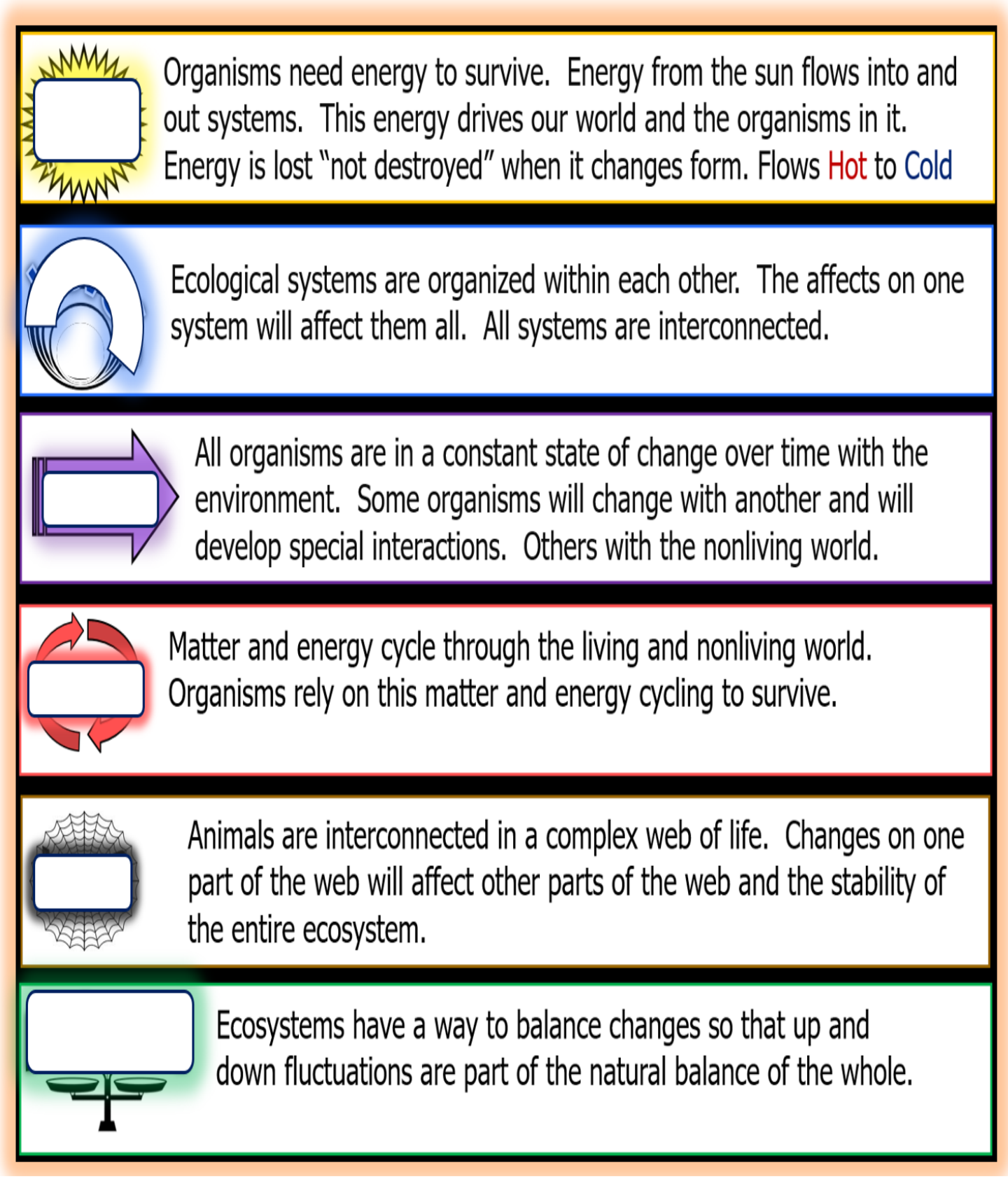
Part 2 Animals in the Environment Name:

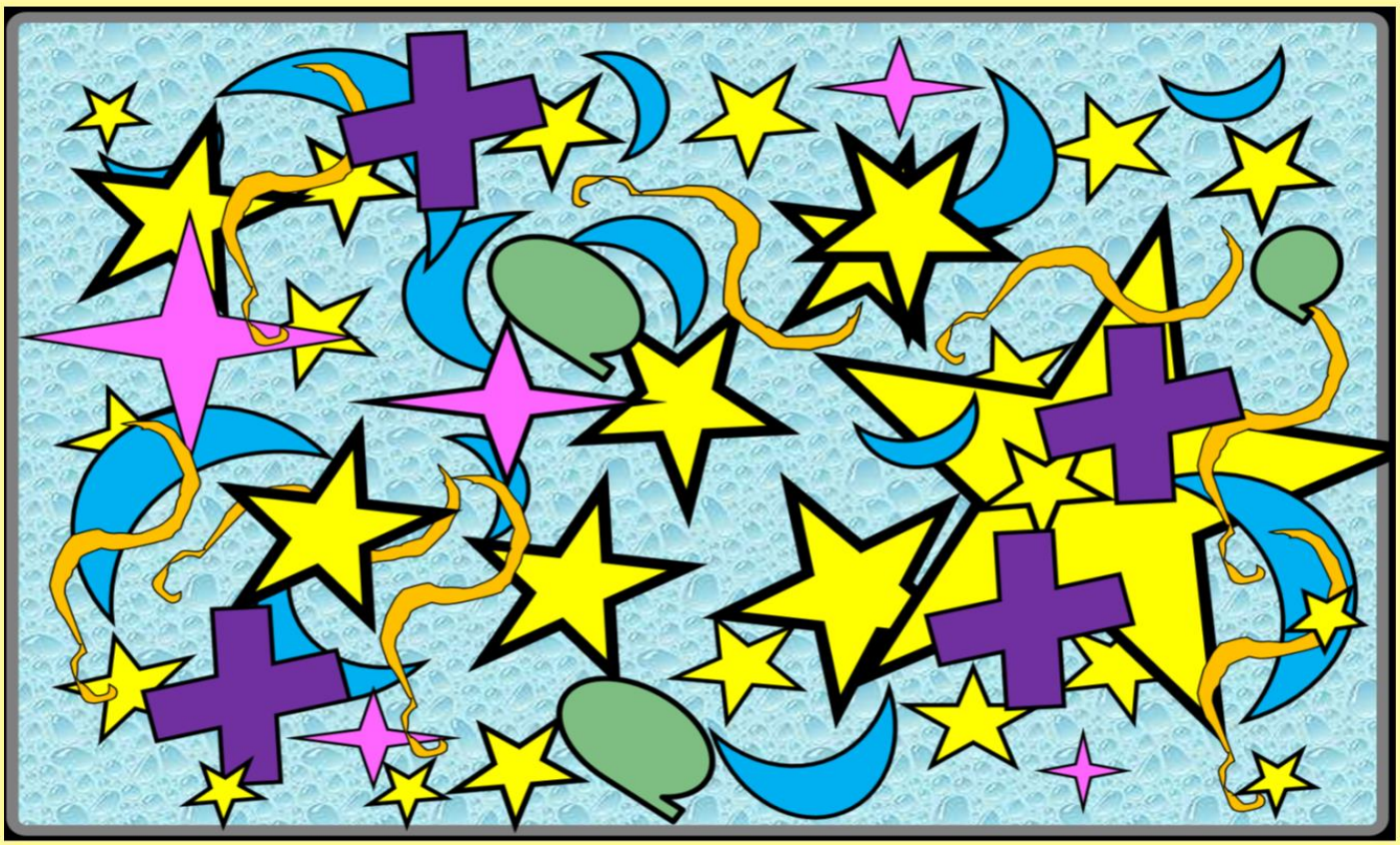
Part 2 Lesson 1 Relative Abundance

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



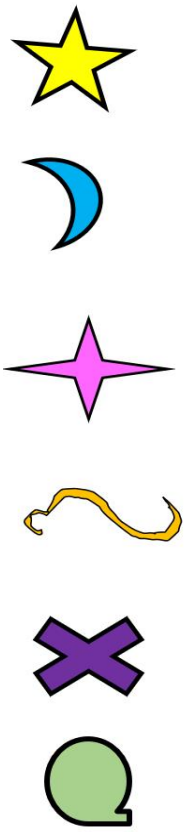
_____: Measurement of the amount of a species. Can be % cover, density, biomass, frequency.

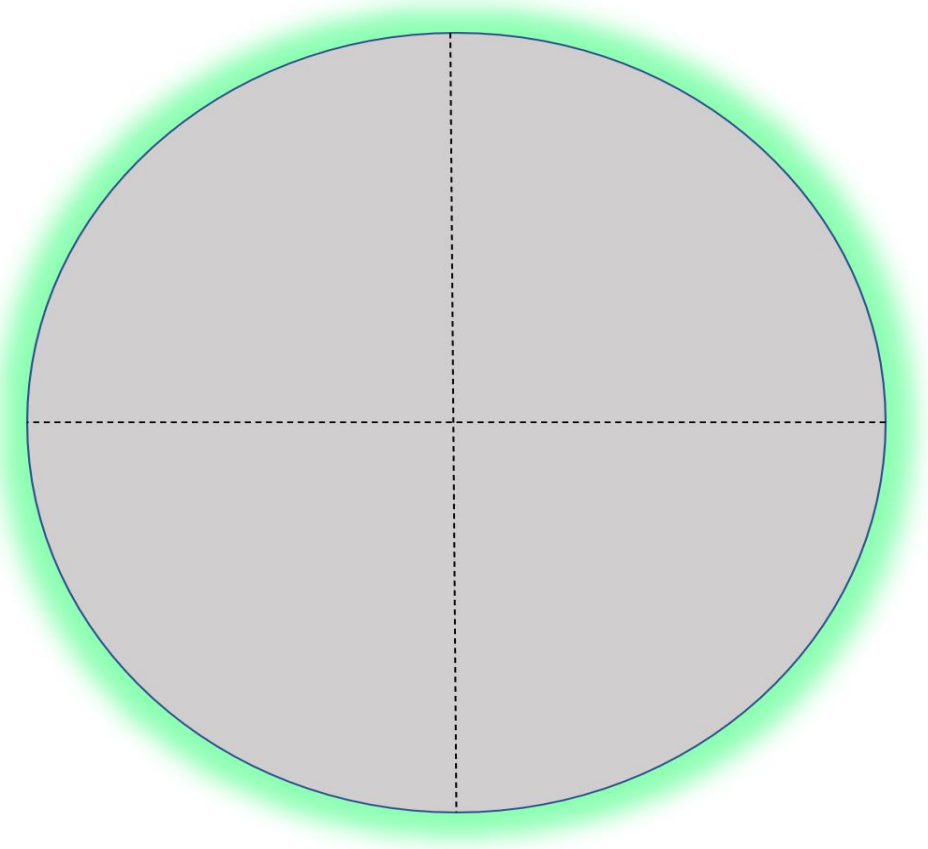
_____ abundance: The amount of each species.
Must sum to 1 or _____%.



Species	# of that Species	Divided by	Total	Equals	X 100	= Relative Abundance %
★		÷			× 100	
☾		÷			× 100	
✦		÷			× 100	
~		÷			× 100	
✖		÷			× 100	
●		÷			× 100	

Graph your findings below. Pie graph Must sum to 1 or 100%





Alternative "Leaves or other" Relative Abundance

Species	# of that Species	Divided by	Total	Equals	X 100	= Relative Abundance %
		÷			× 100	
		÷			× 100	
		÷			× 100	
		÷			× 100	
		÷			× 100	
		÷			× 100	

Species _____: A list of the species present in a community, along with a measure of their relative abundance.

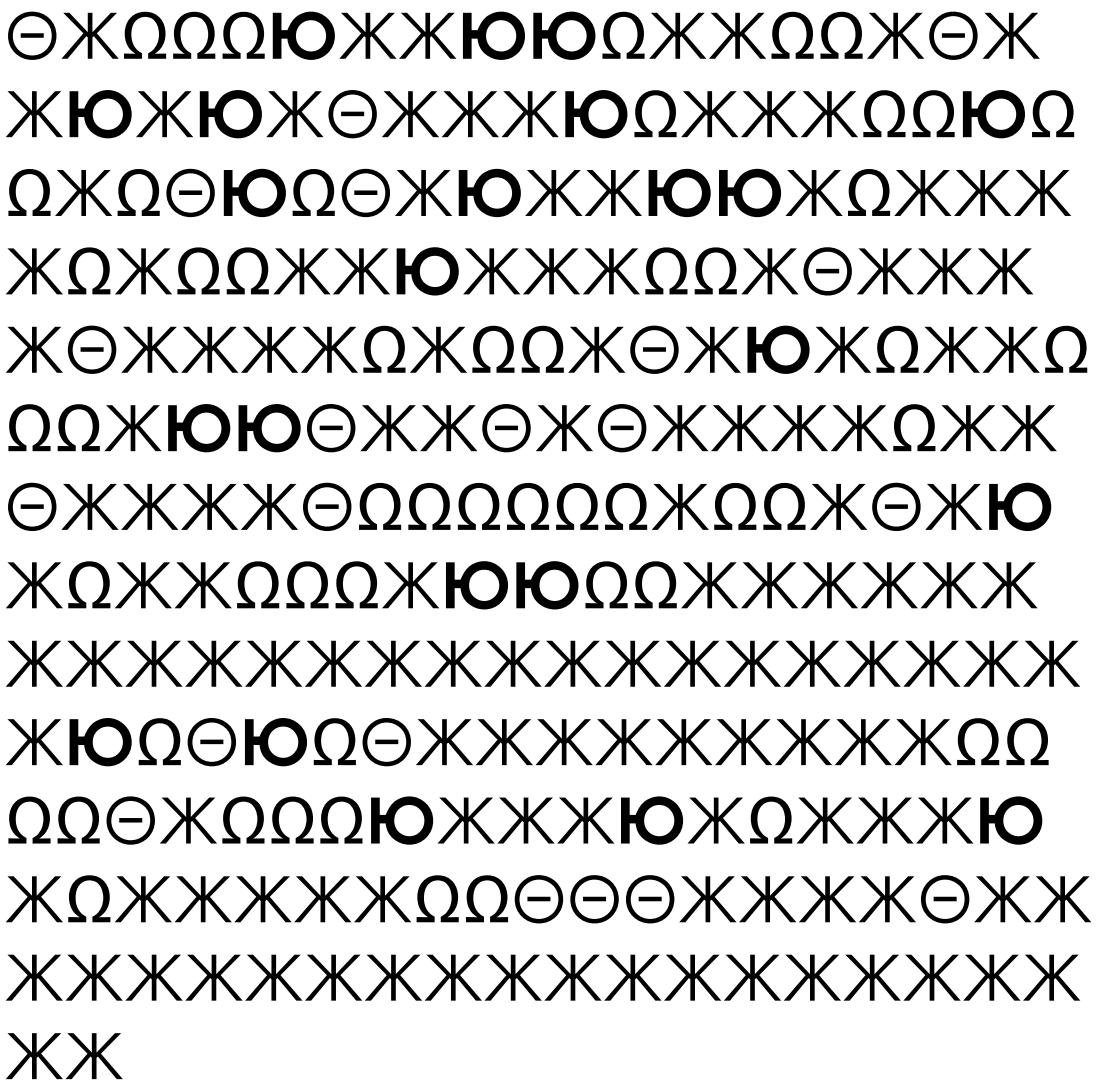
Frequency: The _____ that an event occurs within a given period; rate of recurrence.

What option did you select? _____Time Start_____ Time End
Frequency in a class period_____ Total=_____
Can you break down into frequency per minute? _____

Please find the relative abundance for each of the species below.

Species	Total	%
Ж =		
Ω=		
Ю=		
Θ=		
Total #		

What's the species diversity?

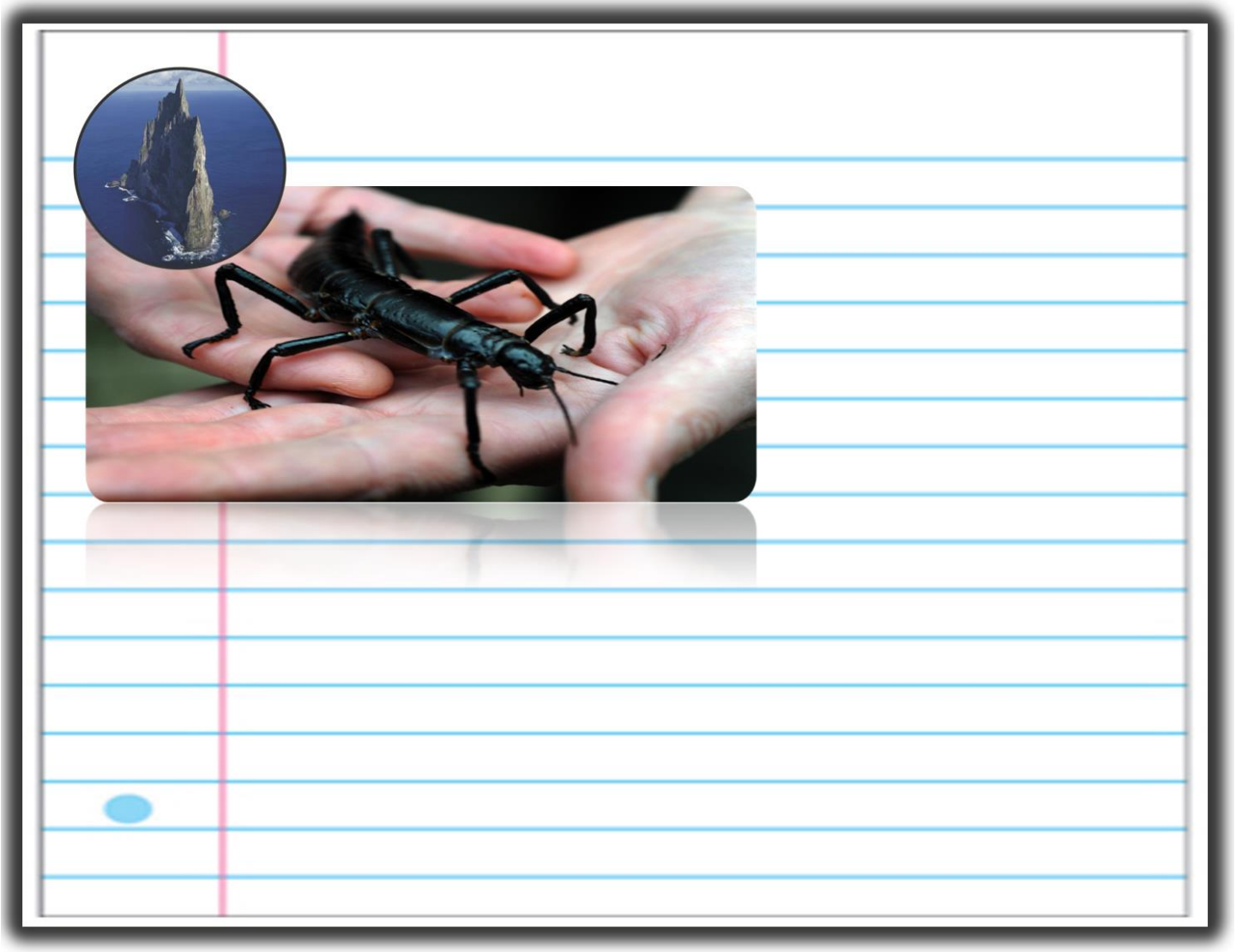


Part 2 Lesson 2 Biodiversity

Diversity: The _____, or number of kinds of _____.
Counting the number of different species.

Biodiversity is the biological _____and variability of life on Earth. Biodiversity is a measure of variation at the genetic, species, and ecosystem level.

Record some important information about the species below? What's so amazing here?



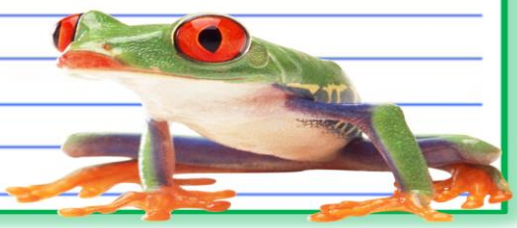
Importance of biodiversity

- Generation of _____ and maintenance of _____ quality.
- Maintenance of _____ quality.
- Maintenance of _____ quality.
- _____Control.
- Detoxification and decomposition of _____.
- _____ and crop production.
- Provision of _____ security.
- Provision of health care (_____).
- _____ generation.
- Spiritual / cultural _____

Which is not an importance of biodiversity A.) Generation of soils and maintenance of soil quality. B.) Maintenance of air quality. C.) Maintenance of water quality. D.) Increase pest species. E.) Detoxification and decomposition of wastes. F.) Pollination and crop production. G.) Provision of food security. H.) Provision of health care (Medicines). I.) Income generation. J.) Spiritual / cultural value.	Which is not an importance of biodiversity A.) Generation of soils and maintenance of soil quality. B.) Maintenance of air quality. C.) Maintenance of water quality. D.) Pest Control. E.) The creation of waste F.) Pollination and crop production. G.) Provision of food security. H.) Provision of health care (Medicines). I.) Income generation. J.) Spiritual / cultural value.

Which is not an importance of biodiversity A.) Generation of soils and maintenance of soil quality. B.) Maintenance of air quality. C.) Maintenance of water quality. D.) Pest Control E.) Detoxification and decomposition of wastes. F.) Pollination and crop production. G.) Decrease in food security. H.) Provision of health care (Medicines). I.) Income generation. J.) Spiritual / cultural value.	Which is not an importance of biodiversity A.) Generation of soils and maintenance of soil quality. B.) Maintenance of air quality. C.) Maintenance of water quality. D.) Pest Control E.) Detoxification and decomposition of wastes. F.) Pollination and crop production. G.) Increase in food security. H.) Provision of health care (Medicines). I.) Loss of income. J.) Spiritual / cultural value.

How and why should we maintain biodiversity?



Plantation Forestry vs. Native Regeneration Forestry (Tasmania)
Pay attention to each side of the story. Which is better to maintain biodiversity?

- http://www.youtube.com/watch?v=vplUH8A_wE

Plantation Forestry	vs. Regeneration Forestry
+ Positives	+ Positives
- Negatives	- Negatives

Which one is better to increase biodiversity? =_____

Part 2 Lesson 3 Camouflage

Activity! Quiz 1-20. Find the hidden "thing" in the picture.

- General names are acceptable.
- You will have about 10 seconds.

1)	2)	3)	4)
5)	6)	7)	8)
9)	10)	11)	12)
13)	14)	15)	16)
17)	18)	19)	20)

_____: An adaptation that allows the animal to blend in with its environment to avoid being detected.

Adaptation: To be better suited to _____.

There are four types of camouflage

Concealing Coloration

Concealing Coloration: When an animal hides itself against a _____of the _____ color / pattern.

Disruptive Coloration

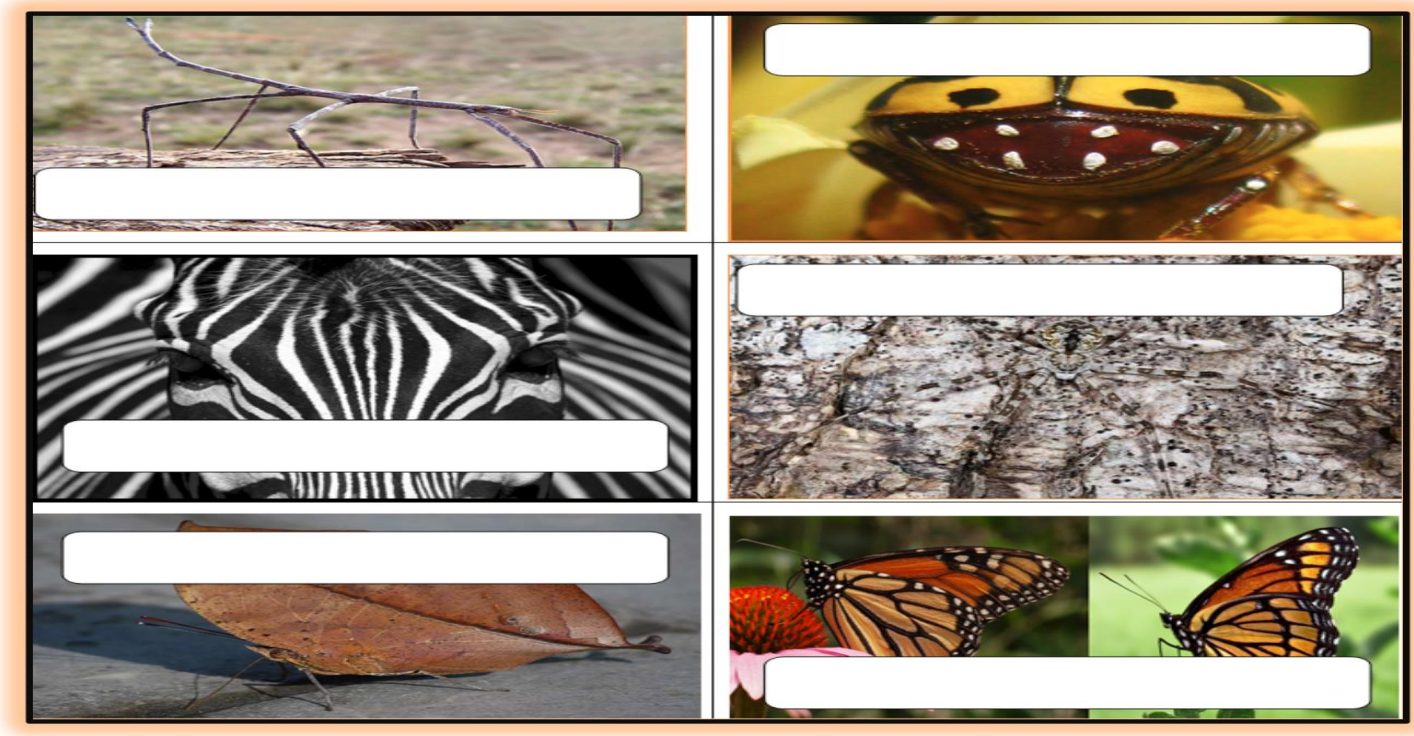
Disruptive Coloration: When stripes, spots or other patterns make it hard for other animals _____ of their bodies

Disguise

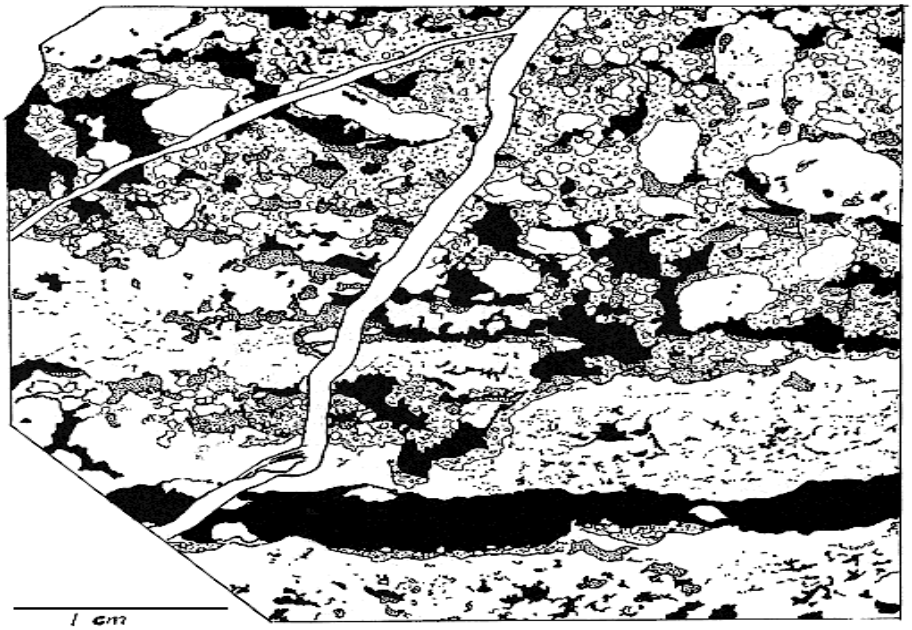
Disguise: This is like concealing coloration except that the animals _____in with their surroundings by their _____ rather than color.

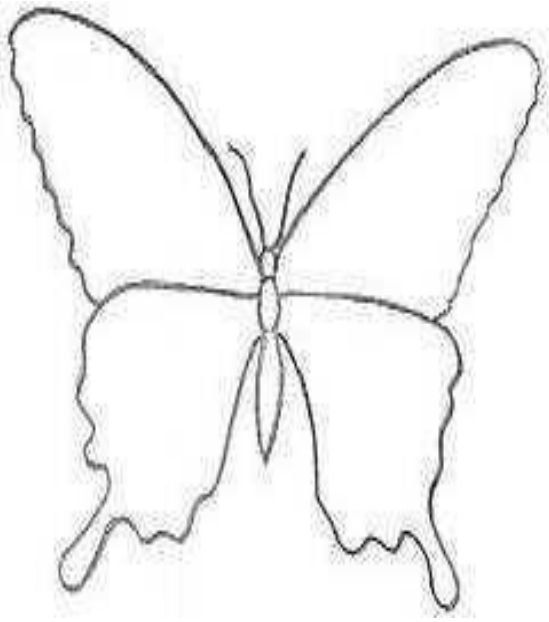
Mimicry

Mimicry: Animals that use mimicry are _____. Resemble a stick example They often mimic the characteristics of unappetizing animals.

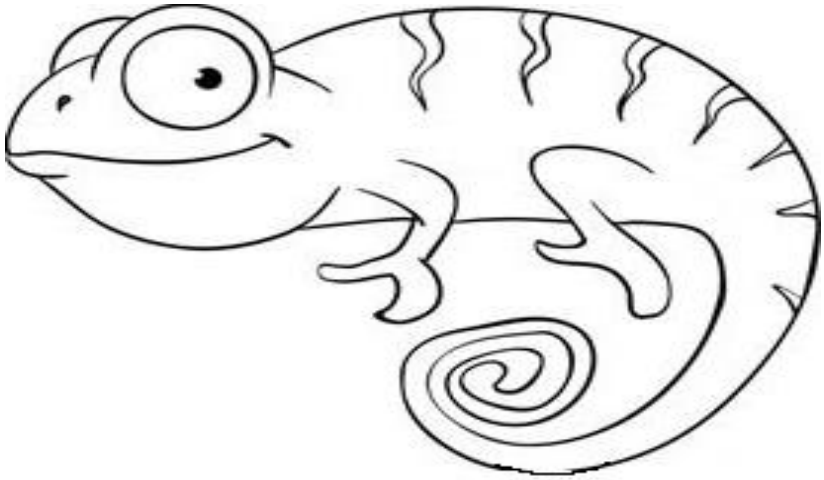


Camouflage the butterfly to match the background. Camouflage the lizard and frog to a background of your choice. Please use color and don't just scribble.





Make up a background and Chameleon camouflage pattern so I don't see it?



On the back page are three cut-outs to camouflage and hide around the school. Grab some colored pencils and follow me around the building. When you find an area, color to hide your animal. Then cut-out with scissors back in the classroom, tape (loop method) from the back so the tape doesn't show, and hide. Best behavior is expected. Put your names on them! Perhaps the younger kids might get to go for a hunt! Will yours survive the year?

Part 2 Lesson 4 Mimicry

_____: The resemblance of an animal species to another species or to natural objects.

Make some notes and sketches about different examples of mimicry as shown in the slideshow.

Activity! Young Bird (Learn through Experience)

- Today you will become a young bird foraging for food.
- You are tasting the world for the first time after leaving the nest.
- Go around your group eating the provided food one at a time. Share your experiences with your group.
- Record your food choice for each round (1-10+). What will you learn? Write DONE! When you don't want to feed anymore / you've learned your lesson

Rounds / Color selected	Experience / What did you get / eat?
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

Which species did you choose as a primary food source? Why?_____

_____

_____

_____

Which species did you not choose? Why?_____

_____

_____

_____

Which species is the mimic, and which is the model?_____

_____

_____

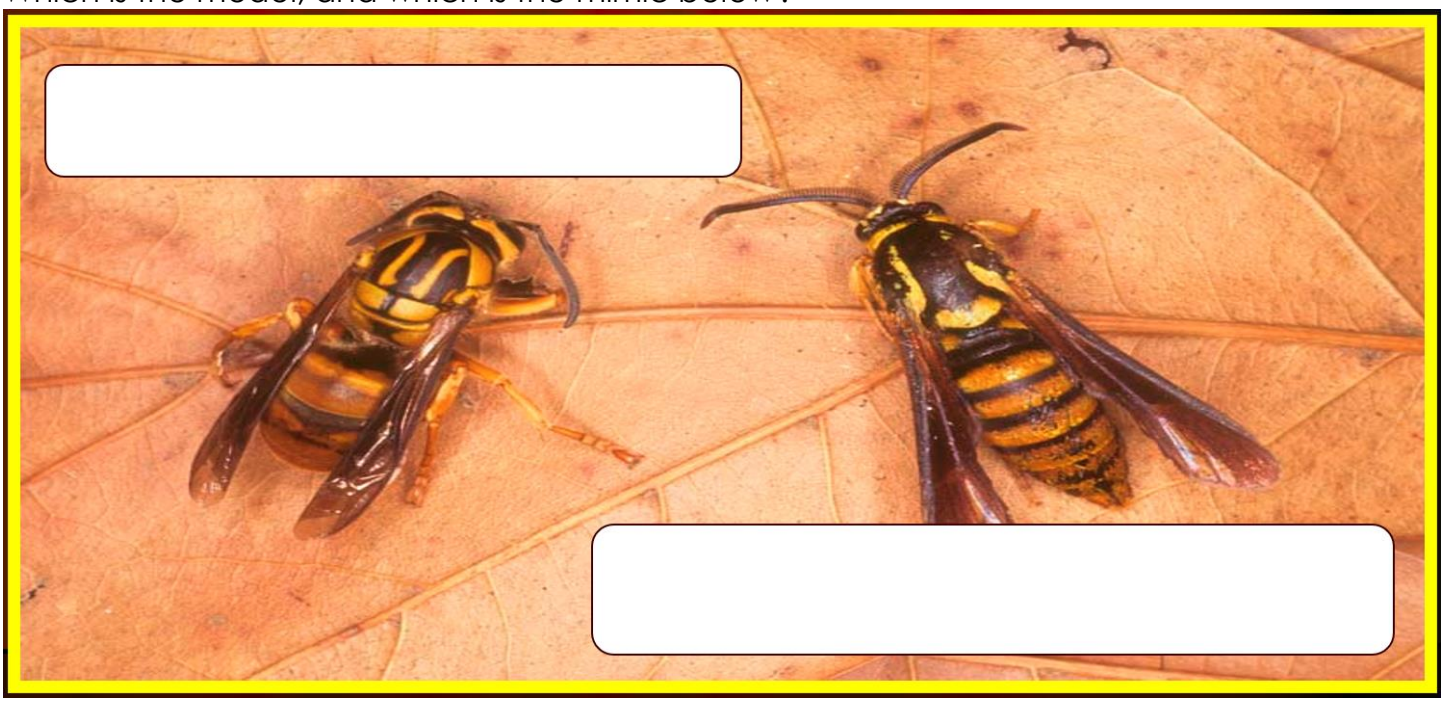
How does your taste influence who eats you?_____

_____

Part 2 Lesson 5 Batesian Mimicry

Batesian mimicry: Looking like another species that is _____or may taste bad.
There is a mimic, and the model. Look like someone who has a stinger.

Which is the model, and which is the mimic below?



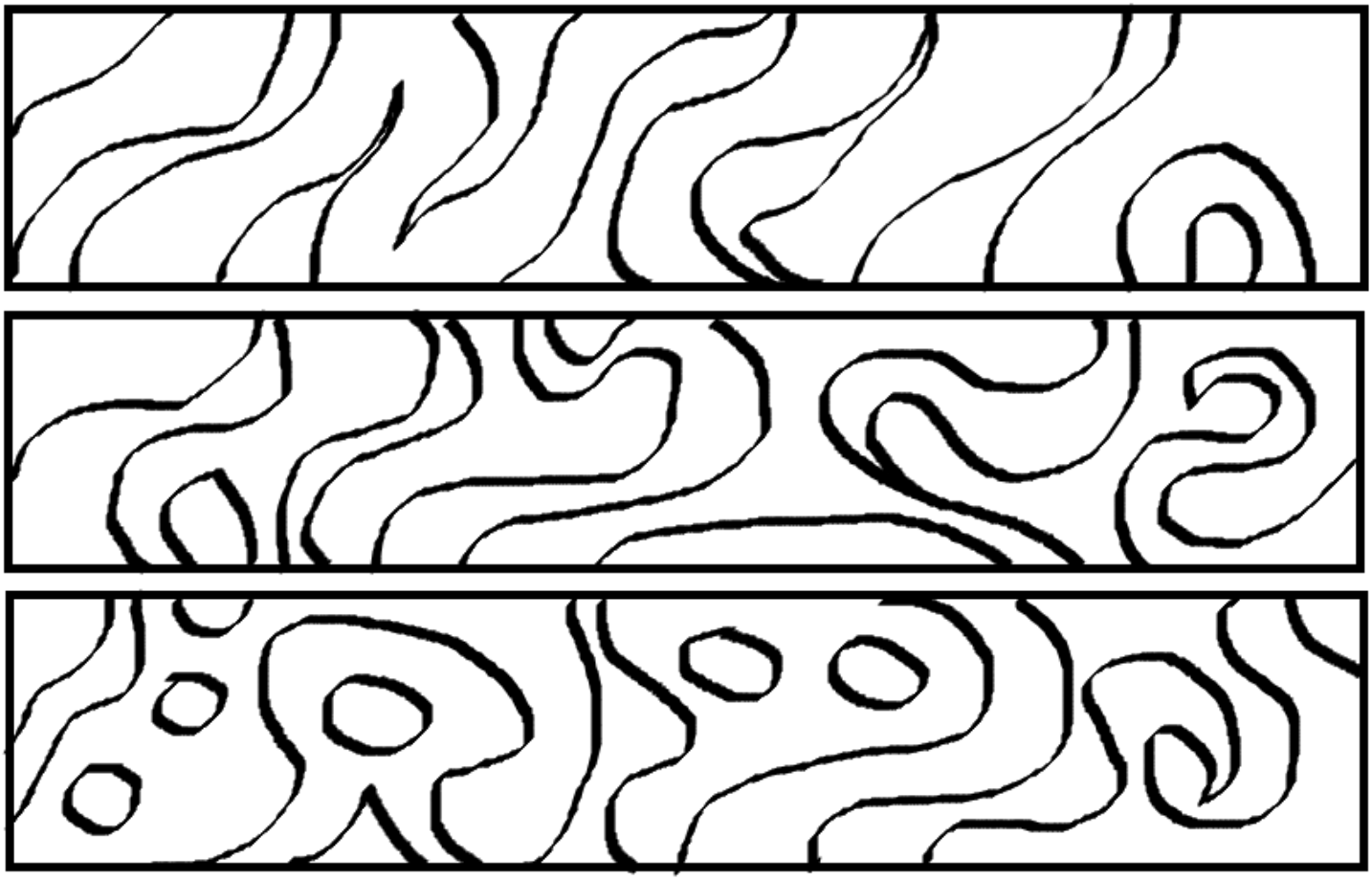
Aggressive Mimicry: A form of mimicry in which a predator (the _____) closely resembles another organism (the _____) that is attractive to a third organism (the _____) on which the mimic preys.

Who is the Mimic=_____, Who is the Model=_____ Dupe=_____ below with the alligator snapping turtle example?

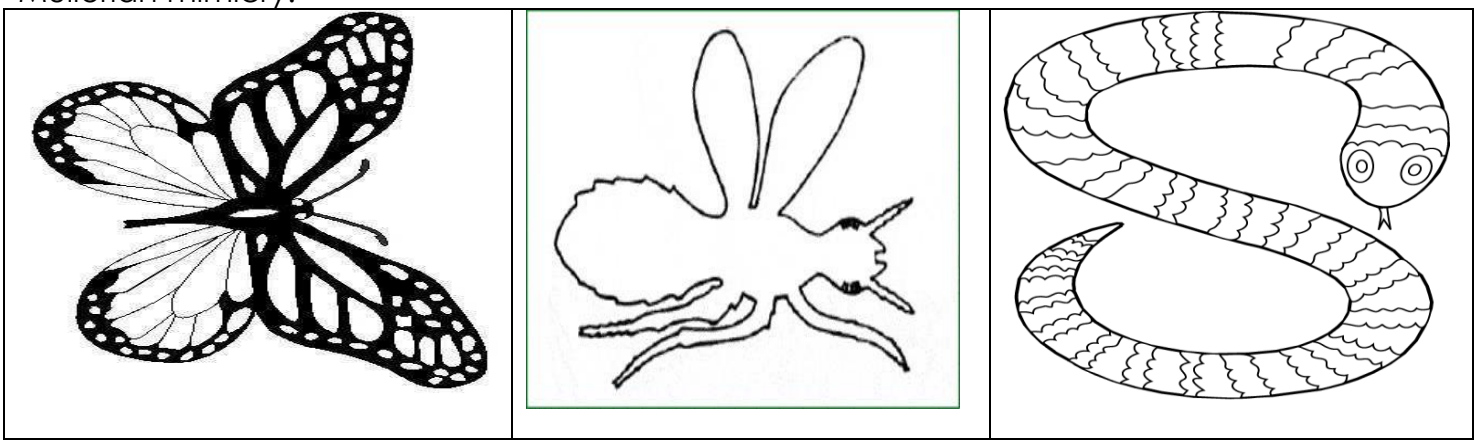
_____ Coloration: coloration or markings of an animal serving to warn off predators.

Part 2 Lesson 6 Mullerian Mimicry

Mullerian mimicry: Several unrelated species share _____that warn predators that these colors are dangerous or toxic. "Warming Colors" / Aposematic Coloration



Please dress up the following organisms with <u>different</u> colors schemes that represent Mullerian mimicry.



Some animals avoid predations with physical features that just make them a difficult meal.

- Poisonous
- Spikes
- Shells
- Confusing Color Patterns

Across

2. Measurement of the amount of a species. Can be % cover, density, biomass, frequency.
7. _____ Coloration: coloration or markings of an animal serving to warn off predators.
8. Species _____ A list of the species present in a community, along with a measure of their relative abundance.
10. _____ abundance: The amount of each species. Must sum to 1 or 100%.
13. This is like concealing coloration except that the animals blend in with their surroundings by their shape and/or texture rather than color.
14. _____ mimicry: Several unrelated species share warning colors that warn predators that these colors are dangerous or toxic. "Warming Colors" / Aposematic Coloration
15. The biological variety and variability of life on Earth. Biodiversity is a measure of variation at the genetic, species, and ecosystem level.
16. The number of times that an event occurs within a given period; rate of recurrence.

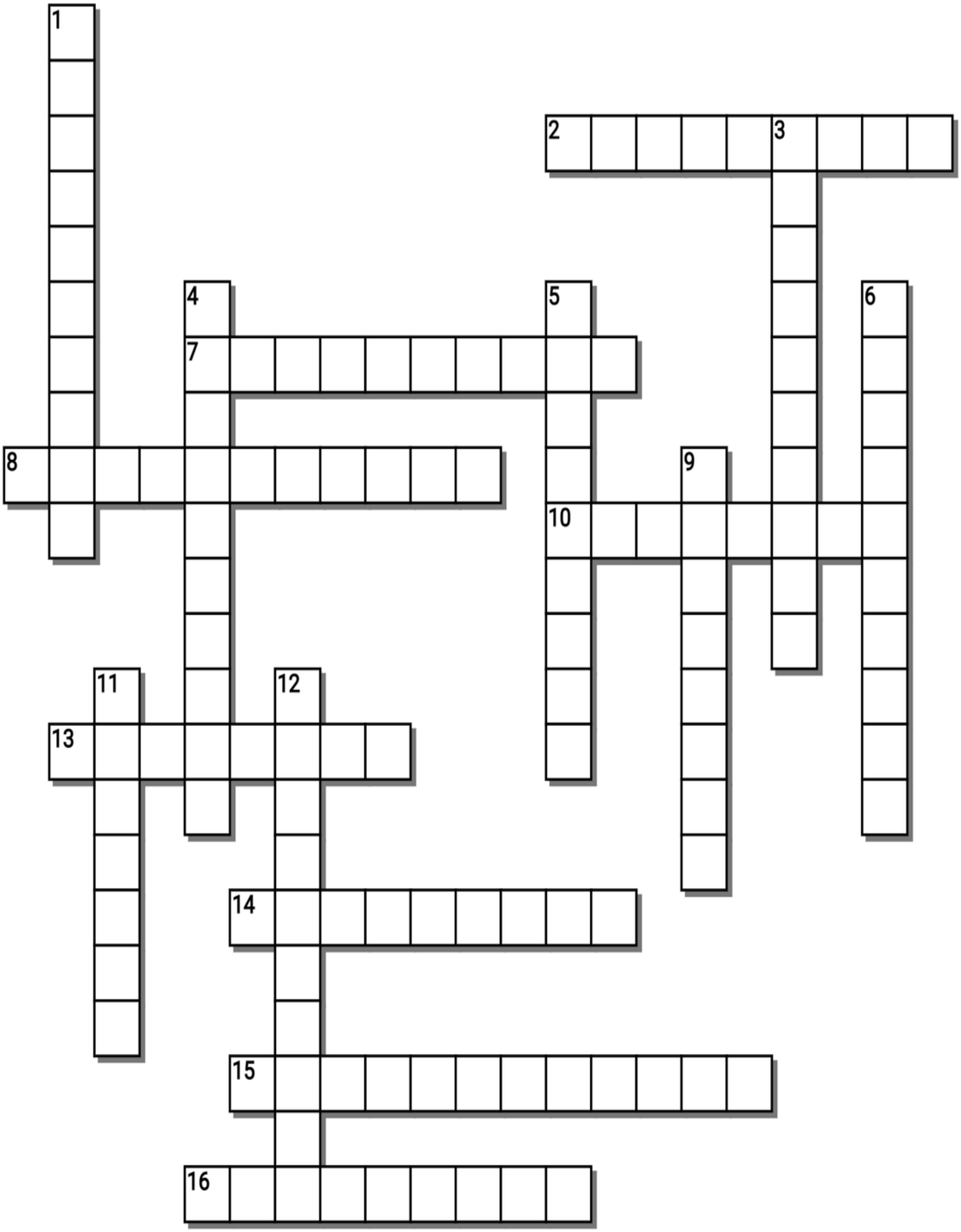
Down

1. To be better suited to survive.
3. _____ Mimicry: A form of mimicry in which a predator (the mimic) closely resembles another organism (the model) that is attractive to a third organism (the dupe) on which the mimic preys.
4. An adaptation that allows the animal to blend in with its environment to avoid being detected.
5. The variety, or number of kinds of species.
6. _____ Coloration: When an animal hides itself against a background of the same color / pattern.
9. _____ mimicry: Looking like another species that is dangerous or may taste bad. There is a mimic, and the model.
11. Animals that use mimicry are imposters. Resemble a stick example They often mimic the characteristics of unappetizing animals.
12. _____ Coloration: When stripes, spots or other patterns make it hard for other animals to see the outline of their bodies

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

Possible Answers

FREQUENCY, ABUNDANCE, ADAPTATION, AGGRESSIVE, APOSEMATIC, BATESIAN, BIODIVERSITY, CAMOUFLAGE, CONCEALING, DISGUISE, DISRUPTIVE, DIVERSITY, MIMICRY, MULLERIAN, RELATIVE, COMPOSITION:


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

Part 2 Review Game Lesson 7

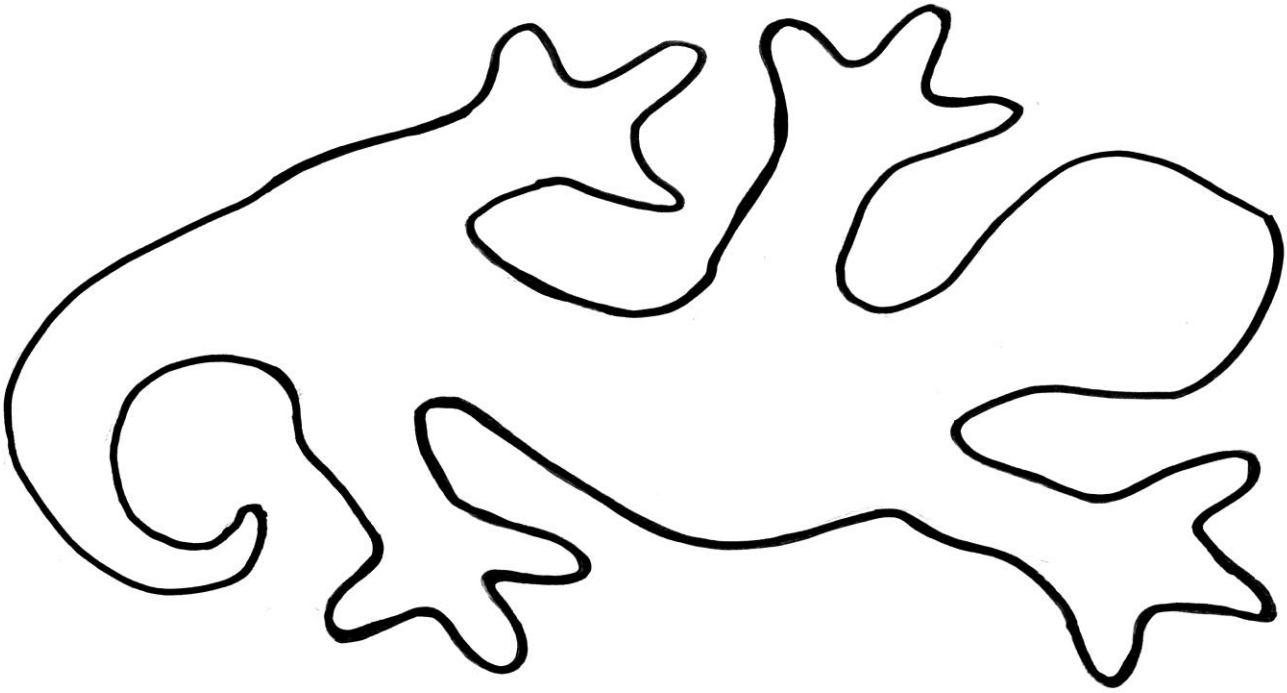
Name:

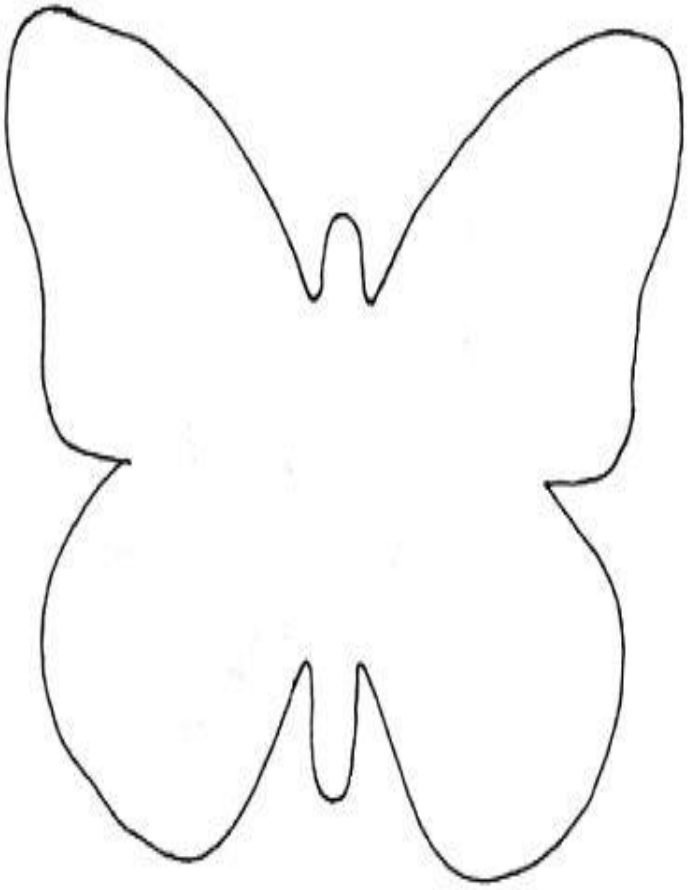
1-10 = 5 pts * = Bonus + 1 pt,
(Secretly write owl in correct space +1 pt)
Final Question = 5 pt wager

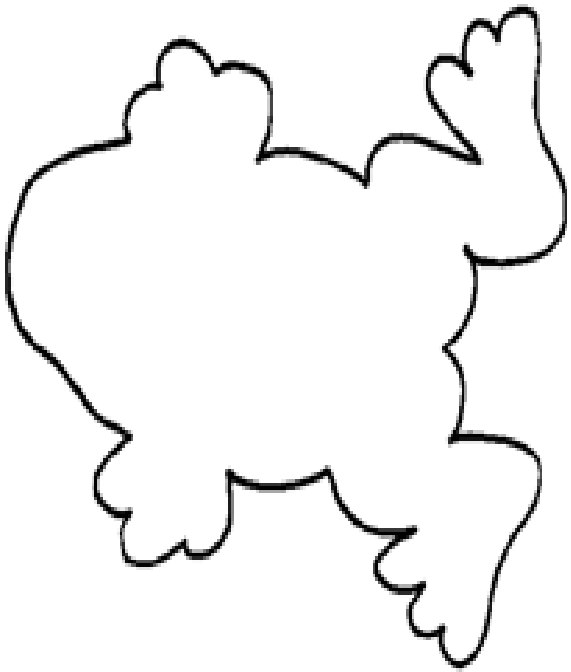
Due: Today
Score ____ / 100

HOUSE OF CARDS	SNEAK PEAK	SIMON SAYS	HELPING HAND	MIX UP 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 2 Ecology Interactions

Name:

Part 2 Lesson 1 Relative Abundance

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.

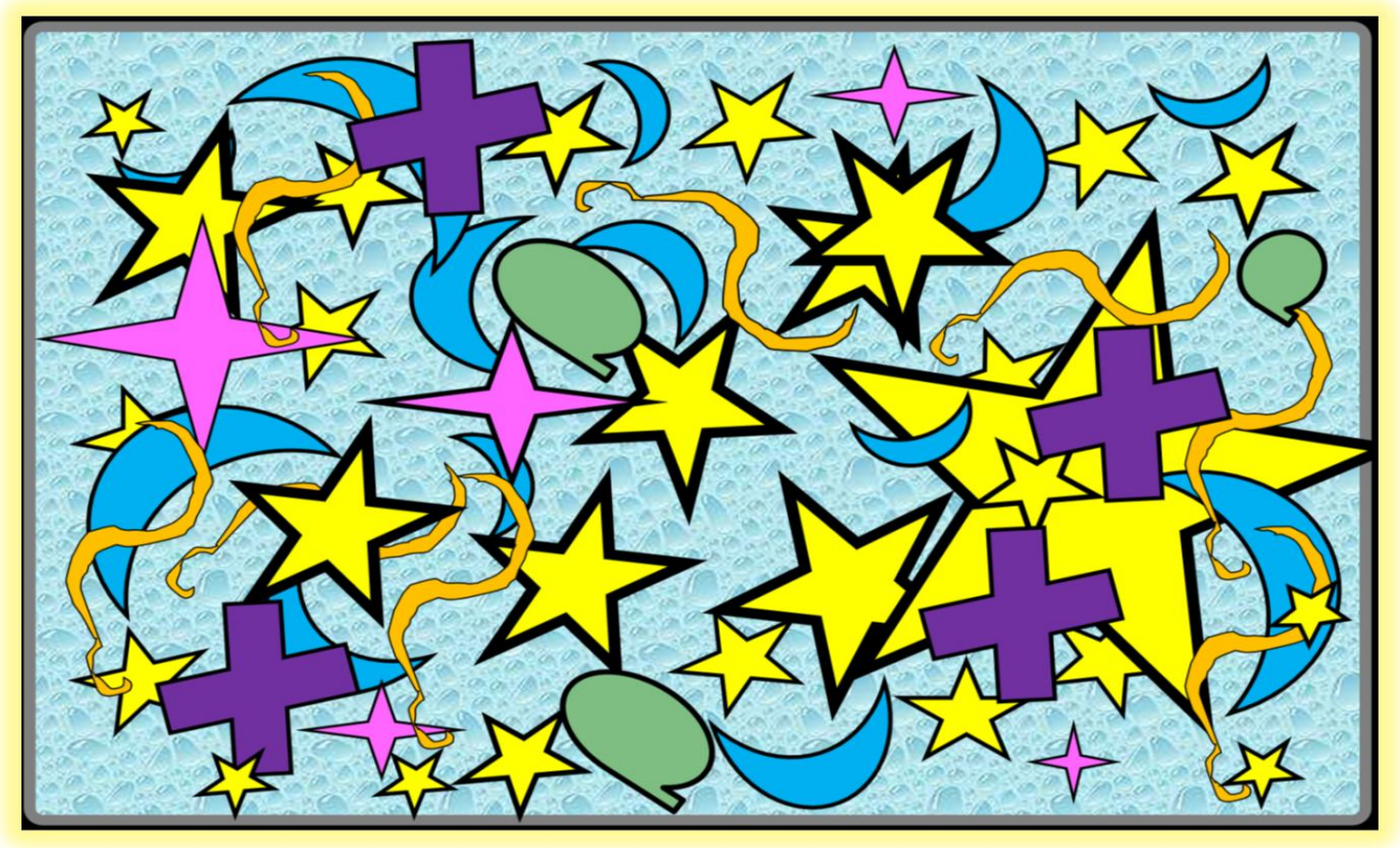
Matter and energy cycle through the living and nonliving world. Organisms rely on this matter and energy cycling to survive.

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.

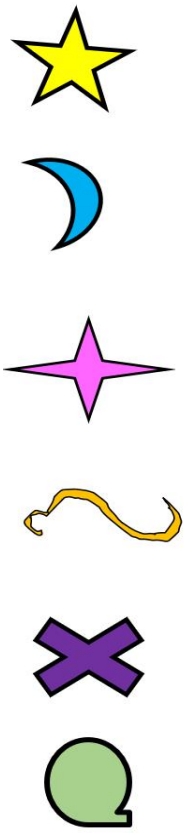
Abundance: Measurement of the amount of a species. Can be % cover, density, biomass, frequency.

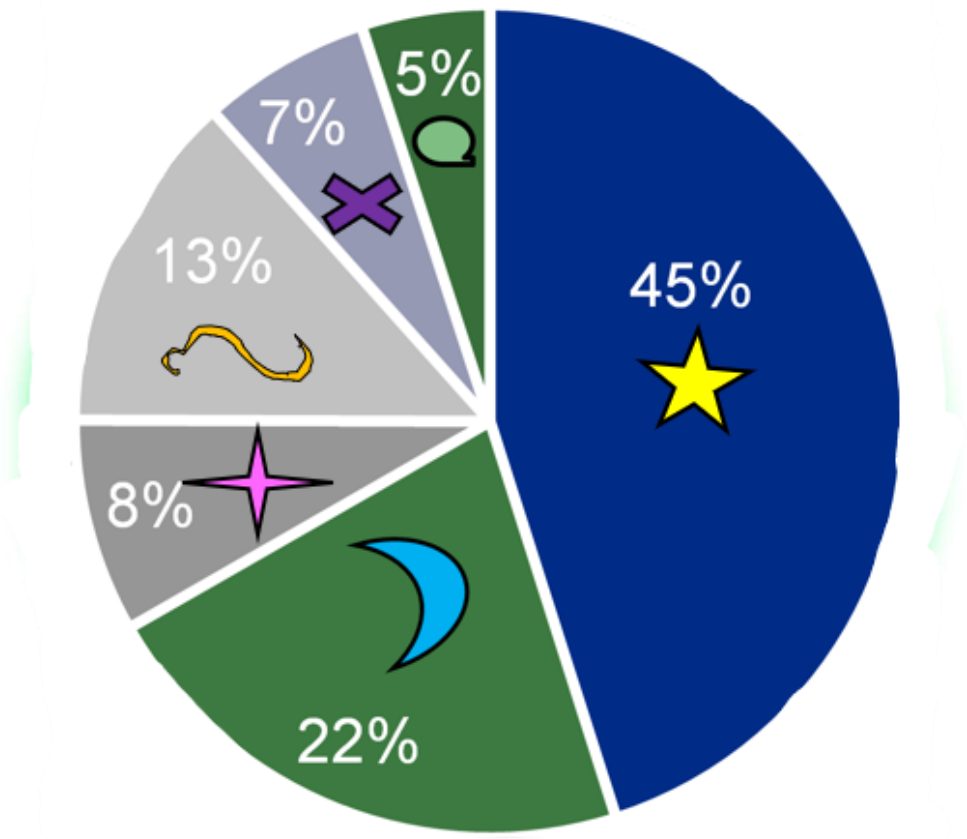
Relative abundance: The amount of each species.
Must sum to 1 or 100%.



Species	# of that Species	Divided by	Total	Equals	X 100	= Relative Abundance %
	27	÷	60	.45	× 100	45%
	13	÷	60	.216	× 100	21.6%
	5	÷	60	.083	× 100	8.3%
	8	÷	60	.133	× 100	13.3%
	4	÷	60	.066	× 100	6.6%
	3	÷	60	.05	× 100	5%

Graph your findings below. Pie graph Must sum to 1 or 100%





Please find the relative abundance for each of the species below.

Species	Total	%
Ж =	141	59
Ω=	54	22.6
Ю=	23	9.6
Θ=	21	8.8
Total #	239	

What's the species diversity?

4 Species

ΩΘЖЮ

ΘЖΩΩΩЮЖЖЮЮΩЖЖΩΩЖΘЖЖЮ
ЖЮЖΘЖЖЖЮΩЖЖЖΩΩЮΩΩЖΩΘ
ЮΩΘЖЮЖЖЮЮЖΩЖЖЖЖΩЖΩΩЖ
ЖЮЖЖЖΩΩЖΘЖЖЖЖΘЖЖЖЖΩЖ
ΩΩЖΘЖЮЖΩЖЖΩΩΩЖЮЮΘЖЖΘ
ЖΘЖЖЖЖΩЖЖΘЖЖЖЖΘΩΩΩΩΩΩ
ЖΩΩЖΘЖЮЖΩЖЖΩΩΩЖЮЮΩΩЖ
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Part 2 Lesson 2 Biodiversity

Species composition: A list of the species present in a community, along with a measure of their relative abundance.

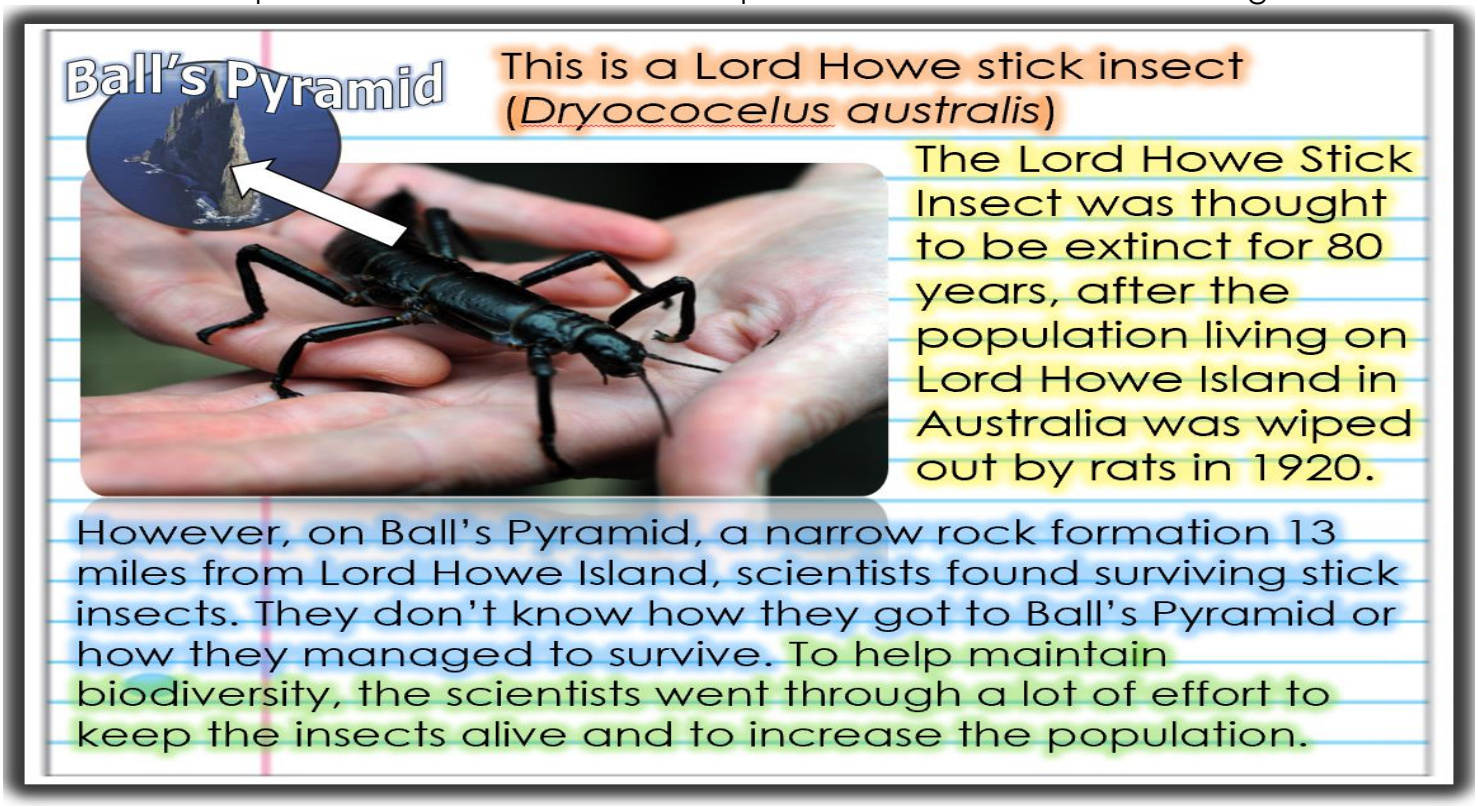
Frequency: The number of times that an event occurs within a given period; rate of recurrence.

What option did you select? _____Time Start_____ Time End
Frequency in a class period_____ Total=_____
Can you break down into frequency per minute? _____

Diversity: The variety, or number of kinds of species.
Counting the number of different species.

Biodiversity is the biological variety and variability of life on Earth. Biodiversity is a measure of variation at the genetic, species, and ecosystem level.

Record some important information about the species below? What's so amazing here?



Importance of biodiversity

- Generation of soils and maintenance of soil quality..
- Maintenance of air quality.
- Maintenance of water quality.
- Pest Control.
- Detoxification and decomposition of wastes.
- Pollination and crop production.
- Provision of food security.
- Provision of health care (Medicines).
- Income generation.
- Spiritual / cultural value

Which is not an importance of biodiversity A.) Generation of soils and maintenance of soil quality. B.) Maintenance of air quality. C.) Maintenance of water quality. D.) Increase pest species. E.) Detoxification and decomposition of wastes. F.) Pollination and crop production. G.) Provision of food security. H.) Provision of health care (Medicines). I.) Income generation. J.) Spiritual / cultural value.	Which is not an importance of biodiversity A.) Generation of soils and maintenance of soil quality. B.) Maintenance of air quality. C.) Maintenance of water quality. D.) Pest Control. E.) The creation of waste F.) Pollination and crop production. G.) Provision of food security. H.) Provision of health care (Medicines). I.) Income generation. J.) Spiritual / cultural value.
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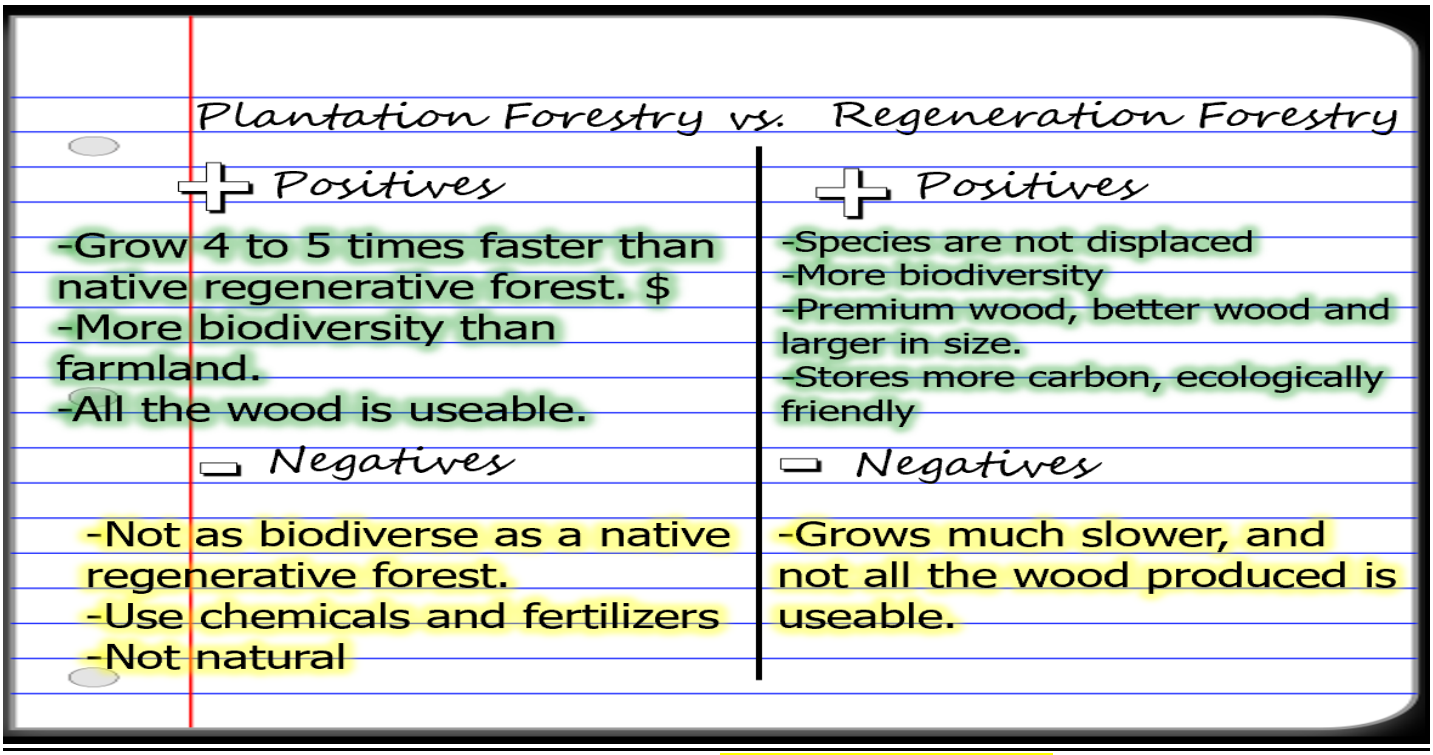
How and why should we maintain biodiversity?

Pay attention to each side of the story. Which is better to maintain biodiversity?

- http://www.youtube.com/watch?v=vplUH8A_wE



Which one is better to increase biodiversity? = Regeneration forestry

Part 2 Lesson 3 Camouflage

Activity! Quiz 1-20. Find the hidden "thing" in the picture.

- General names are acceptable.
- You will have about 10 seconds.

1) Frog	2) Antelope	3) Grasshopper	4) Giraffe
5) Lizard	6) Seahorse	7) Elephant	8) Chameleon
9) Stick bug	10) Toad	11) Small mammal Ermine	12) Snake
13) Octopus	14) Coyote/mammal	15) Bird	16) Wolf
17) Toad	18) Wolf	19) Snow leopard	20) Human

Camouflage: An adaptation that allows the animal to blend in with its environment to avoid being detected.

Adaptation: To be better suited to survive.

There are four types of camouflage

Concealing Coloration

Concealing Coloration: When an animal hides itself against a background of the same color / pattern.

Disruptive Coloration

Disruptive Coloration: When stripes, spots or other patterns make it hard for other animals to see the outline of their bodies

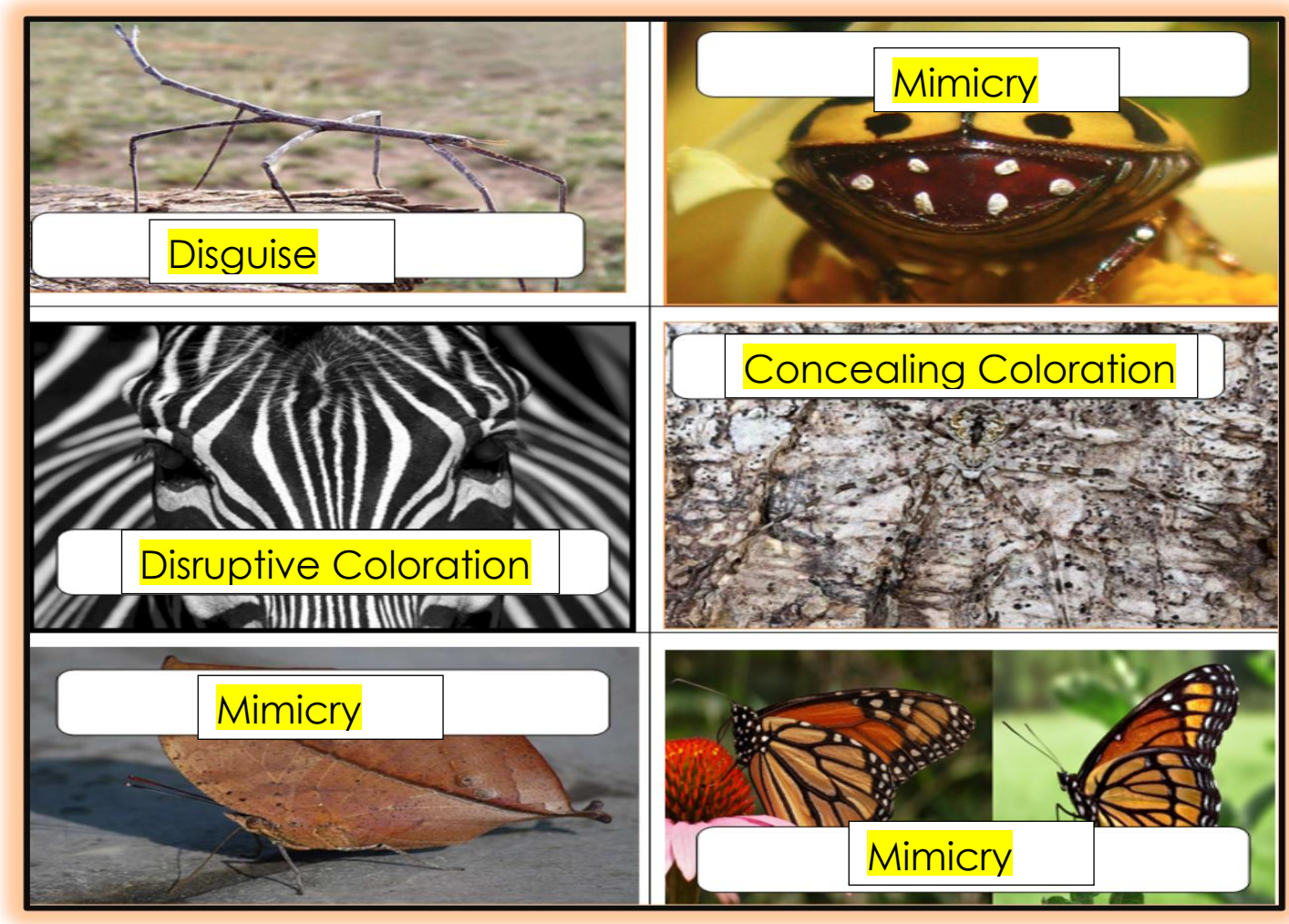
Disguise

Disguise: This is like concealing coloration except that the animals blend in with their surroundings by their shape and/or texture rather than color.

Mimicry

Mimicry: Animals that use mimicry are imposters. Resemble a stick example

They often mimic the characteristics of unappetizing animals.



Camouflage the butterfly to match the background. Camouflage the lizard and frog to a background of your choice. Please use color and don't just scribble.

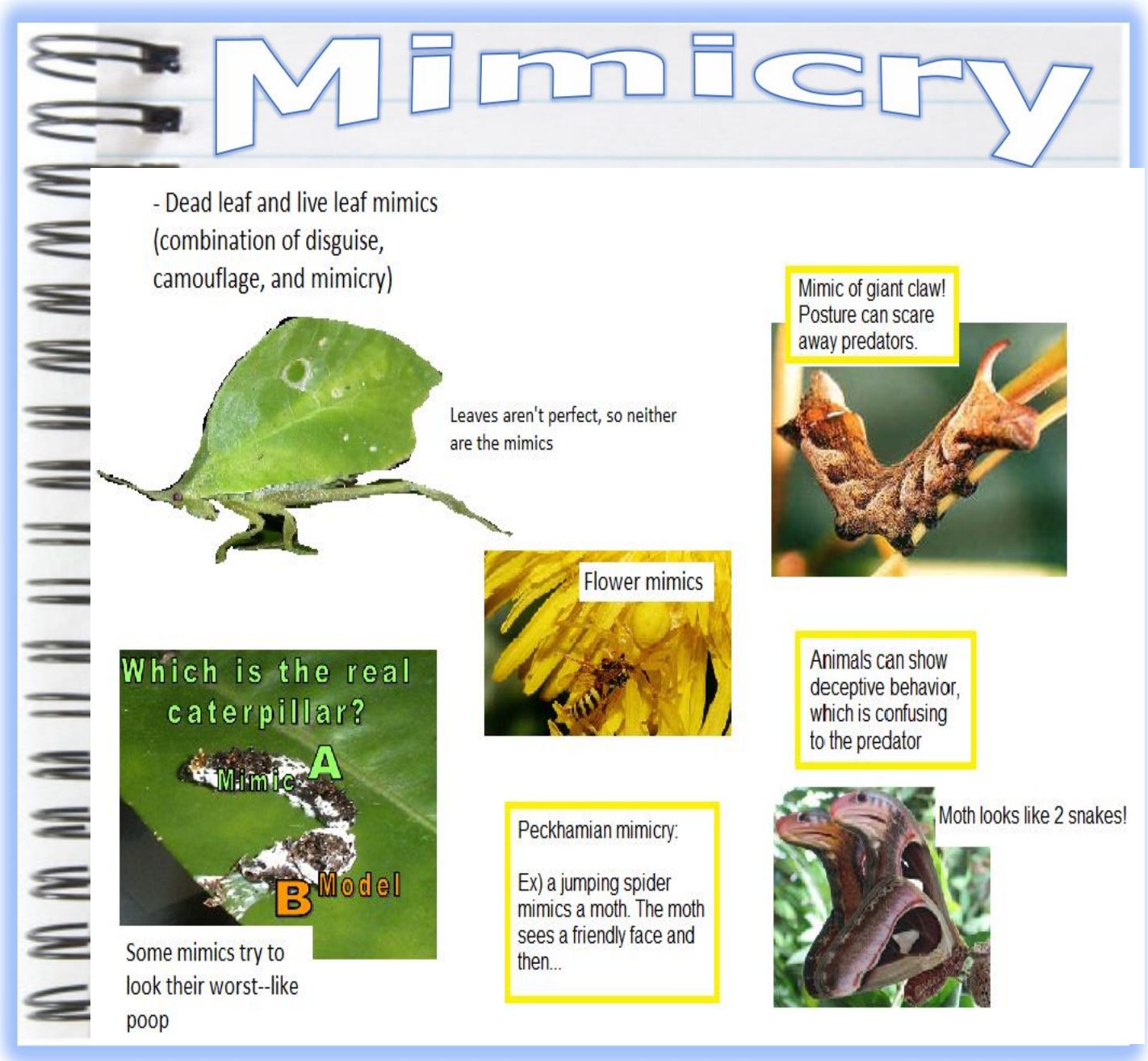
Make up a background and Chameleon camouflage pattern so I don't see it?

On the back page are three cut-outs to camouflage and hide around the school. Grab some colored pencils and follow me around the building. When you find an area, color to hide your animal. Then cut-out with scissors back in the classroom, tape (loop method) from the back so the tape doesn't show, and hide. Best behavior is expected. Put your names on them! Perhaps the younger kids might get to go for a hunt! Will yours survive the year?

Part 2 Lesson 4 Mimicry

Mimicry: The resemblance of an animal species to another species or to natural objects.

Make some notes and sketches about different examples of mimicry as shown in the slideshow.



Activity! Young Bird (Learn through Experience)

- Today you will become a young bird foraging for food.
- You are tasting the world for the first time after leaving the nest.

- Go around your group eating the provided food one at a time. Share your experiences with your group.
- Record your food choice for each round (1-10+). What will you learn? Write DONE! When you don't want to feed anymore / you've learned your lesson

Rounds / Color selected	Experience / What did you get / eat?
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	

Which species did you choose as a primary food source? Why? Students should have chosen the tasty items / Ones they are familiar with as being a good food source.

Which species did you not choose? Why? The foul tasting options / less palatable

Which species is the mimic, and which is the model? The mimic is the good tasting food source (mimic) that looks like the foul tasting option (model)

How does your taste influence who eats you? How well you taste will play a role in who eats whom.

Part 2 Lesson 5 Batesian Mimicry

Batesian mimicry: Looking like another species that is dangerous or may taste bad.
There is a mimic, and the model.

Which is the model and which is the mimic below?

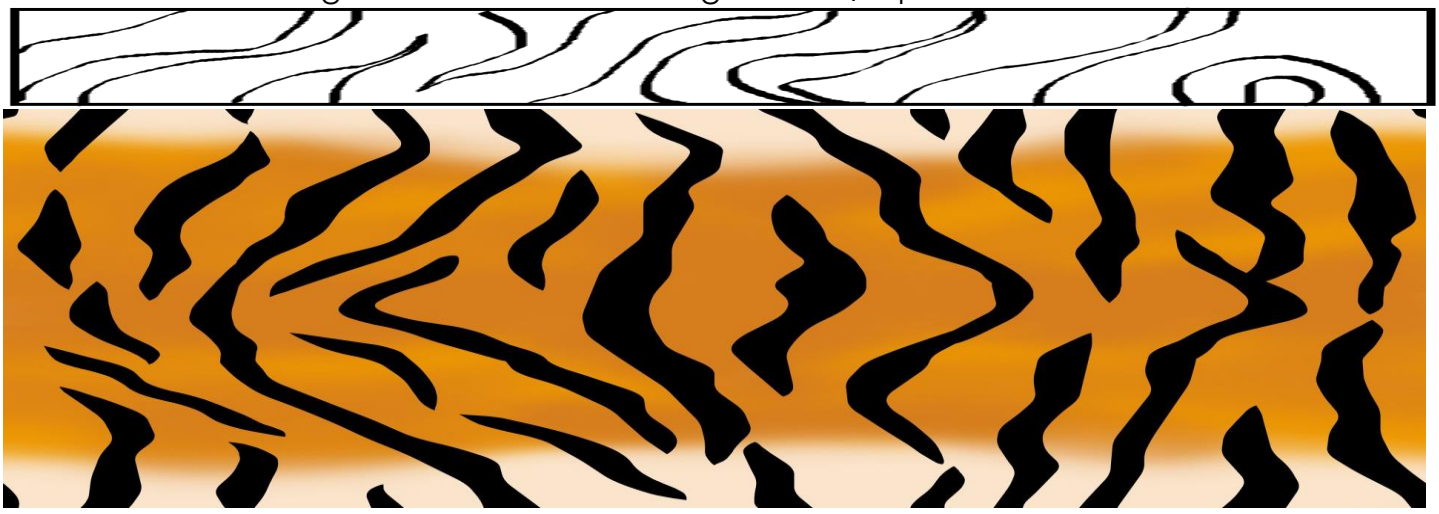
Aggressive Mimicry: A form of mimicry in which a predator (the mimic) closely resembles another organism (the model) that is attractive to a third organism (the dupe) on which the mimic preys.

Who is the Mimic= Alligator snapper, Who is the Model= Worm/tongue, Dupe= Fish below with the alligator snapping turtle example?

Aposematic Coloration: coloration or markings of an animal serving to warn off predators.

Part 2 Lesson 6 Mullerian Mimicry

Mullerian mimicry: Several unrelated species share warning colors that warn predators that these colors are dangerous or toxic. "Warming Colors" / Aposematic Coloration



Please dress up the following organisms with <u>different</u> colors schemes that represent Mullerian mimicry.

Some animals avoid predations with physical features that just make them a difficult meal.

- Poisonous
- Spikes
- Shells
- Confusing Color Patterns

Across

2. Measurement of the amount of a species. Can be % cover, density, biomass, frequency.
7. _____ Coloration: coloration or markings of an animal serving to warn off predators.
8. Species _____ A list of the species present in a community, along with a measure of their relative abundance.
10. _____ abundance: The amount of each species. Must sum to 1 or 100%.
13. This is like concealing coloration except that the animals blend in with their surroundings by their shape and/or texture rather than color.
14. _____ mimicry: Several unrelated species share warning colors that warn predators that these colors are dangerous or toxic. "Warming Colors" / Aposematic Coloration
15. The biological variety and variability of life on Earth. Biodiversity is a measure of variation at the genetic, species, and ecosystem level.
16. The number of times that an event occurs within a given period; rate of recurrence.

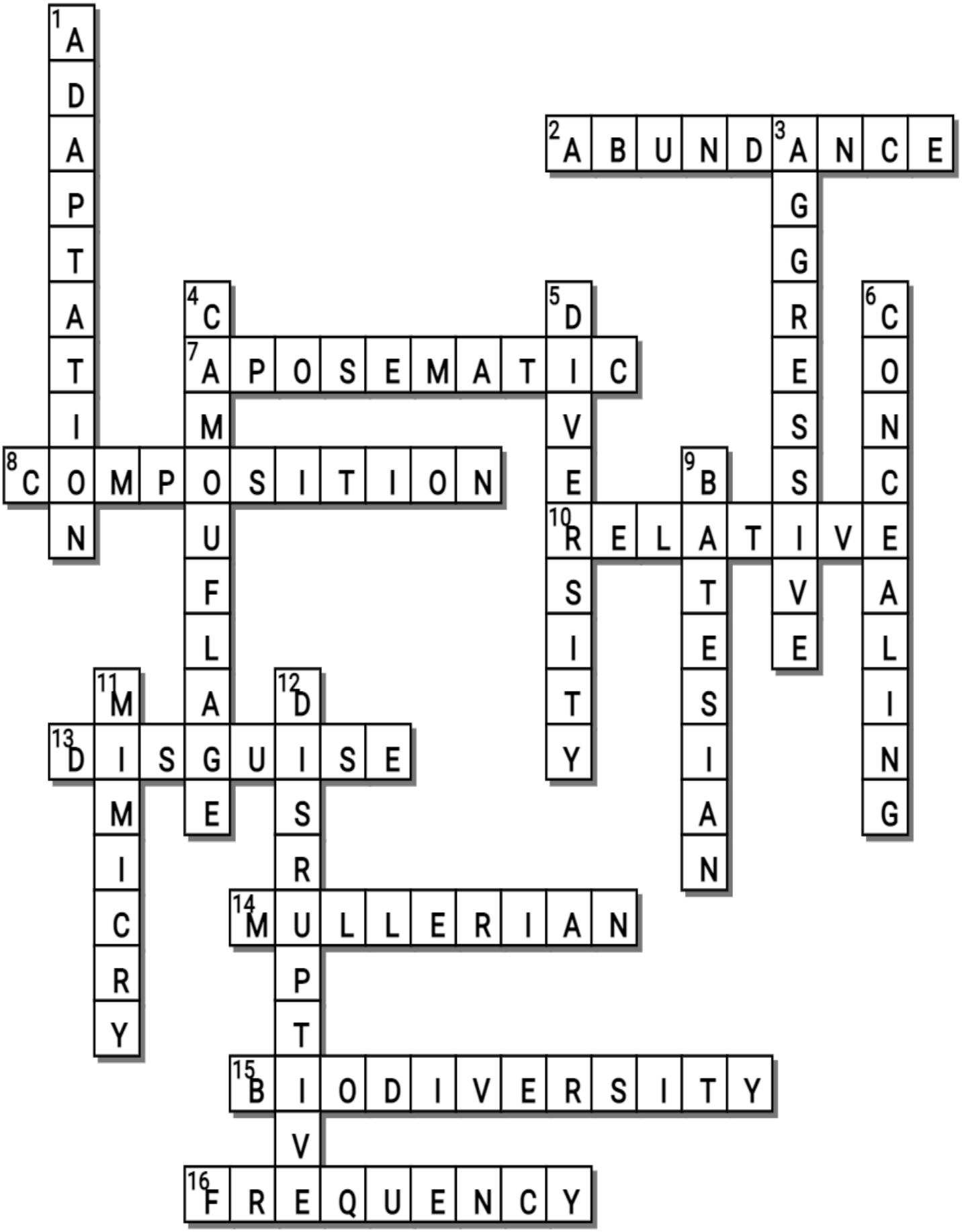
Down

1. To be better suited to survive.
3. _____ Mimicry: A form of mimicry in which a predator (the mimic) closely resembles another organism (the model) that is attractive to a third organism (the dupe) on which the mimic preys.
4. An adaptation that allows the animal to blend in with its environment to avoid being detected.
5. The variety, or number of kinds of species.
6. _____ Coloration: When an animal hides itself against a background of the same color / pattern.
9. _____ mimicry: Looking like another species that is dangerous or may taste bad. There is a mimic, and the model.
11. Animals that use mimicry are imposters. Resemble a stick example They often mimic the characteristics of unappetizing animals.
12. _____ Coloration: When stripes, spots or other patterns make it hard for other animals to see the outline of their bodies

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

Possible Answers

FREQUENCY, ABUNDANCE, ADAPTATION, AGGRESSIVE, APOSEMATIC, BATESIAN, BIODIVERSITY, CAMOUFLAGE, CONCEALING, DISGUISE, DISRUPTIVE, DIVERSITY, MIMICRY, MULLERIAN, RELATIVE, COMPOSITION:


1 ADAPTATION
2 ABUNDANCE
3 AGGRESSIVE
4 CAMOUFLAGE
5 DECEPTIVE
6 CONCEALING
7 APOSEMATIC
8 COMPOSITION
9 BATESIAN
10 RELATIVE
11 MIMICRY
12 DISSRUPTIVE
13 DISGUISE
14 MULLERIAN
15 BIODIVERSITY
16 FREQUENCY

Part 2 Review Game Lesson 7

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

HOUSE OF CARDS	SNEAK PEAK	SIMON SAYS	HELPING HAND	MIX UP Bonus round 1 pt each
1) 50%	6) Camouflage	11) Model	16) C, also called Aposematic coloration	*21) Lando Calrissian
2) Diversity or biodiversity	7) Disguise	12) Look like poop/scat, bird droppings	17) Prey, balance, Adaptations, survive, predators	*22) Weird Al Yankovic
3) Decrease in food security	8) Mimicry	13) Batesian Mimicry	18) A= venomous Coral Snake B=nonvenomous King Snake	*23) Biff Tannen
4) - see the value - prevent habitat destruction - laws and regulations, conservation measures, parks, etc - conservation of key species - minimize human interference!	9) Disruptive coloration	14) Aggressive Mimicry	19) Change	*24) Professor Quirrell
5) 70,000 species	10) Concealing coloration	15) Mullerian Mimicry	20) Balance	*25) Titan

Final Question Wager ___ /5 Answer: Creation of waste