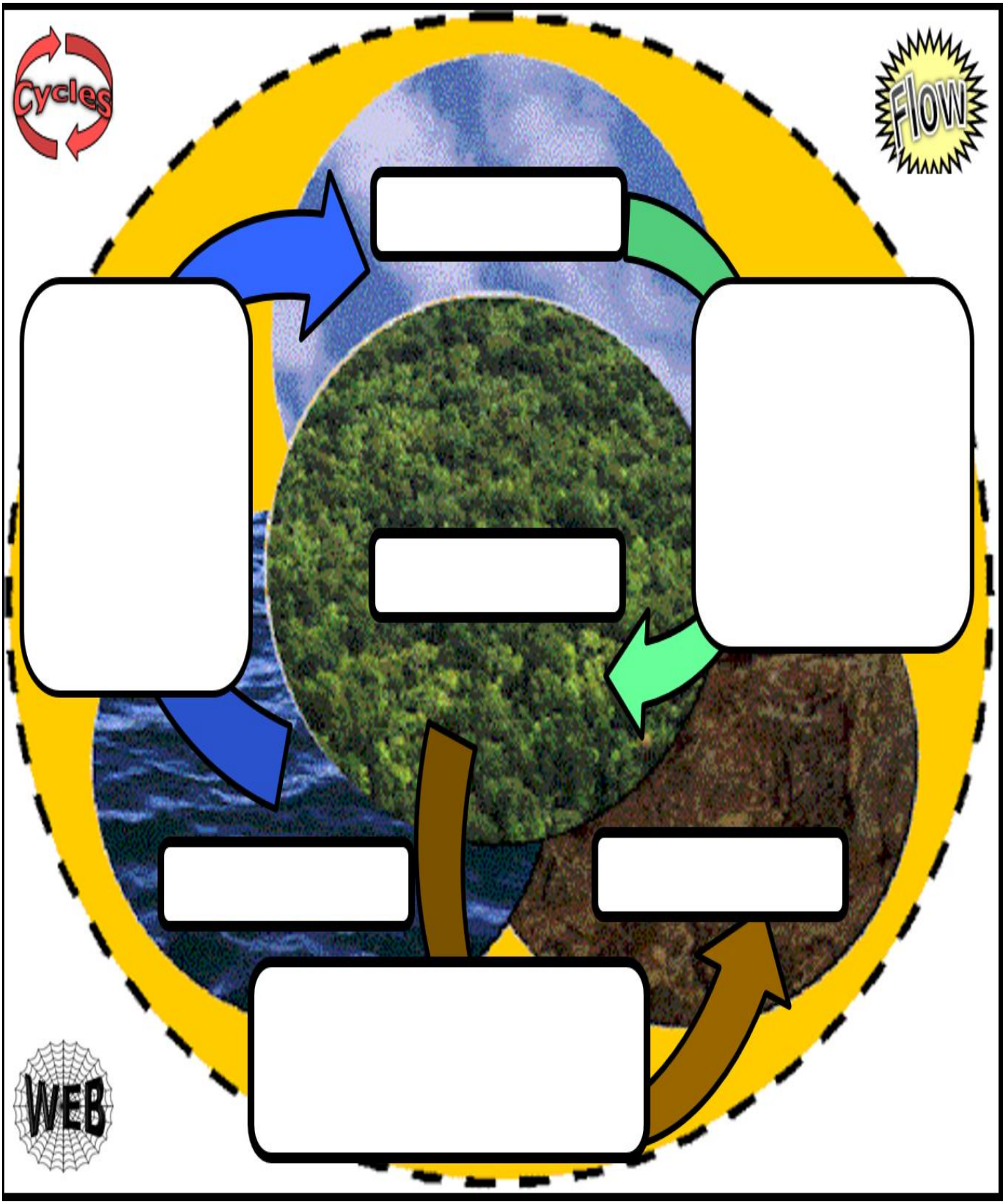
-Climate, Air, wind, weather, jet Stream, Heat Mixing, Clouds, Solar radiation buffer

D

-Land, plate tectonics, volcanoes, rocks cycle, earthquakes, sedimentation, minerals Soil

Part 3 Lesson 3 Sphere Interactions

Please label the biospheres below. Optional – Conduct some research and record information about them around the circle



The processes that move _____ and _____ from one sphere to another are called sphere interactions.

-The _____ (Solar Energy) is the Driver of Energy and Matter Interactions.

Example-Humans (biosphere) harness energy from the moving water (hydrosphere), as it travels over the lithosphere, spin turbines to produce electricity.Can you name the sphere? Maybe sketch it out as well.

Sphere= -Water, Water Cycle, Oceans, Lakes and Rivers, Sea Ice, Glaciers, Snow Cover, Soil Moisture, Aquifers	Sphere= -Plants, animals, fungi, Bacteria, protists, coral reefs, evolution and adaptations
Sphere= -Climate, Air, wind, weather, jet Stream, Heat Mixing, Clouds, Solar radiation buffer	Sphere= -Land, plate tectonics, volcanoes, rocks cycle, earthquakes, sedimentation, minerals Soil

Part 3 Lesson 4 Earths Interacting Systems Project

How the Earth's Spheres Interact Project

-Your project must include several spheres and several interactions. The more the better!

-Your project must label the spheres.

-Your project should research each sphere and describe the interactions between one sphere to another. Please cite sources.

-Try and describe how matter and energy are moved in this interaction.

-Create a display / model / exhibit that includes the above requirements.

What's your Idea / How do you want to display / model your sphere interactions?

Describe your project in the box below

Earth's Sphere Interactions Project

Name the spheres you are connecting?

_____ -> _____ -> _____

What's the process that allows the two spheres to interact? Explain	What's the process that allows the two spheres to interact? Explain

Citation:

Can you cite the source for your research.

Feel free to visit a source that makes citing a website easy such as https://www.easybib.com/

How is energy needed to make the processes above work / make the interactions between the spheres possible? Explain below.

What are you going to do for your project? _____

_____

What materials do you need from the teacher? _____

_____

Is this project doable in the time that we have?_____

What questions do you have?_____

Okay – Use paper to sketch out a rough draft.

Earth's Spheres Project Rubric

Name:
Due:

Completion	**Accuracy**	**Student Work**	**Risk Takers, Due Dates, Extra's, and Something More.**
25 pts	25 pts	25 pts	25 pts
A Student meet all requirements of project. Included and labeled several spheres and several interactions. Included a properly cited source / research. 25 pts	**A** Spheres were labeled correctly, and research was accurate with many interactions. Project was clear and easily understood / easy to follow 25 pts	**A** Work is clear, legible, neat, uses well constructed diagrams and sketches or other. No spelling errors, GUM's, Clearly a strong time commitment. Colored when appropriate. 25 pts	**A** Student handed in on due date, with some clear time commitment to neatness and quality. Excellent behavior during class time. Student found a way to create something fantastic. Some neat extra's and unexpected. 25pts
B Student meet most of the requirements of project. Included at least two spheres and two interactions. Included a properly cited source / research. 20pts	**B** Spheres were labeled correctly, and research was accurate with some interactions. Project had a few parts that may have needed some clarity 20pts	**B** Work is well done with some minor spelling / GUM's, and student included diagrams / sketches with some time commitment. 20pts	**B** Student handed in on due date. The project was good but could have used some more time to create a final project. Good behavior during class work time. A good project. 20pts
C Student meet some of the requirements of project. Included at least two spheres but did not have research / interactions. No cited source / research. 15 pts	**C** Spheres were present but not accurately labeled and research / interactions was hard to follow. 15 pts	**C** Some spelling errors especially environmental print. Some GUM's, few diagrams / sketches. Not a strong commitment. 15 pts	**C** Student did not hand in at due date but shortly after. Student had to be talked to about staying on-task during class work time. 15 pts
D/X Many incomplete parts / did not include earth's spheres and interactions. No Cited Source 10pts / 5pts / 0 pts	**D/X** Many errors and inaccuracies. Difficult to understand. Little to no research present. 10pts / 5pts / 0 pts	**D/X** Many errors in spelling, GUM's, and little to no sketches, diagrams, and charts. 10pts / 5pts / 0pts	**D/X** Late / Not handed in. Student was not well behaved during in class work time. 10pts / 5pts / 0pts

Comments: _____

_____

_____

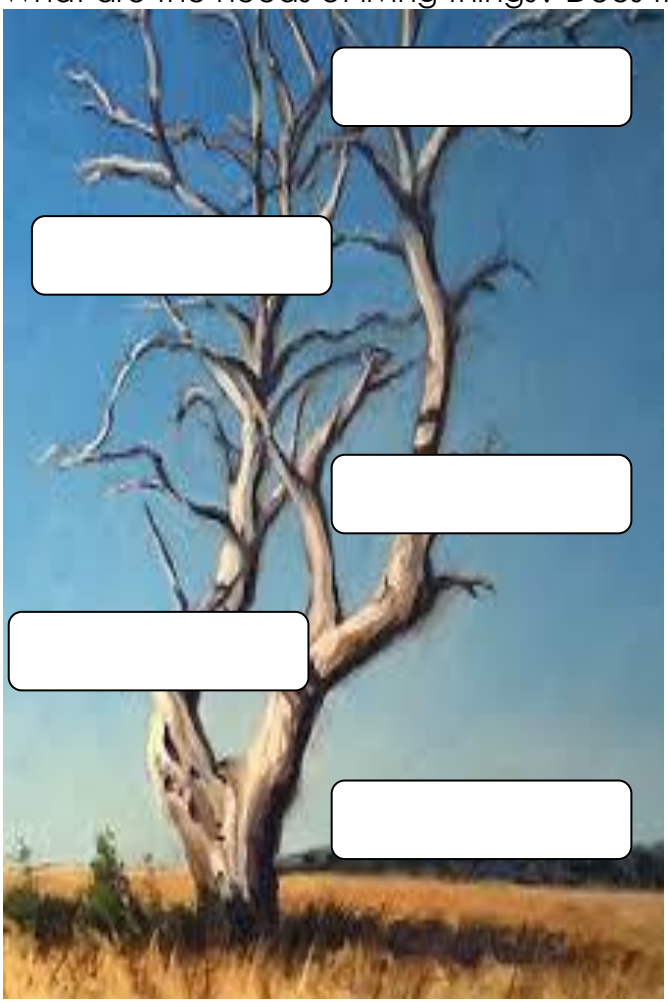
_____ Grade: _____

Part 1 Lesson 5 Habitat

Habitat: The type of _____ in which an organism lives.

Match the organism to its habitat?

What are the needs of living things? Does this dead tree have value?



Please match the animal to its habitat (Use this word bank to help)

Boreal Forest	Tide Pool	Desert	Tropical Rain Forest
Tundra	Deciduous Forest	Savanna	Polar / Arctic
Prairie	Eyelash River	Coral Reef	Estuary

-Note: There's a lot of diversity in the world so the matching below is meant to be general.

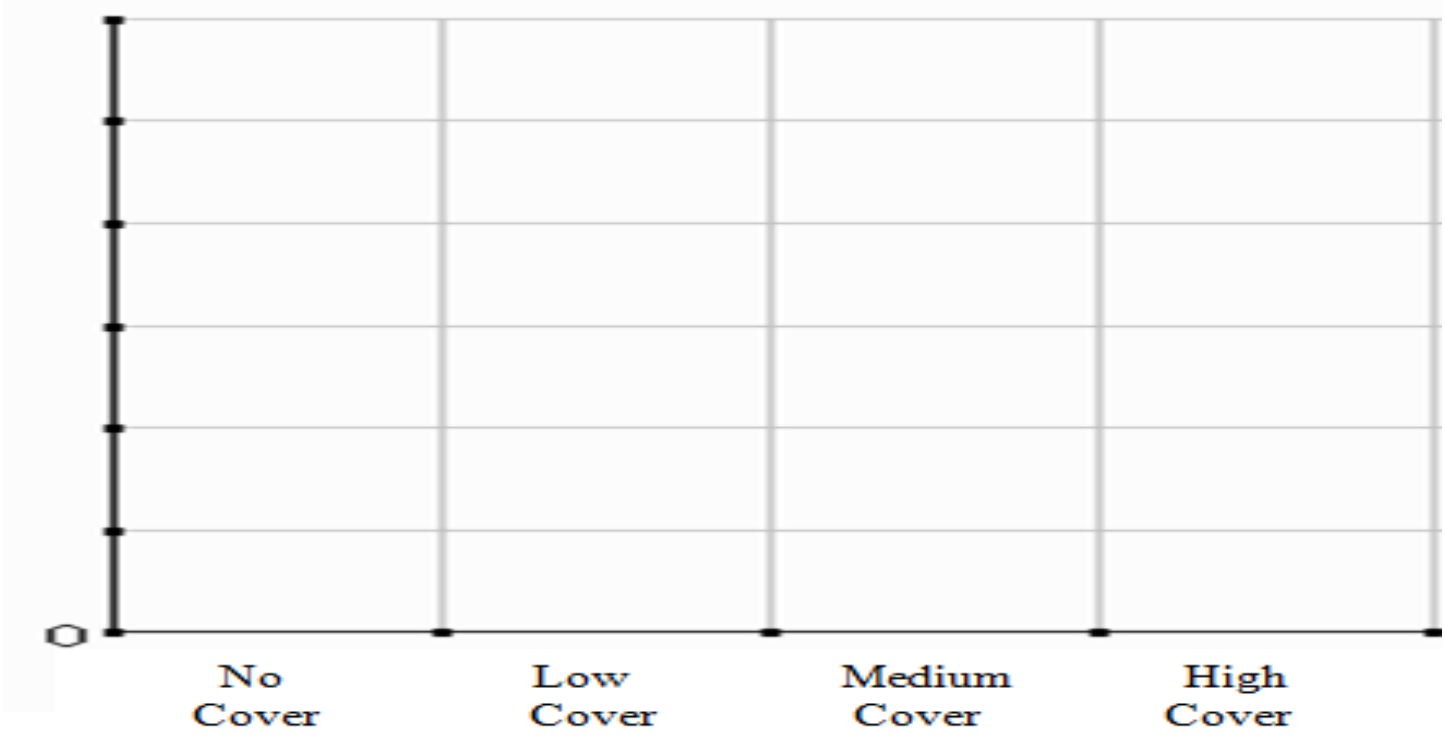
_____ : Monkey
_____ : Moose
_____ : Trout
_____ : Antelope
_____ : Squirrel
_____ : Mushroom
_____ : Follicle Mite

_____ : Starfish
_____ : Reindeer
_____ : Pelican
_____ : Lion
_____ : Anemone
_____ : Scorpion
_____ : Penguin

Habitat

Number of Mice	No cover Habitat	Low Cover	Medium Cover	High Cover
# caught by you				
Group Total				
Final Total All trials				

Please graph your final total for all trials below



How did an increase in cover habitat change the amount of mice captured by the foxes? Use data from your graph in your response.

Part 1 Lesson 6 Needs and Niches

The needs of an organism are…

_____, Water, Food, _____, _____

Community ecology: The study of _____ populations.

Ecological Niche: The place or _____ of a given organism within its ecosystem. "Job"

Please describe what the ecological niche of an African Dung Beetle might be. – You may need to do some research.

Breaks down waste / returns nutrients to soil

I make sugar through photosynthesis -Start of the food chain

I maintain Balance in the ecosystem

I help to pollinate plants

I create valuable aquatic habitat

I help keep insects In check

Please match the animal to its niche (Use this word bank to help)

Spider	Clam	Algae	Lion	Fungus	Hyena	Termite	Bee
Squirrel	Deer	Beaver	Earthworm	Porcupine	Crab	Tree	

_____ I eat the cambium of trees which kills the tree. The dead hollow trees become denning and feeding habitats for countless other species.
_____ I decompose wood in dry areas where fungus can't break it down.
_____ I help spread the seeds of trees by collecting them and storing them.
_____ I am a filter feeder who helps clean water by filtering out the organics.
_____ I am a top predator that keeps the herbivores in balance with the ecosystem.
_____ I am a rodent that creates valuable habitat by blocking up streams with dams to create ponds of standing water.
_____I help pollinate plants.
_____I help control the number of insects by eating them.
_____I produce oxygen on planet earth through photosynthesis and also a valuable food source / start of the food chain in ponds and in the ocean.
_____I eat producers and I'm a food source to larger predators
_____I help scavenge the landscape / decompose dead animals.
_____I help aerate the soil by crawling through it and create nutrient rich castings.
_____I help break down organic matter and return nutrients to the producers
_____I live in water and help breakdown organic matter by scavenging.
_____I produce sugar through photosynthesis. I also keep the soil together, provide habitat, food, oxygen, and keep the forest floor cool and damp.

Fundamental Niche: The _____role, place, or function that a species has within its ecosystem.

This is what an organism wants but rarely gets.

Realized Niche: The _____that an organism is reduced to live in due to limiting factors.

Not the best situation but it works… Sometimes (Don't Die)

Partner up, please determine the jobs of each of the following "players" in your town?o Teachers will assign each pair one from the group below. Be prepared to present.

Principal	
Custodian	
Lunch Staff	
Bus Company	
Teachers	
Students	
Parents	
Tax Payers	
Dept. of Ed.	
Farmers	

Part 1 Lesson 7 Population Growth

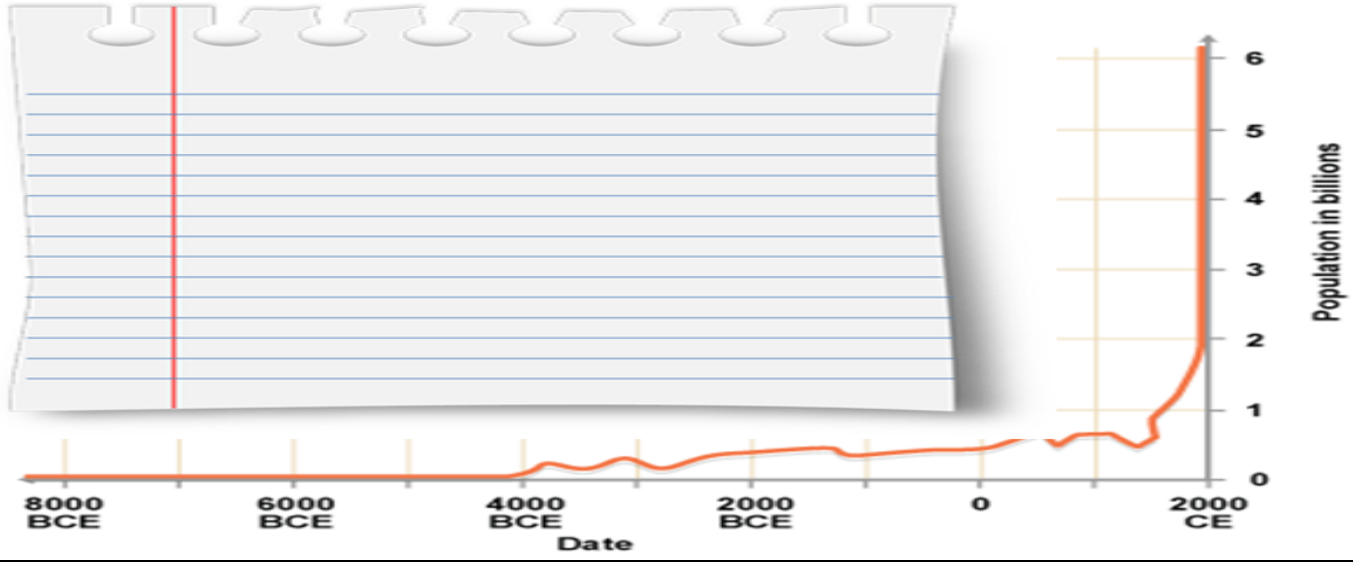
What is the current population of humans on planet Earth?_____

- https://www.worldometers.info/world-population/

Carrying Capacity: The amount of _____ that an area of land will yield.

Therefore, the number of _____ that an area of land will support.

What is so concerning about this graph about human population growth.



Are we a "R" Species, or are we a "K" species? What does this have to do with human population growth and our environment?

R Species	K Species
Organism is very small size	Large Organism
Energy to make a new organism is low	Energy to make a new organism is high
Many babies made at once	Low number of babies made at a time
Early maturity	Long time for maturity
Short Life	Long Life
Each individual reproduces once and then dies	Individuals can reproduce many times throughout life

Part 1 Lesson 8 Competition

Competition: The _____ between organisms or species, in which the fitness of one is _____by the presence of another.

Four types of competition

_____specific competition: Over resources between different species.
_____specific competition: The same species compete for resources.
Interference competition: fighting / disrupting.
_____: Sharing resources.

Activity Quiz! 1-10 + bonus, Name the type of competition.

- Interspecific, Intraspecific, Interference, Exploitative

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

Competitive Exclusion: One thrives, the other goes _____

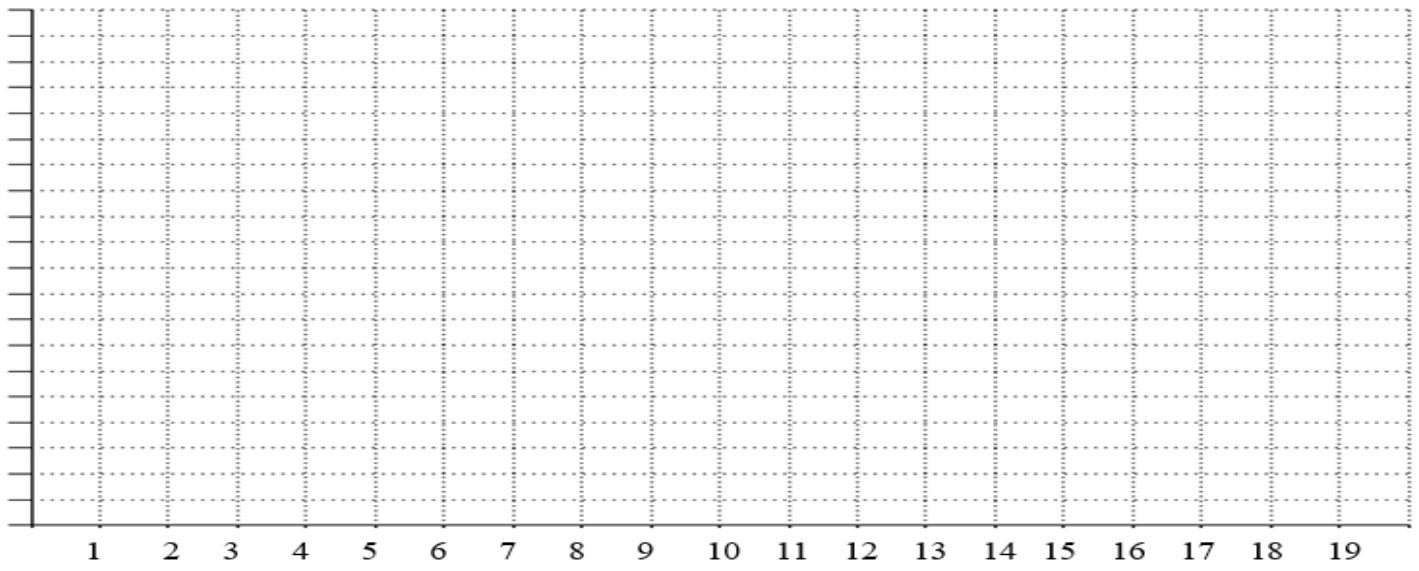
No two species with the same job can _____.

_____: All organisms exist in competition for available resources. Those that create a competitive advantage will flourish at the expense of the less competitive. No two organisms can have the same niche. One lives, the other dies.

Competitive Exclusion Activity

Species	1	2	3	4	5	6	7	8	9	10	11
# (X) Grabber Beaks											
# of (0) Spoon Beaks											

Please complete a graph of your results. X = Grabber beak, O = Spoon Beak



How did this activity show interspecific competition?

How did this activity show intraspecific competition?

Which bird species was better adapted to eat the seeds?

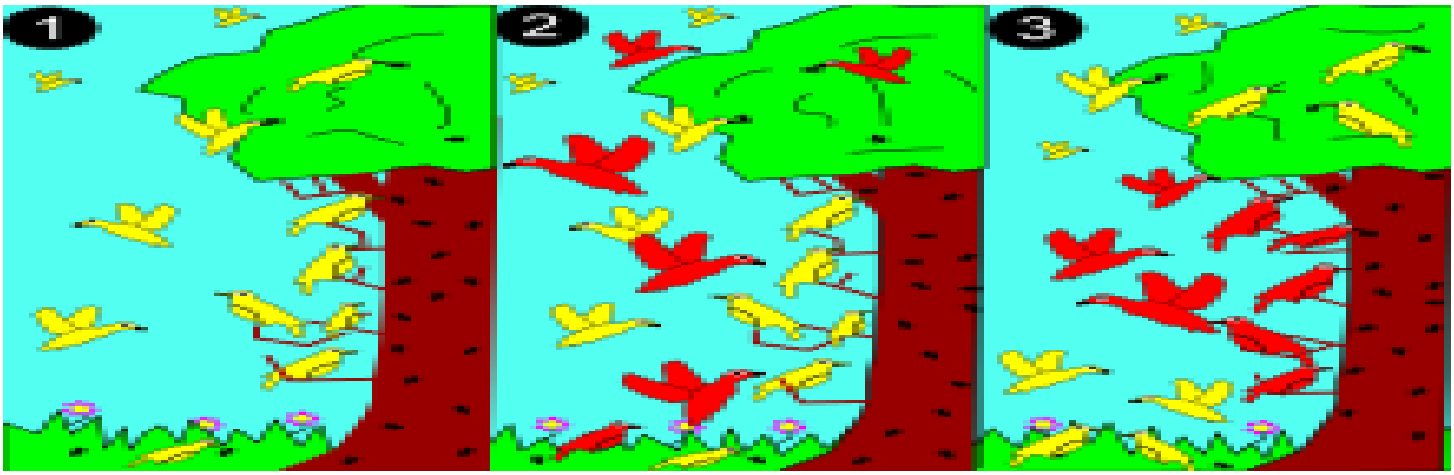
What happened to the species less adapted to eat the seeds over time?

Please describe the type of competition based on the pictures below.

Two male Oryx competing for females

Hyena trying to get food from lion.

Please use the picture below to describe a niche and competitive exclusion theory. Think Grabber beaks.



Part 1 Lesson 9 Food Webs

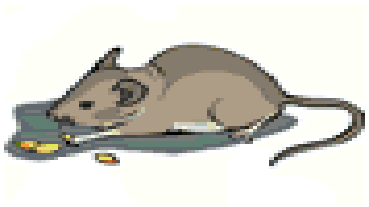
Most animal interactions are…

_____for the same food supply.
_____(predation).
_____ being eaten (avoiding predation).

_____: A complex network of many interconnected food chains and feeding interactions.

Please draw arrows to the organism that each species eats to correctly create a food web.







Part 1 Lesson 10 Feeding Simulation

Predator: An organism that lives by _____ on other organisms.

Prey: An animal hunted for _____.

Generalist doesn't waste energy looking for high quality food. Eat the _____!

Specialist uses lots of time and energy to find the _____ foods.

Gregarious: Tending to form a _____ with others of the same species.

First Part	Second Part	Third Part
Seeds are collected at end of each round, they are not rolled over. • If you have less than 30 you die, you will play again soon. • If you have more than 30 you survive again White bean = 1 Red Bean = 5 Green Bean = 10	Habitat and Predators -Same as first, but this time with predators. -You still need 30 energy units. -You are safe from predators if you are touching Hula-Hoop. -Predators can only walk (no running), only tag someone out if they deliberately don't stop feeding and run away when you are standing over them making hawk noises.	Predator Prey (Round 3) No habitat -A shopping plaza has cut habitat in half. -Only one Hula-Hoop -Predators still exist but in smaller numbers

Describe the competition for resources that you experienced?_____

What type of seeds did you look for? Why?_____

How did predators (hawks) change your feeding?_____

How did habitat help you?_____

Please describe the bean game? What is a generalist? What is a specialist? What strategies were used to survive? How does habitat affect feeding and ultimately survival? I would attach a sheet!

Part 1 Lesson 11 Predator Prey Cycles

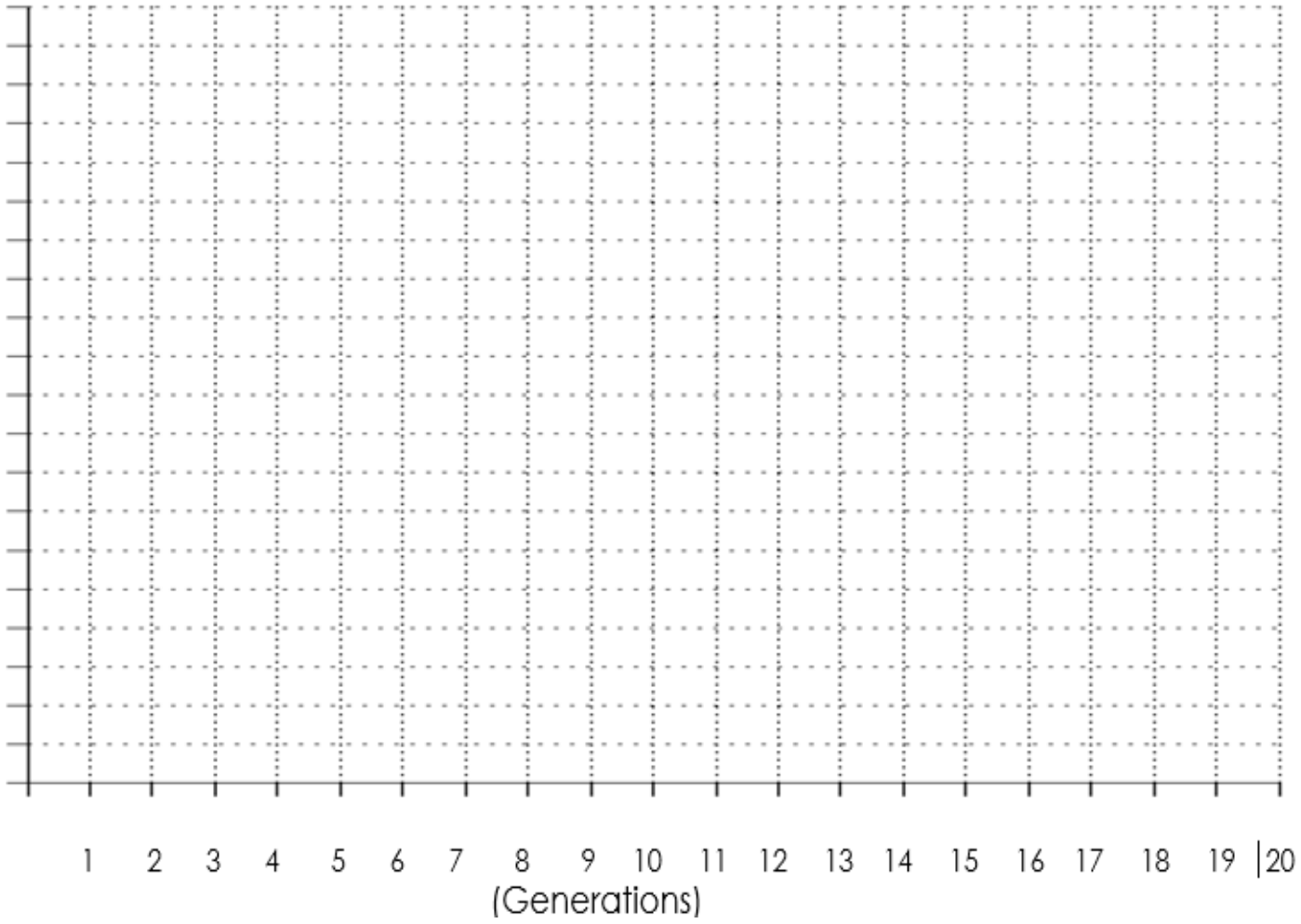
Predator Prey Data Sheet

1.) Have many (300+ per table group) normal note cards (rabbits) (colored if possible)
2.) Have jumbo note cards (different color represent coyotes)
3.) Spread 20 rabbits all over large lab table so no two rabbits are touching but they are all close.
4.) Toss 5 coyote cards onto large lab table to get the most rabbits that you can from a short distance.
5.) If coyote card touches a rabbit then the rabbit is eaten and removed. The coyote reproduces, pick up cards and double them. If coyote misses – It's dead and removed. Record new number after doubling each round
6.) All the surviving rabbits reproduce as well and then spread onto the table.
7.) Repeat rounds, record statistics on spreadsheet.
8.) Visual of activity on the next series of slides.

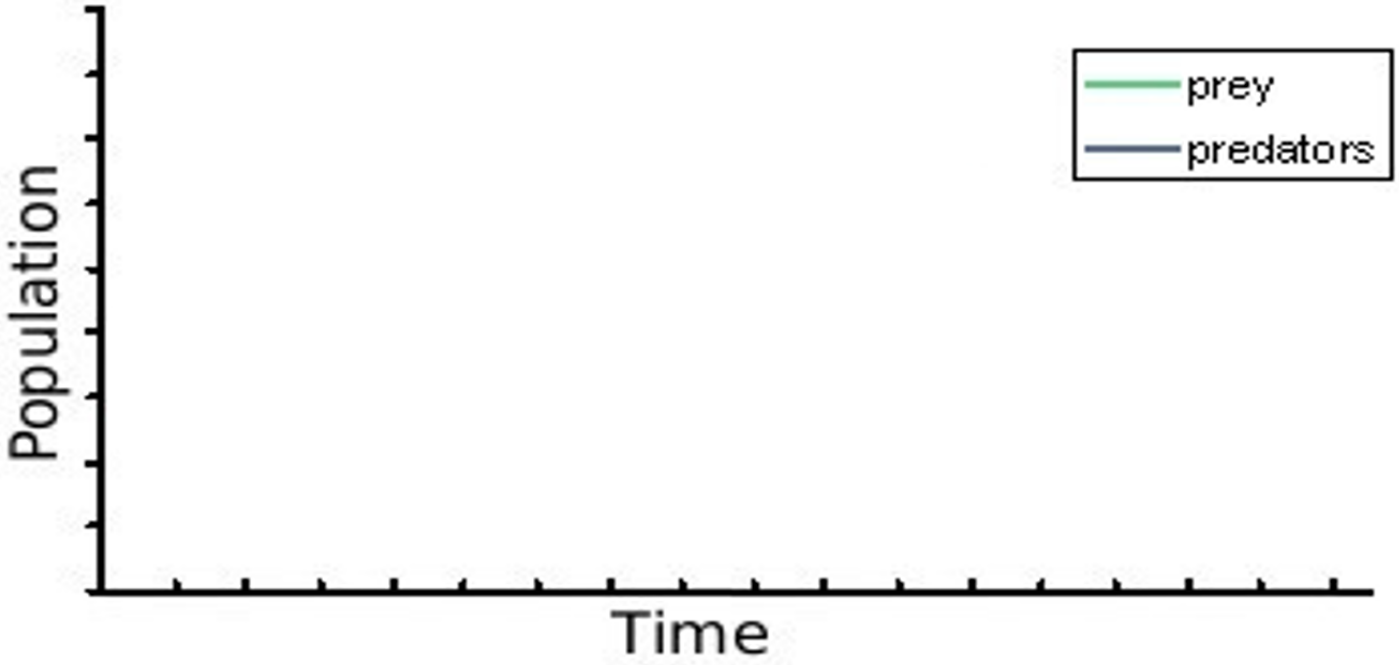
- Note: If all rabbits are eaten 20 will move into the area. If all coyotes die than 5 will move into the area for the next round

Generations	#'s of Rabbits	#'s of Coyotes
1.)		
2.)		
3.)		
4.)		
5.)		
6.)		
7.)		
8.)		
9.)		
10.)		
11.)		
12.)		
13.)		
14.)		
15.)		
16.)		
17.)		
18.)		
19.)		
20.)		

Please graph your data over generations. (R = Rabbits, C = Coyotes)



Draw a typical Predator and Prey population graph.



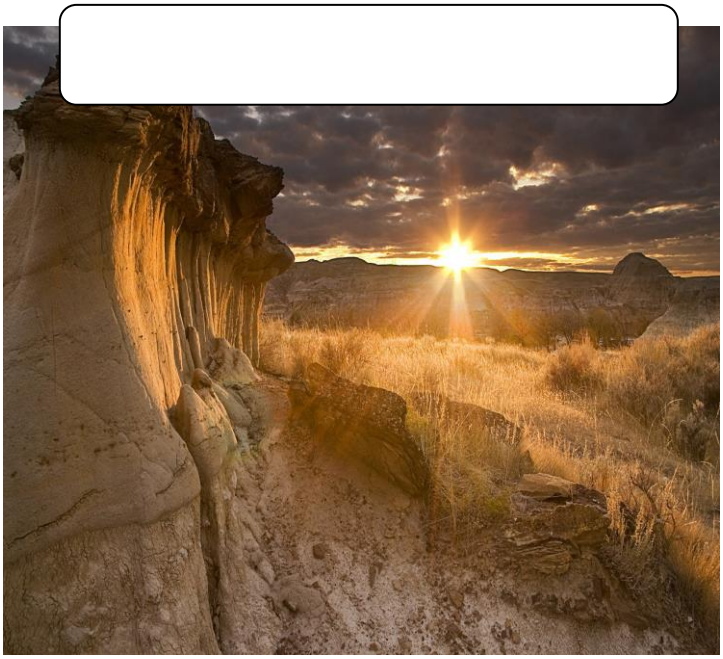
Circle the limiting factors from the list below that were described in class?

Mushrooms, Competition, Rainbows, Tacos, Space, Water, Sell by dates, Corn Starch, Sunlight, Diseases, Holidays, Wipes, Hunting, Rechargeable Batteries, Dictionaries, Predators, Whistles Energy Drinks, Magic Markers, Parasites, Almonds, Cans, Folds

From the circled list above, which are density dependent and which are density independent?

Density Dependent	Density Independent

Which box is showing a density dependent limiting factor, and which is showing a density independent limiting factors? **Explain**



Across

2. _____ Capacity: The amount of food that an area of land will yield.
3. _____ Niche: The theoretical role, place, or function that a species has within its ecosystem.
5. The frozen water part of our planet
6. All waters not in atmosphere and lithosphere
8. _____ Niche: The way of life that an organism is reduced to live in due to limiting factors.
9. Competitive _____: One thrives, the other goes extinct. No two species with the same job can coexist.
12. The interaction between organisms or species, in which the fitness of one is lowered by the presence of another.
13. A region of space surrounding an astronomical object in which charged particles are affected by that object's magnetic field.
17. A regional ecosystem characterized by distinct types of vegetation, animals. Determined by temperature and rainfall.
18. The area of gases that surround the planet.
20. An organism that lives by preying on other organisms
22. Organism with unique DNA and cells
23. The relationships between groups of populations.
24. Refers to the solid parts of the Earth; it is used along with atmosphere, hydrosphere, cryosphere to describe the systems of the Earth (Abiotic=non-living)

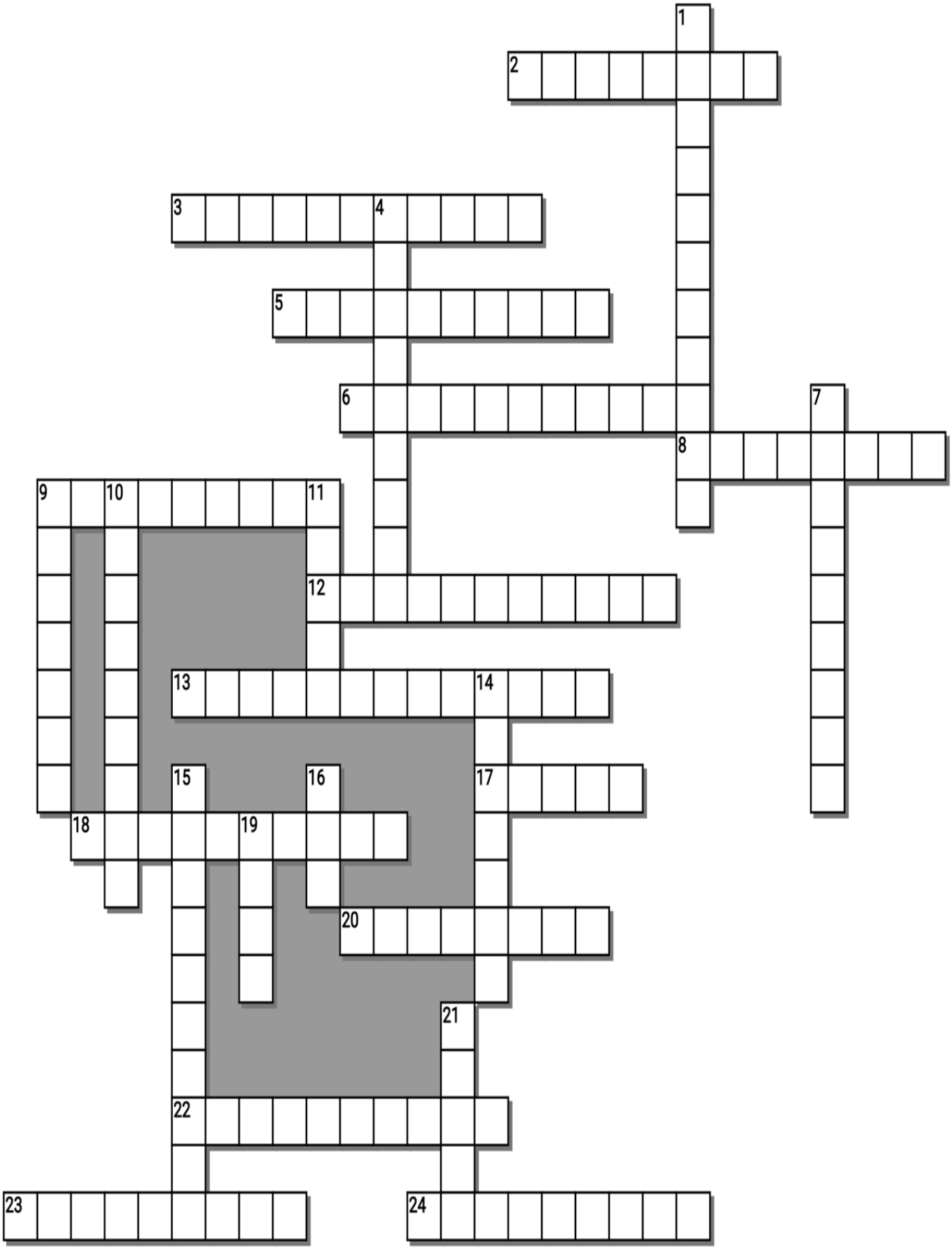
Down

1. Below the surface, in the crust and mantle.
4. The relationships of populations with each other and their environment.
7. The part of the earth and its atmosphere in which living organisms exist.
9. A study of the relationship between living things and the environment.
10. _____ ecology: The study of interacting populations
11. Ecological _____: The place or function of a given organism within its ecosystem. "Job"
14. The type of environment in which an organism lives.
15. Groups of similar individuals who tend to mate with each other in a limited geographic area.
16. Food _____: A complex network of many interconnected food chains and feeding interactions.
19. An animal hunted for food.
21. The needs of an organism are… Air, Water, Food, Shelter, _____

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

Possible Answers

COMMUNITY, ECOSYSTEM, PREDATOR, ATMOSPHERE, BIOME, BIOSPHERE, CARRYING, COMMUNITY, COMPETITION, CRYOSPHERE, ECOLOGY, EXCLUSION, FUNDAMENTAL, GEOSPHERE, HABITAT, HYDROSPHERE, INDIVIDUAL, LITHOSPHERE, MAGNETOSPHERE, NICHE, POPULATION, PREY, REALIZED, SPACE, WEB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Part 1 Review Game Lesson 13

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

It's BIG	LEVEL-UP	MR. DEEDS	WATCH YOUR BACK JACK	CARTOON PREDATORS 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 Levels of Organization

Name:

Part 1 Lesson 1 Levels of Biological Organization

Everything is connected to each other

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

Please fill-in the correct key word for the big concepts in eco-literacy.

Organisms need energy to survive. Energy from the sun flows into and out systems. This energy drives our world and the organisms in it. Energy is lost "not destroyed" when it changes form. Flows Hot to Cold

Ecological systems are organized within each other. The affects on one system will affect them all. All systems are interconnected.

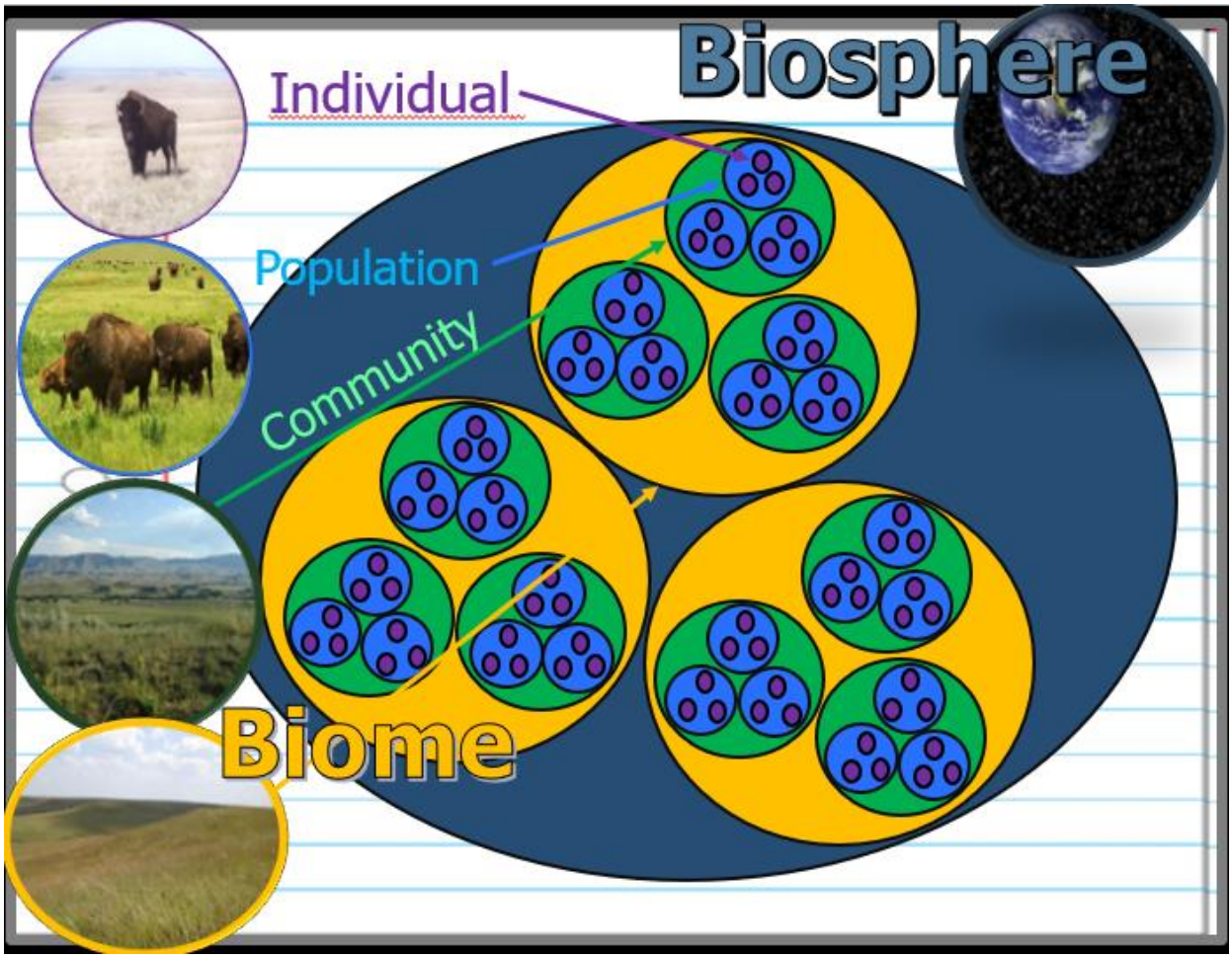
All organisms are in a constant state of change over time with the environment. Some organisms will change with another and will develop special interactions. Others with the nonliving world.

Matter and energy cycle through the living and nonliving world. Organisms rely on this matter and energy cycling to survive.

Animals are interconnected in a complex web of life. Changes on one part of the web will affect other parts of the web and the stability of the entire ecosystem.

Ecosystems have a way to balance changes so that up and down fluctuations are part of the natural balance of the whole.

Please complete the diagram as described in the slideshow with the correct labels.



Individual: Organism with unique DNA and cells

Population: Groups of similar individuals who tend to mate with each other in a limited geographic area.

Ecosystem: The relationships of populations with each other and their environment.

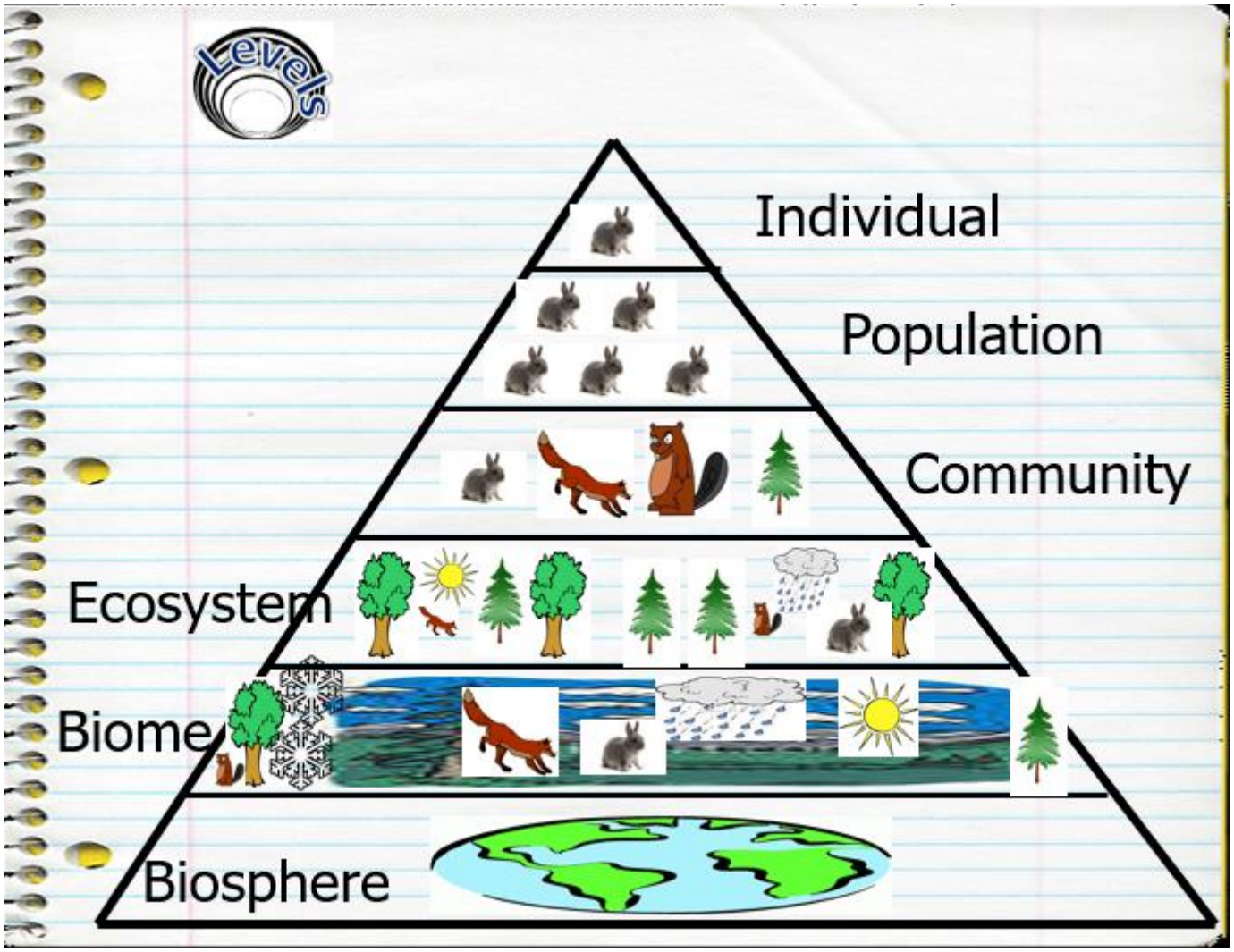
Community: The relationships between groups of populations.

Biome: A regional ecosystem characterized by distinct types of vegetation, animals. Determined by temperature and rainfall.

Biosphere: The part of the earth and its atmosphere in which living organisms exist.

Activity! Making a pyramid of the levels of biological organization.

- Choose an individual organism of your choice.
- Make a population of those organisms.
- Then community, ecosystem, and biome.



Part 1 Lesson 2 Earth's Spheres

Earth consists of…

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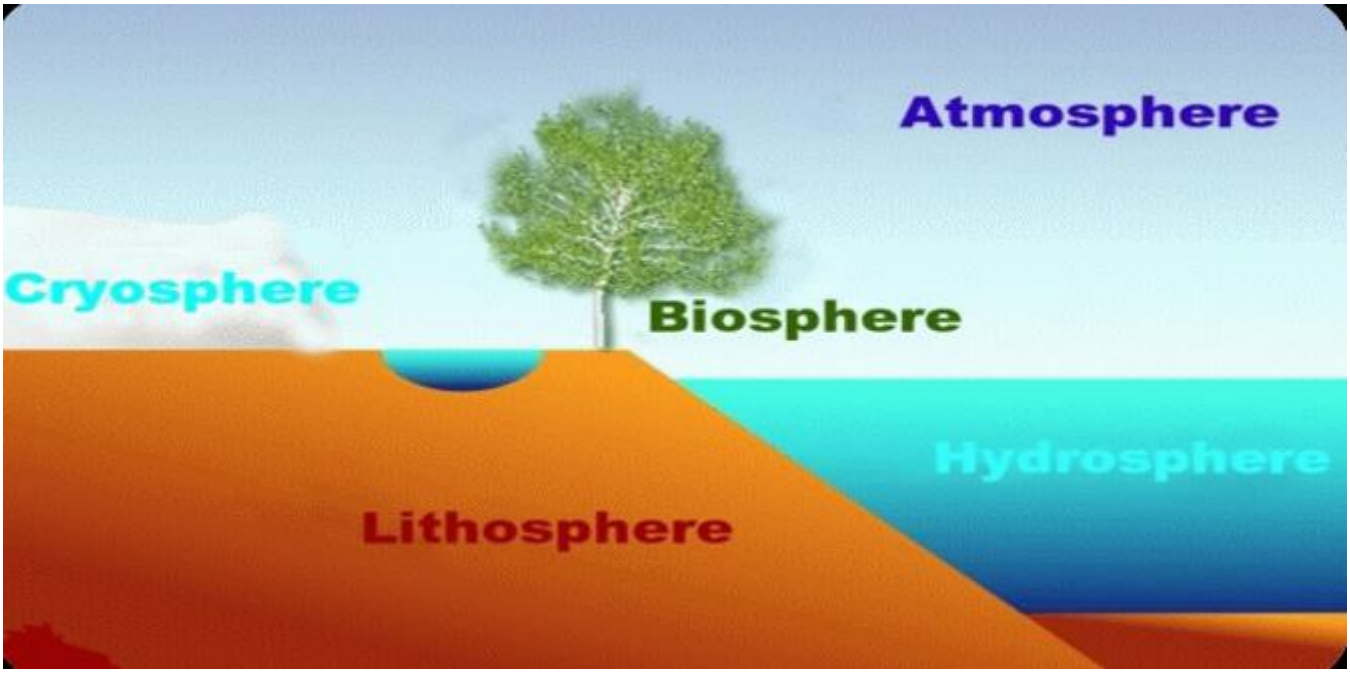
Geosphere: refers to the solid parts of the Earth; it is used along with atmosphere, hydrosphere, cryosphere to describe the systems of the Earth (Abiotic=non-living)

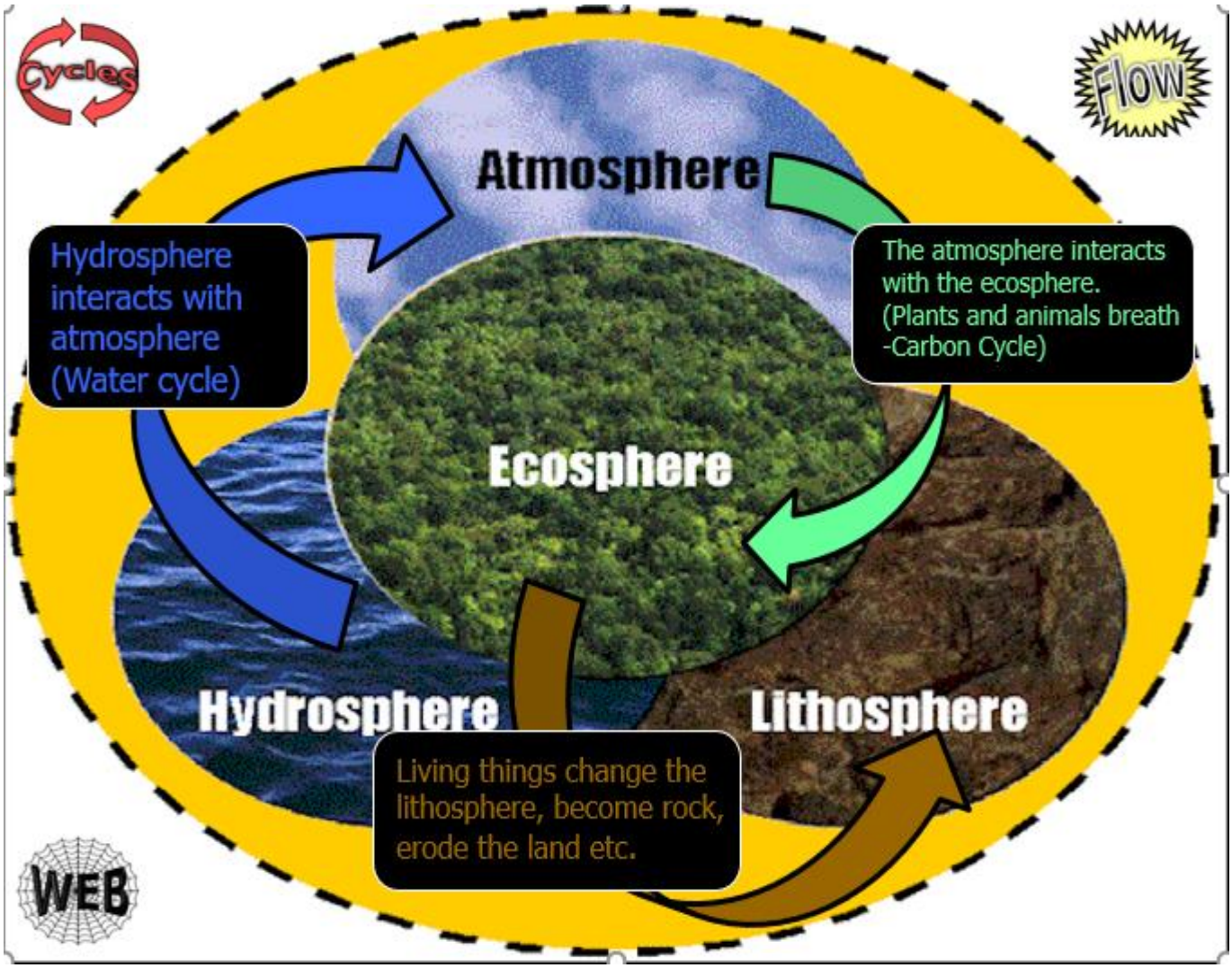
The geosphere consists of…

Lithosphere: Below the surface, in the crust and mantle.
Magnetosphere: A region of space surrounding an astronomical object in which charged particles are affected by that object's magnetic field.
Hydrosphere: All waters not in atmosphere and lithosphere.
Atmosphere: The area of gases that surround the planet.
Cryosphere: The frozen water part of our planet.

The Geosphere consists of the…

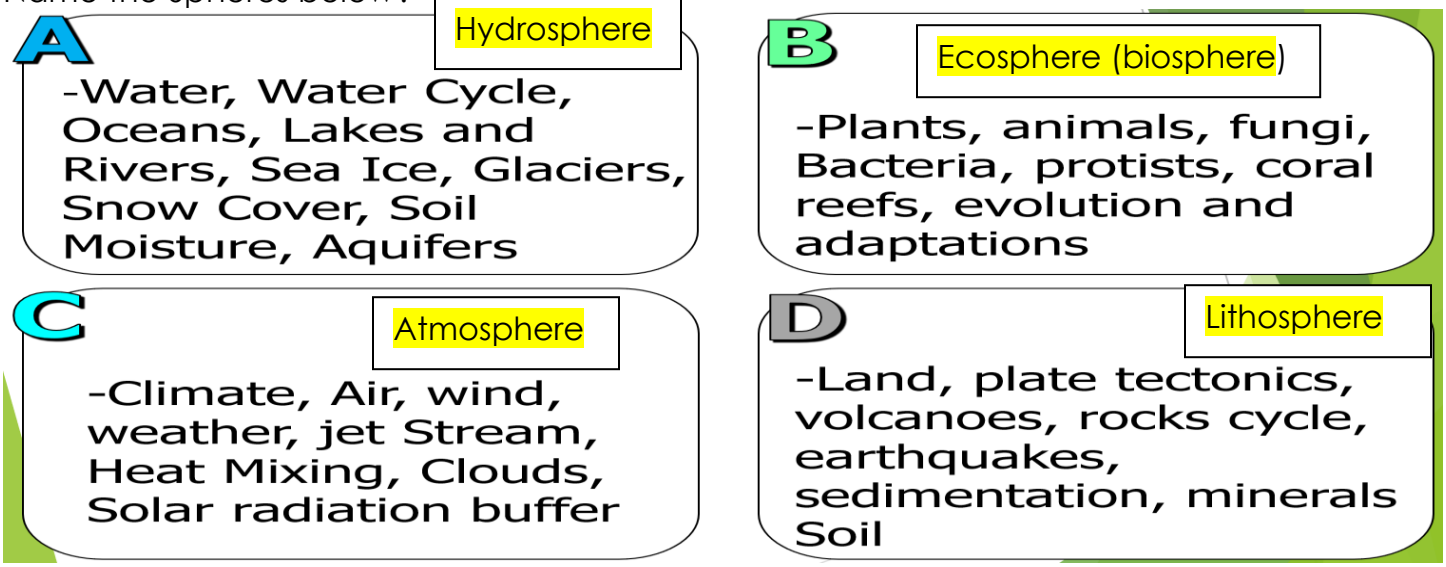


Please label the biospheres below. Optional – Conduct some research and record information about them around the circle



Part 3 Lesson 3 Sphere Interactions

Name the Spheres below?



The processes that move matter and energy from one sphere to another are called sphere interactions.

-The sun (Solar Energy) is the Driver of Energy and Matter Interactions.

Example-Humans (biosphere) harness energy from the moving water (hydrosphere), as it travels over the lithosphere, spin turbines to produce electricity. Can you name the sphere? Maybe sketch it out as well.

Sphere= Hydrosphere -Water, Water Cycle, Oceans, Lakes and Rivers, Sea Ice, Glaciers, Snow Cover, Soil Moisture, Aquifers	Sphere= Ecosphere -Plants, animals, fungi, Bacteria, protists, coral reefs, evolution and adaptations
Sphere= Atmosphere -Climate, Air, wind, weather, jet Stream, Heat Mixing, Clouds, Solar radiation buffer	Sphere= Lithosphere -Land, plate tectonics, volcanoes, rocks cycle, earthquakes, sedimentation, minerals Soil

Part 3 Lesson 4 Earths Interacting Systems Project

How the Earth's Spheres Interact Project

-Your project must include several spheres and several interactions. The more the better!

-Your project must label the spheres.

-Your project should <u>research</u> each sphere and describe the interactions between one sphere to another. Please cite sources.

-Try and describe how matter and energy are moved in this interaction.

-Create a display / model / exhibit that includes the above requirements.

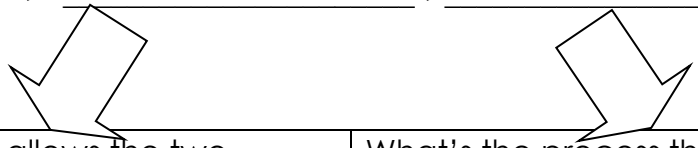
What's your Idea / How do you want to display / model your sphere interactions?

Describe your project in the box below

Earth's Sphere Interactions Project

Name the spheres you are connecting?

_____ -> _____->_____



What's the process that allows the two spheres to interact? Explain	What's the process that allows the two spheres to interact? Explain

Citation:

Can you cite the source for your research.

Feel free to visit a source that makes citing a website easy such as https://www.easybib.com/

How is energy needed to make the processes above work / make the interactions between the spheres possible? Explain below.

What are you going to do for your project? _____

_____

What materials do you need from the teacher? _____

_____

Is this project doable in the time that we have?_____

What questions do you have?_____

Okay – Use paper to sketch out a rough draft.

Earth's Spheres Project Rubric

Name:
Due:

Completion	**Accuracy**	**Student Work**	**Risk Takers, Due Dates, Extra's, and Something More.**
25 pts	25 pts	25 pts	25 pts
A Student meet all requirements of project. Included and labeled several spheres and several interactions. Included a properly cited source / research. 25 pts	**A** Spheres were labeled correctly, and research was accurate with many interactions. Project was clear and easily understood / easy to follow 25 pts	**A** Work is clear, legible, neat, uses well constructed diagrams and sketches or other. No spelling errors, GUM's, Clearly a strong time commitment. Colored when appropriate. 25 pts	**A** Student handed in on due date, with some clear time commitment to neatness and quality. Excellent behavior during class time. Student found a way to create something fantastic. Some neat extra's and unexpected. 25pts
B Student meet most of the requirements of project. Included at least two spheres and two interactions. Included a properly cited source / research.	**B** Spheres were labeled correctly, and research was accurate with some interactions. Project had a few parts that may have needed some clarity	**B** Work is well done with some minor spelling / GUM's, and student included diagrams / sketches with some time commitment.	**B** Student handed in on due date. The project was good but could have used some more time to create a final project. Good behavior during class work time. A good project.

20pts	20pts	20pts	20pts
C Student meet some of the requirements of project. Included at least two spheres but did not have research / interactions. No cited source / research. 15 pts	**C** Spheres were present but not accurately labeled and research / interactions was hard to follow. 15 pts	**C** Some spelling errors especially environmental print. Some GUM's, few diagrams / sketches. Not a strong commitment. 15 pts	**C** Student did not hand in at due date but shortly after. Student had to be talked to about staying on-task during class work time. 15 pts
D/X Many incomplete parts / did not include earth's spheres and interactions. No Cited Source 10pts / 5pts / 0 pts	**D/X** Many errors and inaccuracies. Difficult to understand. Little to no research present. 10pts / 5pts / 0 pts	**D/X** Many errors in spelling, GUM's, and little to no sketches, diagrams, and charts. 10pts / 5pts / 0pts	**D/X** Late / Not handed in. Student was not well behaved during in class work time. 10pts / 5pts / 0pts

Comments:_____

_____

_____

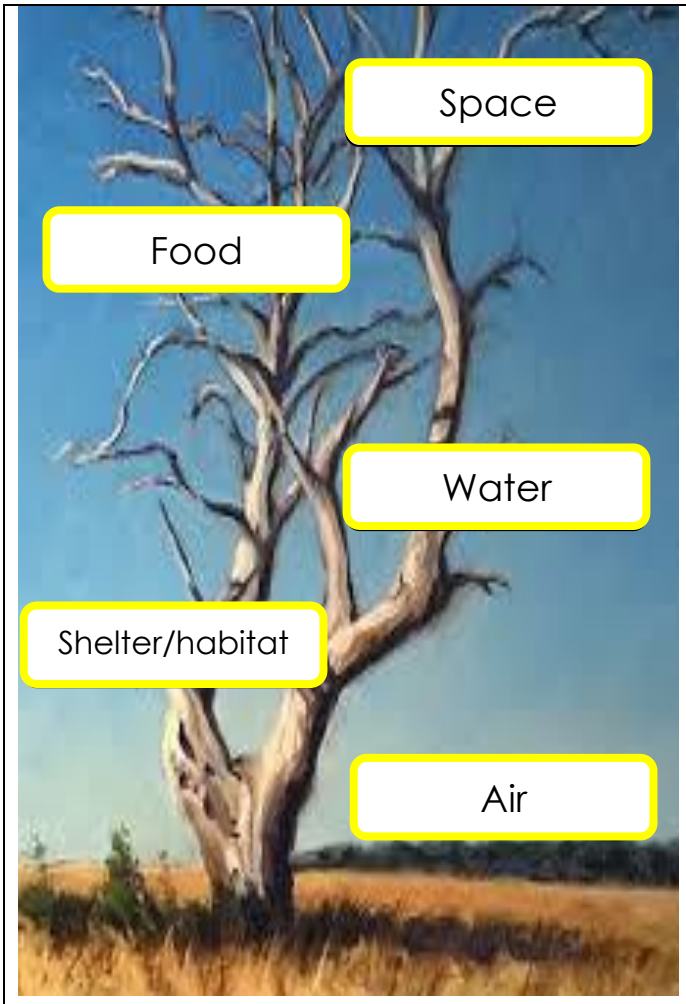
_____ Grade: _____

Part 1 Lesson 5 Habitat

Habitat: The type of environment in which an organism lives.

Match the organism to its habitat?

What are the needs of living things? Does this dead tree have value?



Dead trees are extremely valuable to a forest ecosystem because they provide habitat such as den sites, a steady food source of insects, and ultimately fertilize the soil after decay.

Please match the animal to its habitat (Use this word bank to help)

Boreal Forest	Tide Pool	Desert	Tropical Rain Forest
Tundra	Deciduous Forest	Savanna	Polar / Arctic
Prairie	Eyelash	River	Coral Reef	Estuary

-Note: There's a lot of diversity in the world so the matching below is meant to be general.

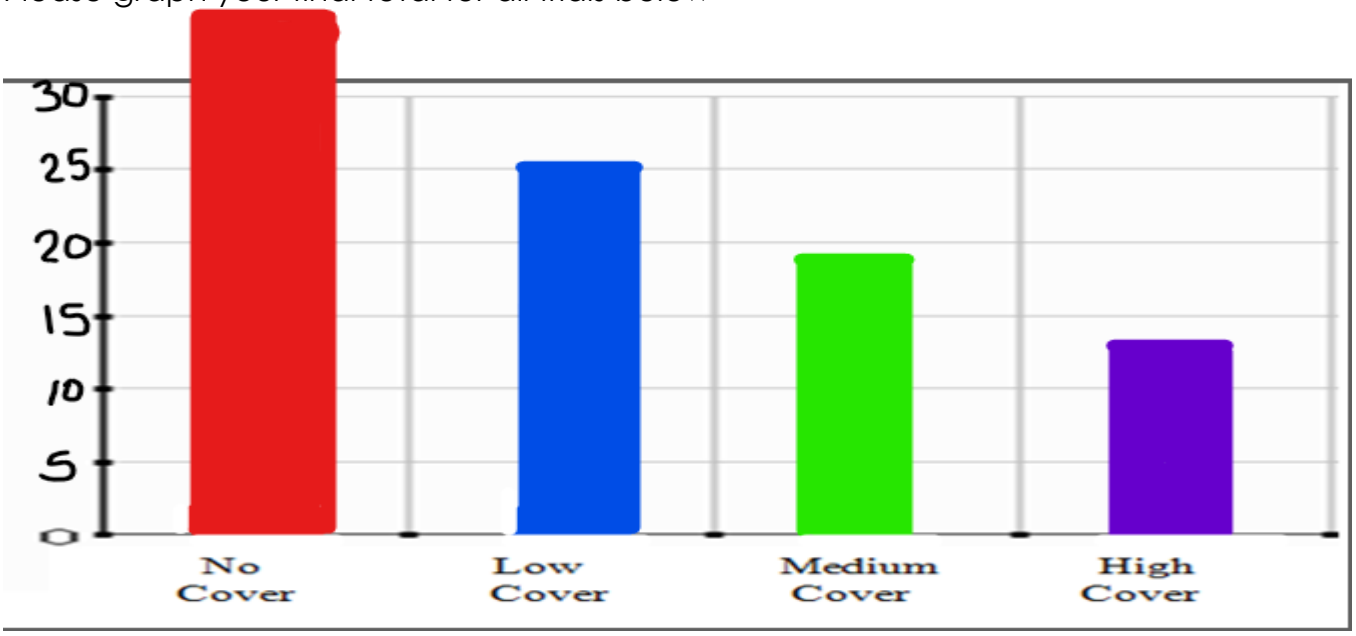
Tropical Rain Forest : Monkey
Boreal Forest : Moose
River : Trout
Prairie : Antelope
Deciduous Forest : Squirrel
Deciduous Forest : Mushroom
Eyelash : Follicle Mite

Tide Pool : Starfish
Tundra : Reindeer
Estuary : Pelican
Savanna : Lion
Coral Reef : Anemone
Desert : Scorpion
Polar/Arctic : Penguin

Habitat (simulated data)

Number of Mice	No cover Habitat			Low Cover			Medium Cover			High Cover		
# caught by you	3	4	3	3	2	2	1	0	3	1	1	0
Group Total	10	12	12	9	8	8	7	6	6	4	5	4
Final Total All trials	34			25			19			13		

Please graph your final total for all trials below



How did an increase in cover habitat change the amount of mice captured by the foxes? Use data from your graph in your response.
The data suggest that the high cover habitat was the most difficult to catch mice. Only 13 mice were captured in the high covered compared to 34 in no cover.

Part 1 Lesson 6 Needs and Niches

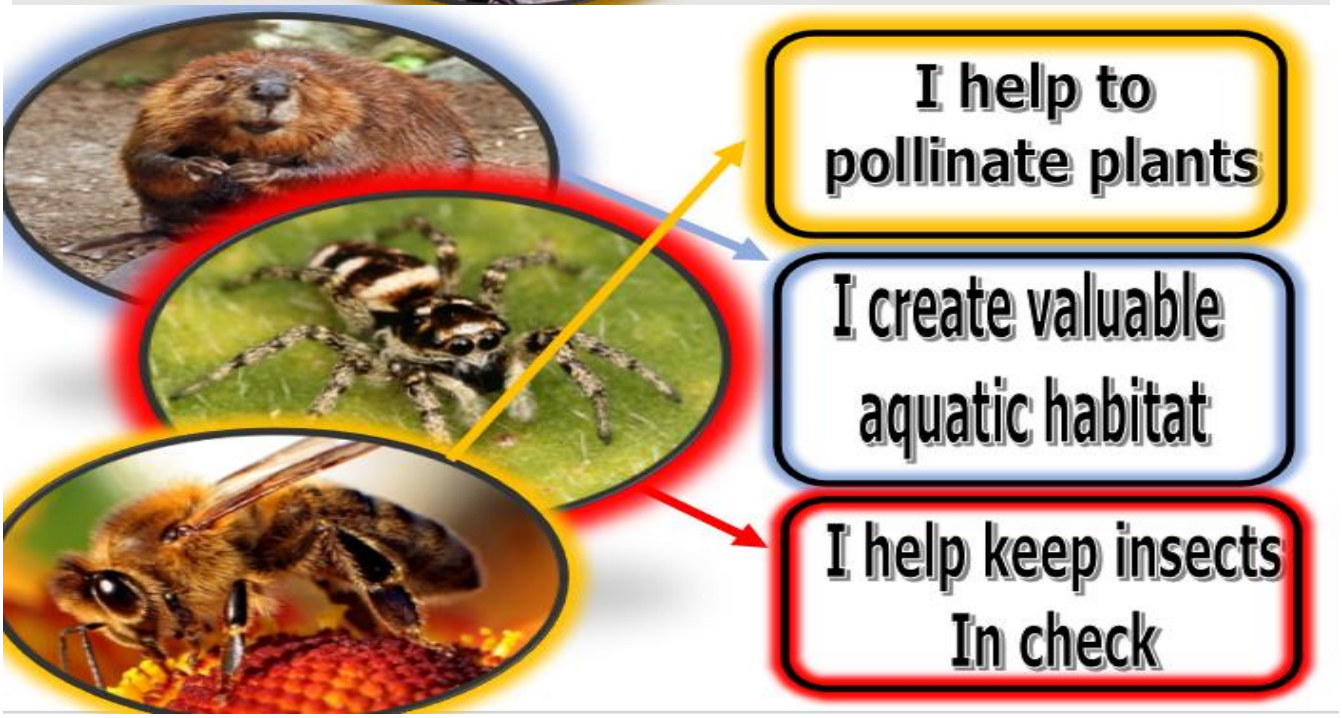
The needs of an organism are…
Air, Water, Food, Shelter, Space.

Community ecology: The study of interacting populations.

Ecological Niche: The place or function of a given organism within its ecosystem. "Job"

Please describe what the ecological niche of an African Dung Beetle might be. – You may need to do some research.

The beetles roll up the dung which helps control flies and recycles nutrients back to the earth (the nutrients are in the dung).



Please match the animal to its niche (Use this word bank to help)

Spider	Clam	Algae	Lion	Fungus	Hyena	Termite	Bee
Squirrel	Deer	Beaver	Earthworm	Porcupine	Crab	Tree	

Porcupine I eat the cambium of trees which kills the tree. The dead hollow trees become denning and feeding habitats for countless other species.
Termite I decompose wood in dry areas where fungus can't break it down.
Squirrel I help spread the seeds of trees by collecting them and storing them.
Clam I am a filter feeder who helps clean water by filtering out the organics.
Lion I am a top predator that keeps the herbivores in balance with the ecosystem.
Beaver I am a rodent that creates valuable habitat by blocking up streams with dams to create ponds of standing water.
Bee I help pollinate plants.
Spider I help control the number of insects by eating them.
Algae I produce oxygen on planet earth through photosynthesis and also a valuable food source / start of the food chain in ponds and in the ocean.
Deer I eat producers and I'm a food source to larger predators
Hyena I help scavenge the landscape / decompose dead animals.
Earthworm I help aerate the soil by crawling through it and create nutrient rich castings.
Fungus I help break down organic matter and return nutrients to the producers
Crab I live in water and help breakdown organic matter by scavenging.
Tree I produce sugar through photosynthesis. I also keep the soil together, provide habitat, food, oxygen, and keep the forest floor cool and damp.

Fundamental Niche: The theoretical role, place, or function that a species has within its ecosystem.
This is what an organism wants but rarely gets.

Realized Niche: The way of life that an organism is reduced to live in due to limiting factors.
Not the best situation but it works… Sometimes (Don't Die)

Circle the limiting factors from the list below that were described in class?

Mushrooms, Competition, Rainbows, Tacos, Space, Water, Sell by dates, Corn Starch, Sunlight, Diseases, Holidays, Wipes, Hunting, Rechargeable Batteries, Dictionaries, Predators, Whistles, Energy Drinks, temperature, Magic Markers, Parasites, Almonds, Oxygen, Cans, Folds

Partner up, please determine the jobs of each of the following "players" in your town? Teachers will assign each pair one from the group below. Be prepared to present.

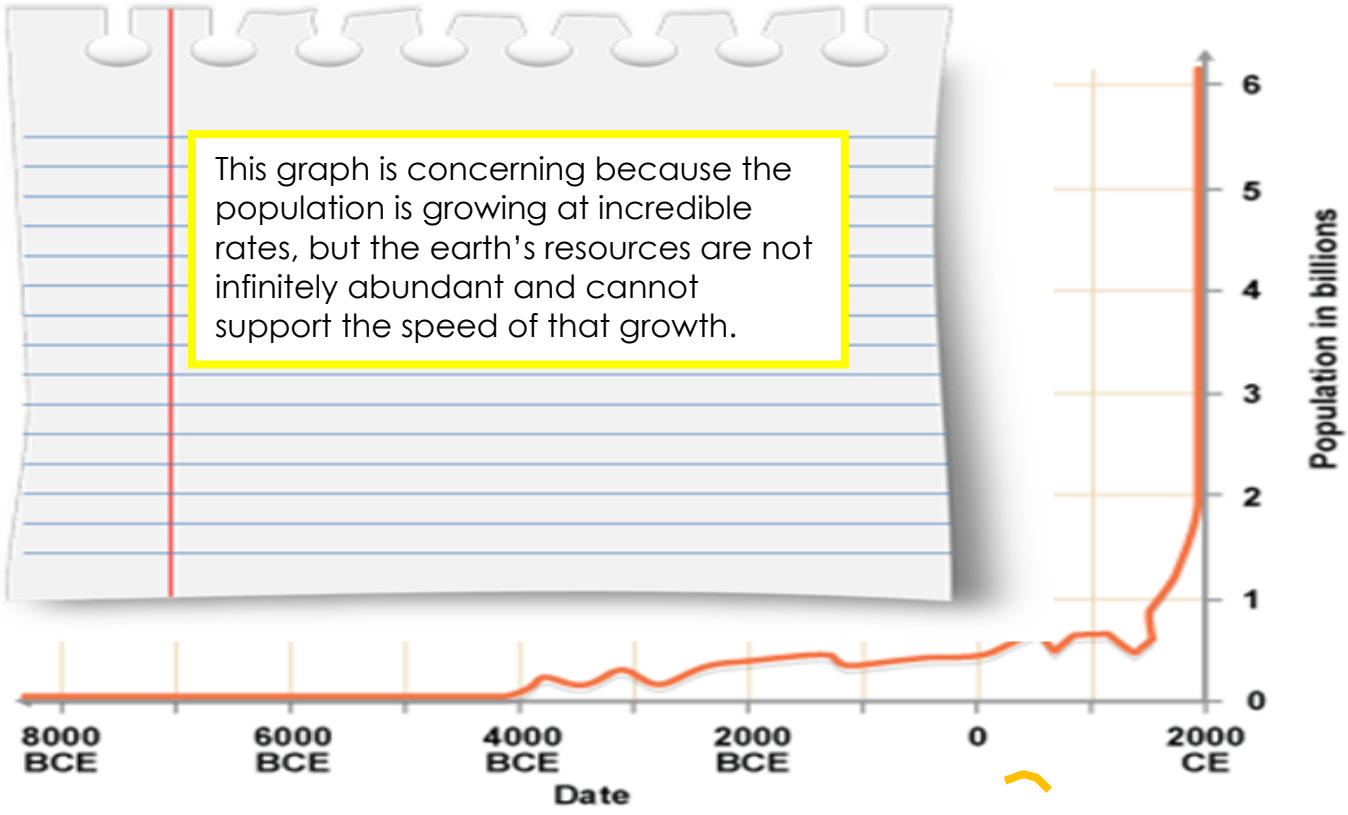
Principal	To manage the entire school
Custodian	Maintain the building
Lunch Staff	To feed the students
Bus Company	To transport students to school
Teachers	To educate the students
Students	To learn and master schoolwork
Parents	To assist teachers and students
Tax Payers	Provide money for all of the above
Dept. of Ed.	To manage teachers
Farmers	Provide the food for all of the above

Part 1 Lesson 7 Population Growth

What is the current population of humans on planet Earth? Check website and see
- https://www.worldometers.info/world-population/

Carrying Capacity: The amount of food that an area of land will yield.
Therefore, the number of animals that an area of land will support.

What is so concerning about this graph about human population growth.



Are we a "R" Species, or are we a "K" species? What does this have to do with human population growth and our environment?
We are a "K" species. We are slow-reproducing animals who are strong competitors in crowded niches and invest lots of energy in our offspring. When looking at human population growth and our environment, this is a problem because our growth is more like an

"R" species. We are **off balance,** and exponential growth doesn't end well in "R" selected species.

R Species	K Species
Organism is very small size	Large Organism
Energy to make a new organism is low	Energy to make a new organism is high
Many babies made at once	Low number of babies made at a time
Early maturity	Long time for maturity
Short Life	Long Life
Each individual reproduces once and then dies	Individuals can reproduce many times throughout life

Part 1 Lesson 8 Competition

Competition: The interaction between organisms or species, in which the fitness of one is lowered by the presence of another.

Four types of competition

Interspecific competition: Over resources between different species.
Intraspecific competition: The same species compete for resources.
Interference competition: fighting / disrupting.
Exploitative: Sharing resources.

Activity Quiz! 1-10 + bonus, Name the type of competition.

- Interspecific, Intraspecific, Interference, Exploitative

1) Intraspecific	2) Interspecific	3) Interference
4) Interspecific	5) Intraspecific	6) Interference
7) Exploitative	8) Interspecific	9) Interference
10) Exploitative	*11) Hulk Hogan	

Competitive Exclusion: One thrives, the other goes extinct.
No two species with the same job can coexist.

Competitive Exclusion Theory: All organisms exist in competition for available resources. Those that create a competitive advantage will flourish at the expense of the less competitive. No two organisms can have the same niche. One lives, the other dies.

Competitive Exclusion Activity

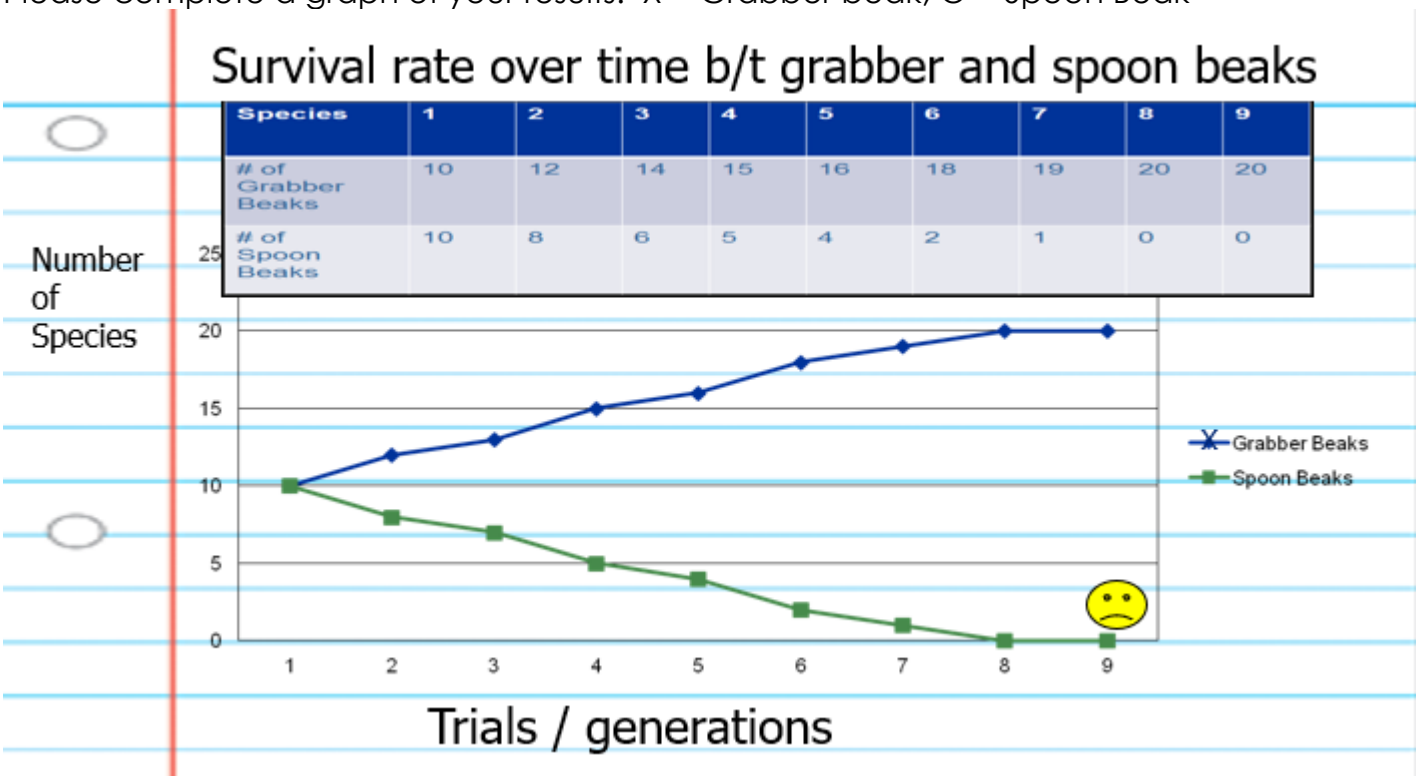
Species	1	2	3	4	5	6	7	8	9	10	11
# (X) Grabber Beaks											

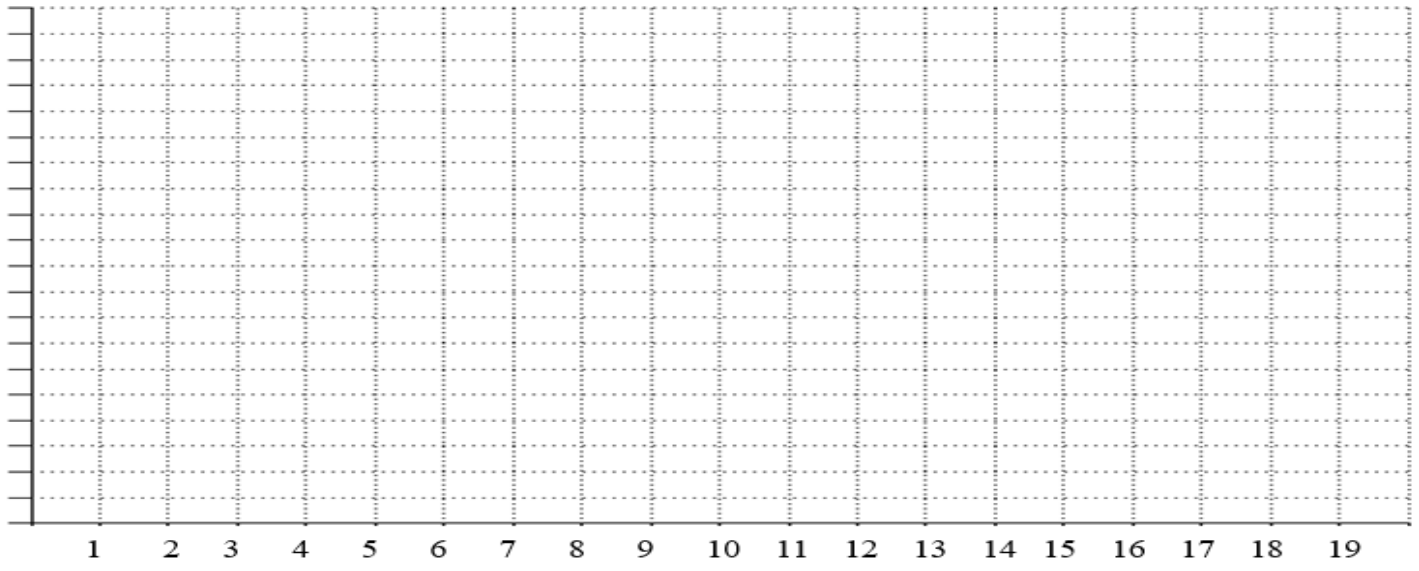
# of (0) Spoon Beaks											

SIMULATED DATA:

Species	1	2	3	4	5	6	7	8	9
# of Grabber Beaks	10	12	14	15	16	18	19	20	20
# of Spoon Beaks	10	8	6	5	4	2	1	0	0

Please complete a graph of your results. X = Grabber beak, O = Spoon Beak





How did this activity show <u>inter</u>specific competition?

Both the Grabberbills and Spoonbills are both different species competing for the same resources.

How did this activity show intraspecific competition?
Intraspecific competition occurred as you competed with members of your species for resources.

Which bird species was better adapted to eat the seeds?
The Grabberbills were better suited to collect the round seeds and hold onto them.

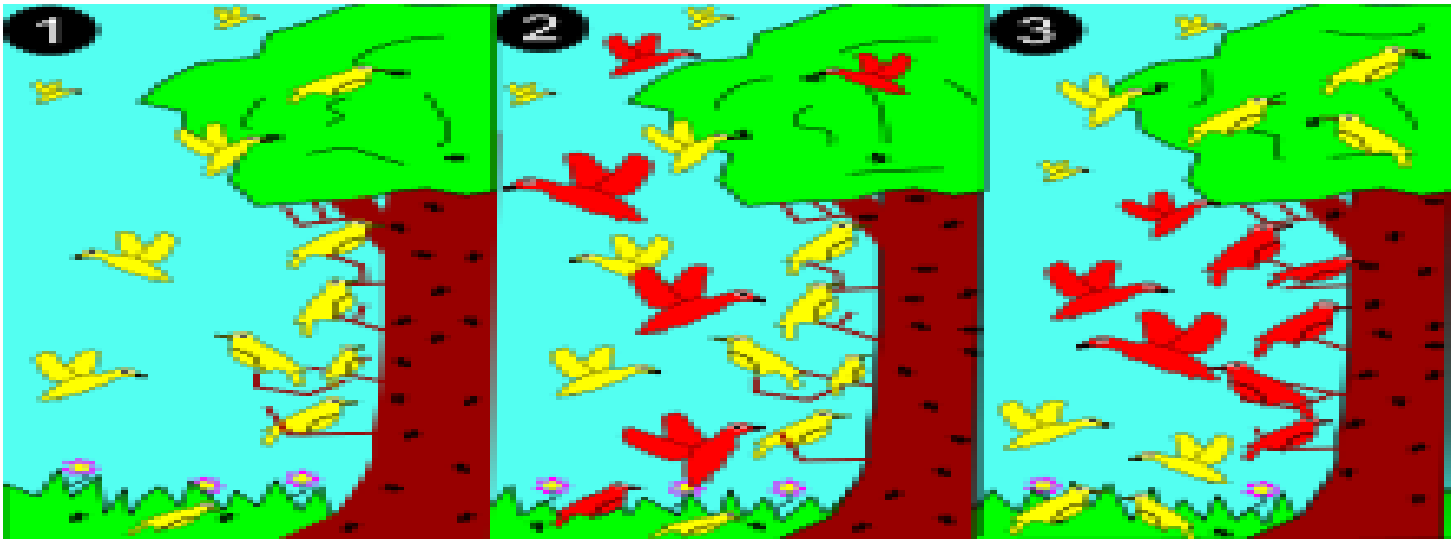
What happened to the species less adapted to eat the seeds over time?
The species slowly began to decrease in population. This occurred because no two species can occupy the same niche. They will eventually go extinct.

Please describe the type of competition based on the pictures below.

Two male Oryx competing for females
INTRAspecific

Hyena trying to get food from lion.
INTERspecific

Please use the picture below to describe a niche and competitive exclusion theory. Think Grabber beaks.



The yellow birds live on a tree. It is where they get food and build their nests. They have large round beaks, perfect for eating fruit at the tops of the trees. Red birds fly over one day and start competing for the resources as well. They have smaller, sharp beaks, perfect for picking bugs off the tree bark. Over time, the yellow birds mostly start feeding off the tops of the tree, getting fruit, while the red birds mostly eat bugs from the trunk of the tree. Both species are able to get food while remaining in the same niche because they feed in different zones.
Why?
Yellow birds that had smaller, less round beaks and were eating from the trunk were less successful (were not able to get much food) compared to the red birds because their beaks weren't as well suited. The red birds were not as successful at getting the fruit from the top of the tree as the yellow birds because their beaks weren't as well suited.

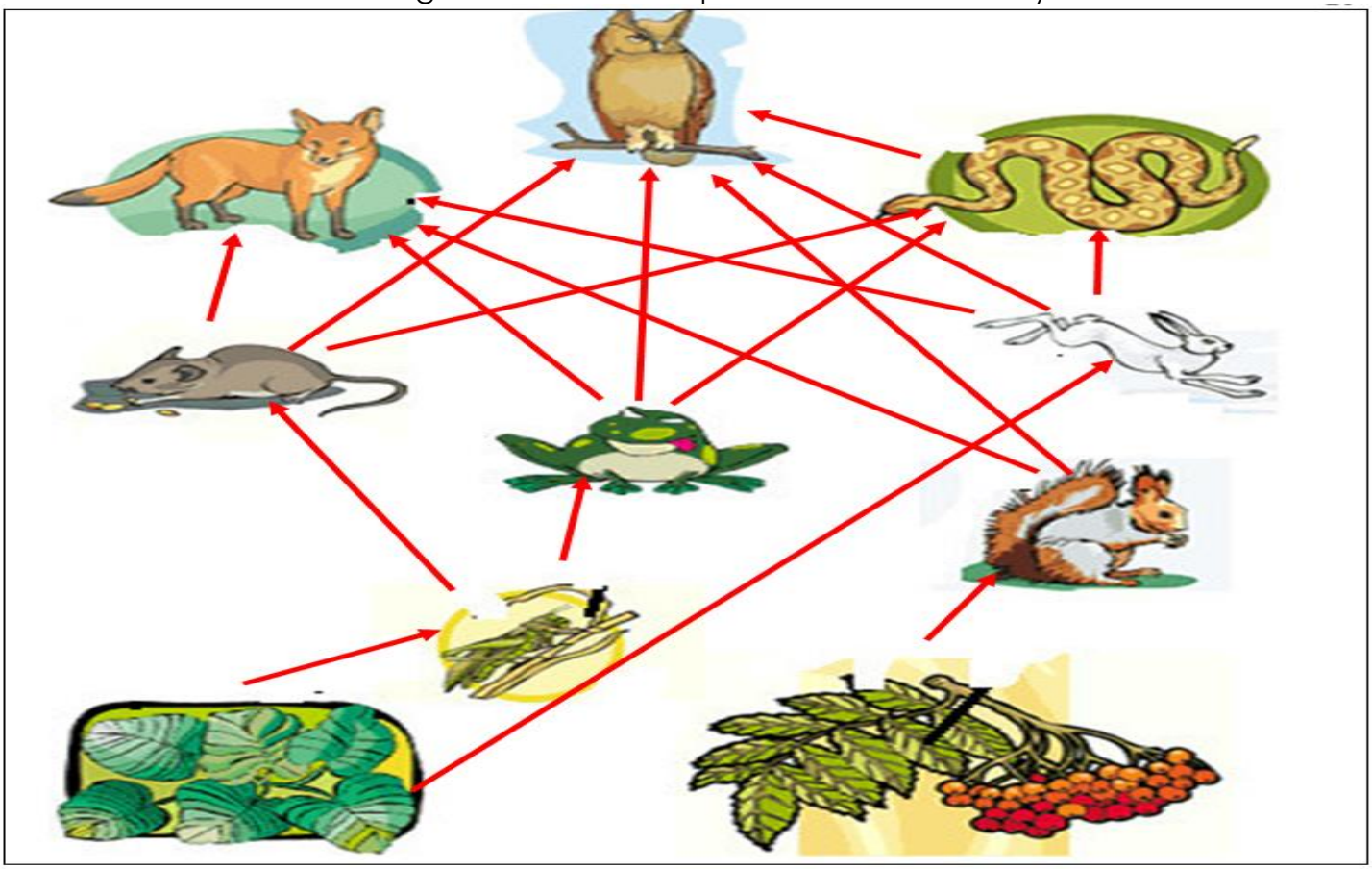
Part 1 Lesson 9 Food Webs

Most animal interactions are…

Competing for the same food supply.
Eating (predation).
Avoid being eaten (avoiding predation).

Food Web: A complex network of many interconnected food chains and feeding interactions.

Please draw arrows to the organism that each species eats to correctly create a food web.



Part 1 Lesson 10 Feeding Simulation

Predator: An organism that lives by preying on other organisms.

Prey: An animal hunted for food.

Generalist doesn't waste energy looking for high quality food. Eat the obvious!

Specialist uses lots of time and energy to find the energy rich foods.

Gregarious: Tending to form a group with others of the same species.

First Part	Second Part	Third Part
Seeds are collected at end of each round, they are not rolled over. • If you have less than 30 you die, you will play again soon. • If you have more than 30 you survive again White bean = 1 Red Bean = 5 Green Bean = 10	Habitat and Predators -Same as first, but this time with predators. -You still need 30 energy units. -You are safe from predators if you are touching Hula-Hoop. -Predators can only walk (no running), only tag someone out if they deliberately don't stop feeding and run away when you are standing over them making hawk noises.	Predator Prey (Round 3) No habitat -A shopping plaza has cut habitat in half. -Only one Hula-Hoop -Predators still exist but in smaller numbers

Describe the competition for resources that you experienced? Students would experience intraspecific competition looking for seeds while competing with each other (same Species)

What type of seeds did you look for? Why?_____

How did predators (hawks) change your feeding? Predators would make feeding more challenging as you waste time and energy looking out for them.

How did habitat help you? Habitat allowed the foragers to search for food without the constant need to watch for predators. It made feeding easier.

Please describe the bean game? What is a generalist? What is a specialist? What strategies were used to survive? How does habitat affect feeding and ultimately survival? I would attach a sheet!

Student will describe bean game. A generalist eats everything and doesn't waste energy looking for higher-quality food. A specialist takes the time to look for energy-rich foods. There could be several strategies used to survive—some students may have chosen to be generalists and some may have chosen to be specialists (since specialists will need less beans total to survive, but generalists can eat all types of beans). Habitat affects feeding because it is a safe place to go to when predators are around. It's harder to feed in an area that has no cover from predators.

Part 1 Lesson 11 Predator Prey Cycles

Predator Prey Data Sheet

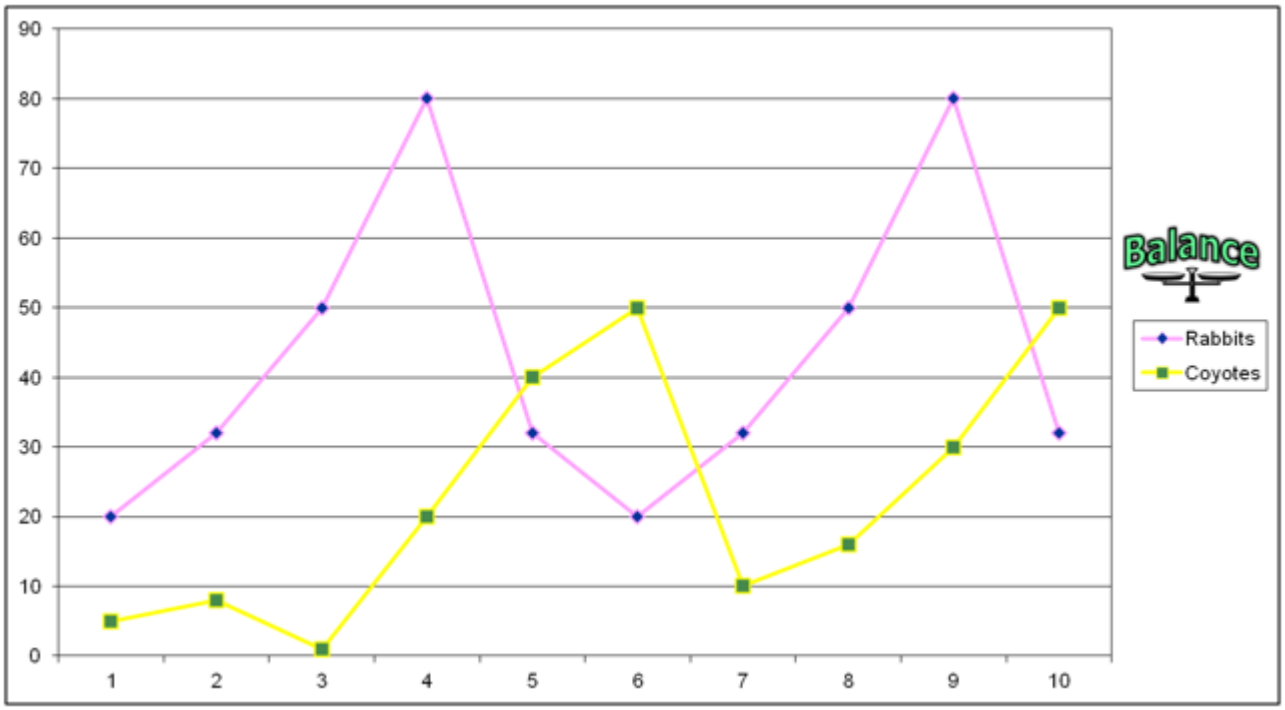
1.) Have many (300+ per table group) normal note cards (rabbits) (colored if possible)
2.) Have jumbo note cards (different color represent coyotes)
3.) Spread 20 rabbits all over large lab table so no two rabbits are touching but they are all close.
4.) Toss 5 coyote cards onto large lab table to get the most rabbits that you can from a short distance.
5.) If coyote card touches a rabbit then the rabbit is eaten and removed. The coyote reproduces, pick up cards and double them. If coyote misses – It's dead and removed. Record new number after doubling each round
6.) All the surviving rabbits reproduce as well and then spread onto the table.
7.) Repeat rounds, record statistics on spreadsheet.
8.) Visual of activity on the next series of slides.

- Note: If all rabbits are eaten 20 will move into the area. If all coyotes die than 5 will move into the area for the next round

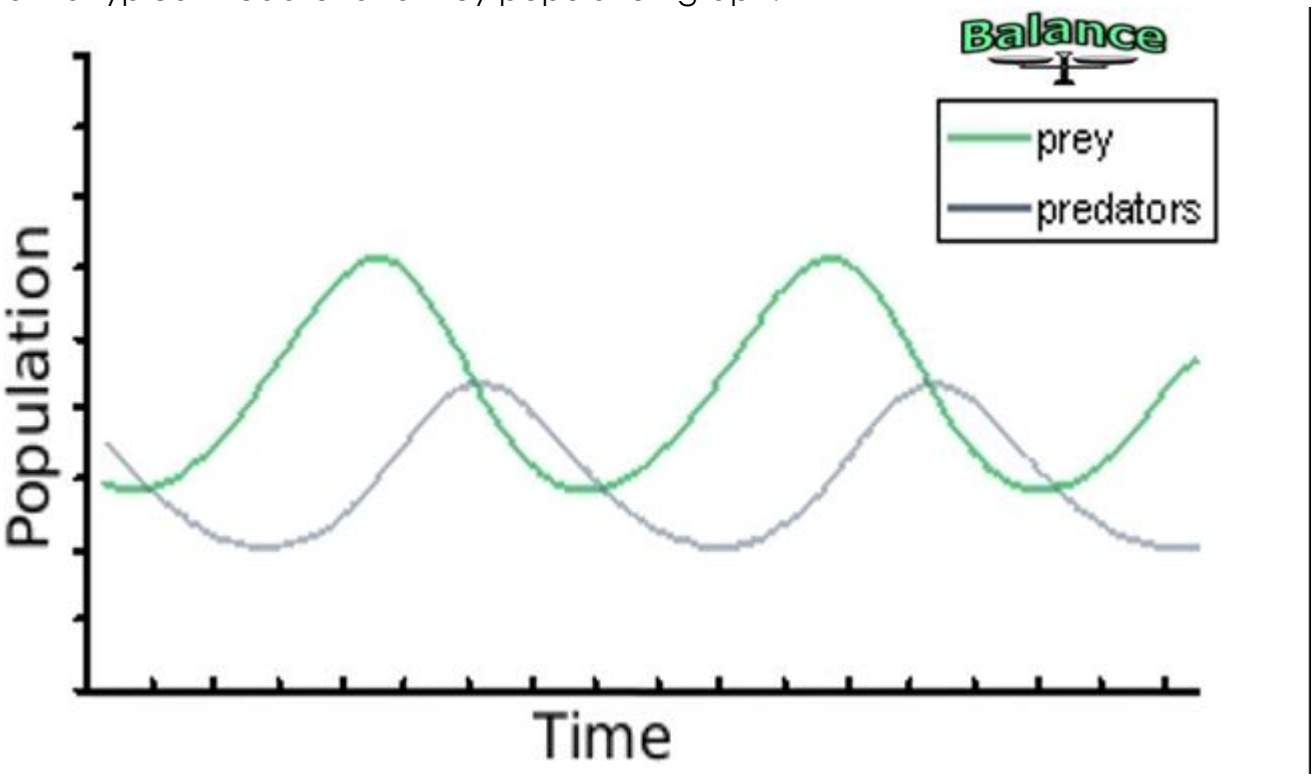
Simulated data

Generations	Rabbits	Coyotes
1	20	5
2	32	8
3	50	12
4	80	20
5	32	40
6	20	50
7	32	10
8	50	16
9	80	30
10	32	50

Please graph your data over generations. (R = Rabbits, C = Coyotes)



Draw a typical Predator and Prey population graph.



From the circled list above, which are density dependent and which are density independent?

Density Dependent	Density Independent
Competition, space, diseases, predators, parasites	Sunlight, water, temperature, oxygen

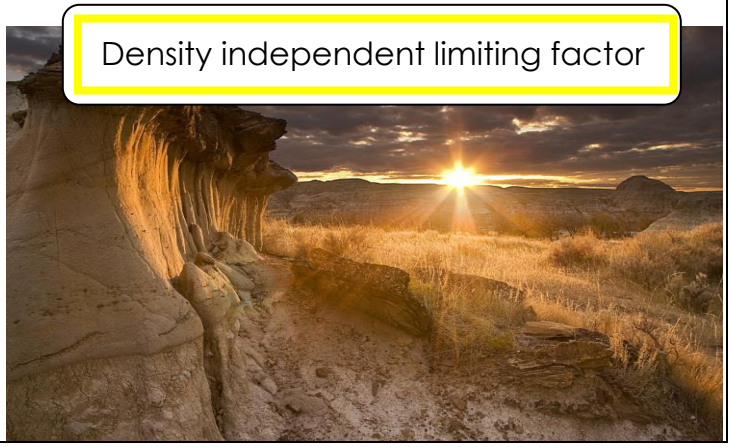
Which box is showing a density dependent limiting factor, and which is showing a density independent limiting factor? **Explain**

Predators are density dependent limiting factors because predation increases prey death rate—which impacts how small or large the population of prey is.

Sunlight is a density independent limiting factor. No matter how large or small a population is, the sun will affect both, and the size of a population does not affect the sun's survival at all.

Density dependent limiting factor

Density independent limiting factor



Across

2. _____ Capacity: The amount of food that an area of land will yield.
3. _____ Niche: The theoretical role, place, or function that a species has within its ecosystem.
5. The frozen water part of our planet
6. All waters not in atmosphere and lithosphere
8. _____ Niche: The way of life that an organism is reduced to live in due to limiting factors.
9. Competitive _____: One thrives, the other goes extinct. No two species with the same job can coexist.
12. The interaction between organisms or species, in which the fitness of one is lowered by the presence of another.
13. A region of space surrounding an astronomical object in which charged particles are affected by that object's magnetic field.
17. A regional ecosystem characterized by distinct types of vegetation, animals. Determined by temperature and rainfall.
18. The area of gases that surround the planet.
20. An organism that lives by preying on other organisms
22. Organism with unique DNA and cells
23. The relationships between groups of populations.
24. Refers to the solid parts of the Earth; it is used along with atmosphere, hydrosphere, cryosphere to describe the systems of the Earth (Abiotic=non-living)

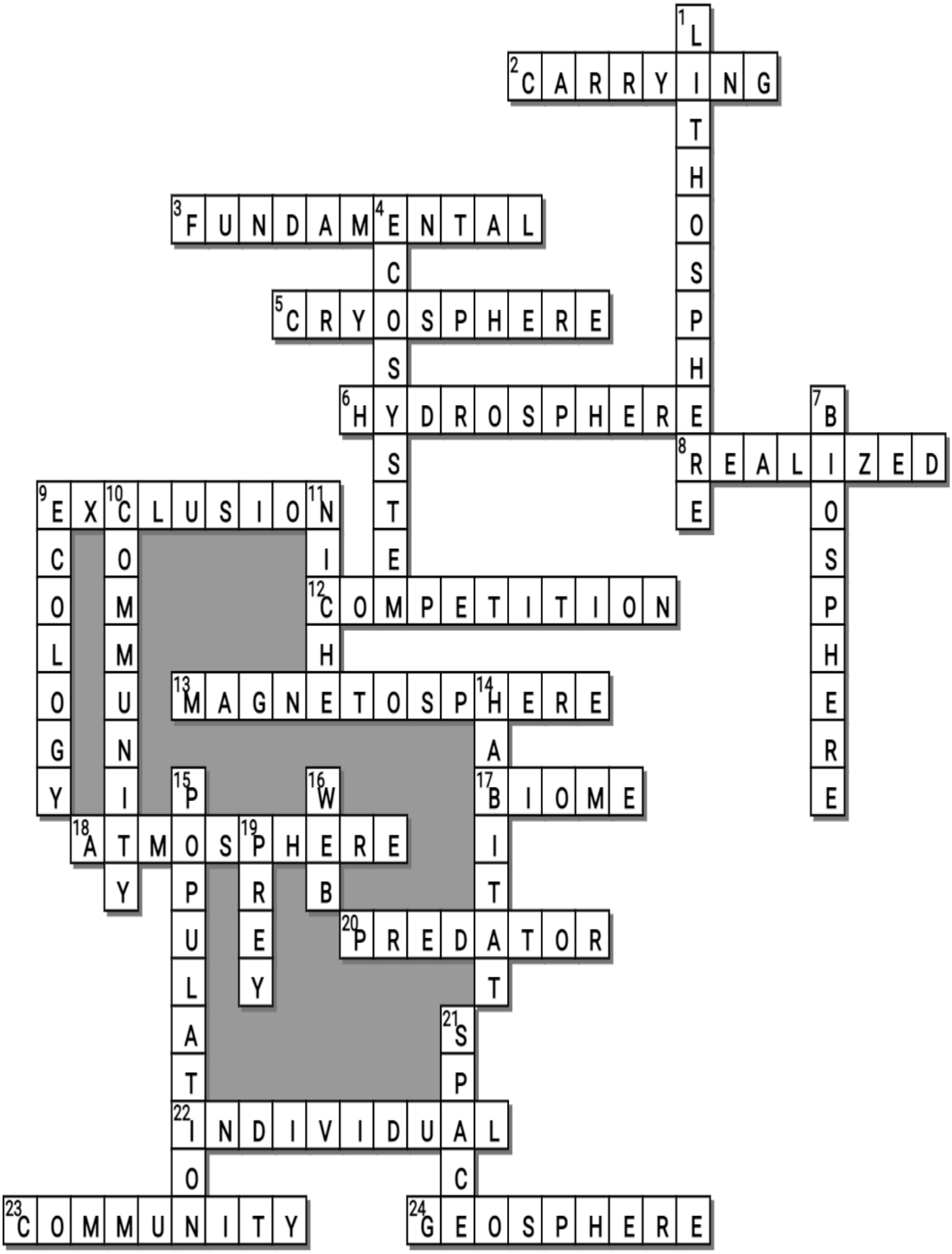
Down

1. Below the surface, in the crust and mantle.
4. The relationships of populations with each other and their environment.
7. The part of the earth and its atmosphere in which living organisms exist.
9. A study of the relationship between living things and the environment.
10. _____ ecology: The study of interacting populations
11. Ecological _____: The place or function of a given organism within its ecosystem. "Job"
14. The type of environment in which an organism lives.
15. Groups of similar individuals who tend to mate with each other in a limited geographic area.
16. Food _____: A complex network of many interconnected food chains and feeding interactions.
19. An animal hunted for food.
21. The needs of an organism are… Air, Water, Food, Shelter, _____

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

Possible Answers

COMMUNITY, ECOSYSTEM, PREDATOR, ATMOSPHERE, BIOME, BIOSPHERE, CARRYING, COMMUNITY, COMPETITION, CRYOSPHERE, ECOLOGY, EXCLUSION, FUNDAMENTAL, GEOSPHERE, HABITAT, HYDROSPHERE, INDIVIDUAL, LITHOSPHERE, MAGNETOSPHERE, NICHE, POPULATION, PREY, REALIZED, SPACE, WEB

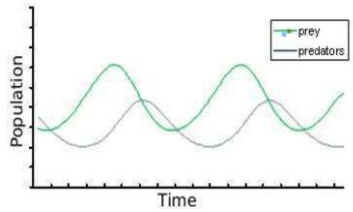

1 L
2 CARRYING
THOSPHERE
3 FUNDAMENTAL
4 ECOSPHERE
5 CRYOSPHERE
6 HYDROSPHERE
7 BIOSPHERE
8 REALIZED
9 EXCLUSION
10 COMMUNITY
11 NICHE
12 COMPETITION
13 MAGNETOSPHERE
14 HABITAT
15 PUPULATION
16 WEB
17 BIOME
18 ATMOSPHERE
19 PREY
20 PREDATOR
21 SPECIES
22 INDIVIDUAL
23 COMMUNITY
24 GEOSPHERE

Part 1 Review Game Lesson 13

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

It's BIG	LEVEL-UP	MR. DEEDS	WATCH YOUR BACK JACK	CARTOON PREDATORS Bonus round 1 pt each
1) Cycles	6) Ecosystem	11) Atmosphere, ecosphere	16) A= Density dependent (living) B= Density independent (non-living)	*21) Wile E. Coyote
2) Levels	7) Population	12) Habitat	17) Interspecific competition	*22) Chester Cheetah
3) Flow	8) Individual	13) Niche	18) Intraspecific competition	*23) Shere Khan and Kaa
4) Web	9) Biosphere	14) A= R selected species B= K selected species	19) Food web	*24) Peter Pan
5) Change *Balance is missing	10) Biome	15) Carrying capacity	20) 	*25) Shelob

Final Question Wager ___ /5 Answer: Competitive Exclusion Theory