RUSD Packet

HS Science- Ecology

Student full name _____ **HS** _____

Teacher _____ **Day and block** _____

Counselor _____ **Academy** _____

Ecology

Purpose Of The Packet
Summer brain drain is a real thing and it generally takes about a month to get back in the academic swing of things in the fall. If we go back to school this year, we will not have the luxury of taking that month to get used to school again. This packet will help keep your mind and skills sharp.

If we do not go back to school, your teacher will issue you a second semester grade based on the evidence of your understanding shown by completion of this packet and the grade you had in Infinite Campus as of March 13th.

For two semester long classes: There is also material from the first semester included in this packet. Your teacher may choose to use successful completion of the review and enrichment activities to improve your first semester grade if you had a failing grade.

How The Packet Will Be Set Up
Each assessment will start with some basic review of the concept(s) needed to complete the activity. A review or enrichment assessment will follow. Each review and assessment will minimally supply a technology free option and some will also include a technology option. Each assessment will also include a time length for expected completion. A 1 Day activity should take you between 30 and 45 minutes to complete. A 2 Day activity should take you two days of work assuming you work between 30 and 45 minutes each day. You may choose to work double the time and complete a 2 Day assessment in one day. Each assessment will also include a rubric for you to use to make sure you include all of the information necessary to show your understanding of the topic.

Where Do I Start
This packet is going out to every student taking this course across the district. Start with what you know! The packet is the best representation of what MOST classes had covered as of the March 13th shut down. If your teacher had not covered a specific topic, you are not expected to teach it to yourself. But you may choose to try it to challenge yourself! If you are unsure if you have covered a topic, please contact your teacher.

How Do I Turn In My Work?
You may turn in your work digitally to your teacher based on their instructions. If you do not have access to technology at home, the district will come out with instructions on how to turn in your work on paper.

Ecology Packet Outline

Topic	Lesson	Page # paper option	**Paper Option** Record all answers in the booklet. Please do not take apart the booklet.	Completed put check
Environement and Sustain ability	review	4-12	Explores Interview Article Chapter 1: Into the Okavango Reading and Qustions	☐
Environement and Sustain ability	evaluation	13	Environment and Sustainability Evaulation essay	☐
Ecological Footprints	review	14	Comprehension activity: Ecological Footprint Read and questions	☐
Ecological Footprints	evaluation	15-16	My Ecological Footprint Evaulatuion	☐
Renewable and Non-renewable energy	review	17-18	Print Reading Renewable vs Nonrevewable TPT single-use	☐
Renewable and Non-renewable energy	evaluation	19-20	Rewnable and non-renewable Energy Evaluation	☐
Climate Change	review	21-22	Climate Change review (reading comprehension)	☐
Climate Change	evaluation	23-25	Test	☐
Pollution & Solutions	review	26-27	Review reading Pollution and sollutions	☐
Pollution & Solutions	evaluation	28-29	Wanted Reward Poster Evauluation	☐

Chapter 1: Into the Okavango with National Geographic Into the Okavango: An Explorer's Interview
Book Title: Environmental Science: Sustaining Your World
Printed By: THOMAS PFEIFFER (thomas.pfieffer@rusd.org)
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Into the Okavango: An Explorer's Interview- REIVEW

Shah Selbe is an engineer, a conservation technologist, and a National Geographic Emerging Explorer. He is also an important member of the Into the Okavango expedition team. National Geographic Learning interviewed Dr. Selbe about biodiversity, his experiences in the Okavango, and what we can do to help protect the environment.

Shah Selbe poses with a giraffe's skull that he found. The hornlike growths on top of the skull are called *ossicones*.

National Geographic Learning:

Shah, why do you believe Earth's biodiversity is at risk?

Shah Selbe:

For most of the time that humans have inhabited this planet, their impact on Earth's ecosystems has been relatively minimal. Although there has been proof of human activity driving certain species to extinction, it wasn't until recent industrialization that larger-scale change resulted. Since then, we have started to see large shifts in previously stable ecosystems coming from habitat loss, overhunting, excessive fishing, or pollution. The

extinction rate of species has been observed to be as much as 1,000 times what we would consider normal, leading scientists to consider this the sixth mass extinction event in Earth's history. Many people believe we have entered a new era during which geologically significant conditions and processes are being profoundly altered by human activities. The most commonly known outcome of this era is climate change.

NGL:

Could you give a specific example of how biodiversity is impacted by environmental problems?

Selbe:

There are a number of ways that environmental problems can impact biodiversity. Climate change is driven by carbon dioxide emissions that come from our industrial processes, coal power plants, and automobiles. As the amount of carbon dioxide in the air increases, the oceans compensate by absorbing more of it. Current estimates put 30–40% of the carbon dioxide that humans release dissolving into our oceans, rivers, and lakes. This impacts biodiversity because the carbon dioxide reacts with the water to make the oceans more acidic. This is particularly problematic for organisms like coral, plankton, oysters, and mussels. These species help build habitat for many other species, play key roles in the food chain, and help clean pollutants from the water.

NGL:

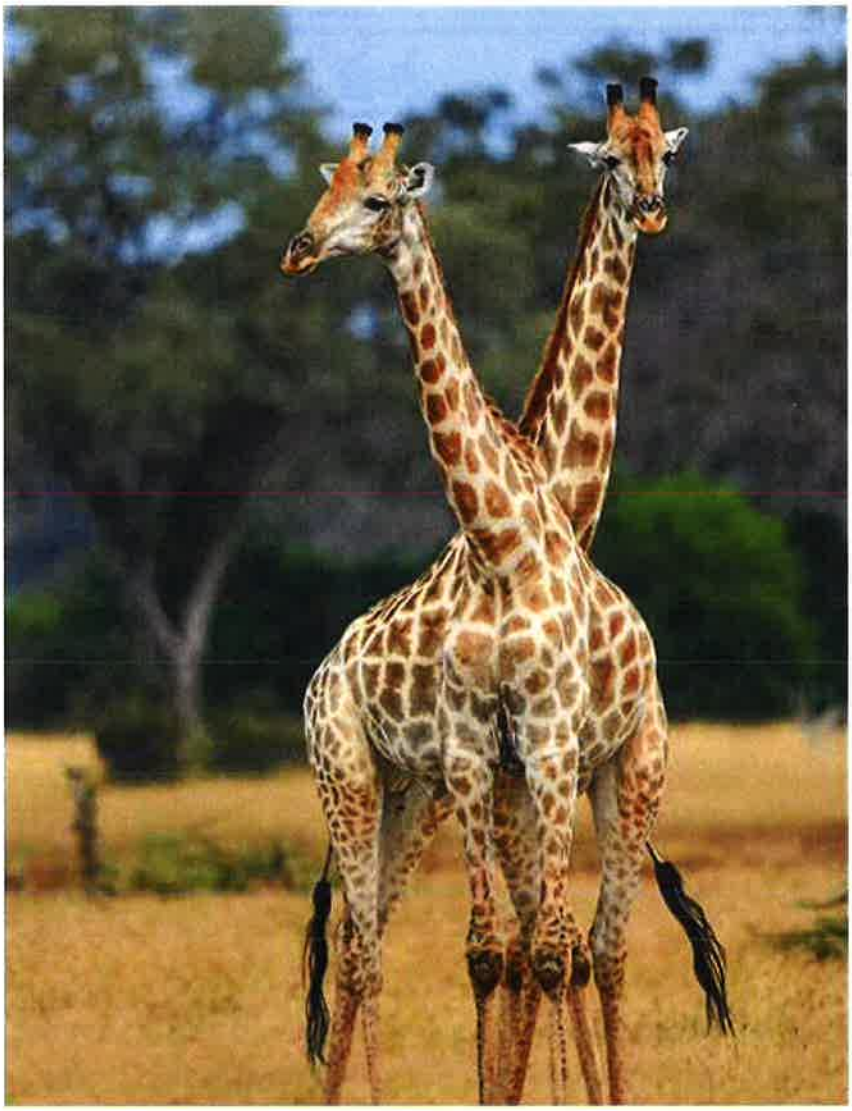
What are one or two meaningful solutions that you believe could significantly impact Earth's environmental problems?

Selbe:

One of the greatest things we can do to help environmental impact is create protected areas or reserves. By creating areas where destructive activities (like commercial fishing, mining, or development) are not allowed, it helps to alleviate stress from the ecosystem and allow wildlife populations to rebound. We have seen how truly successful this can be, but only if it is actually protected. Some of the land we have most successfully protected in the United States is our national parks, which are some of the most beautiful parts of Earth and have become a point of pride.

Additionally, the emerging field of conservation technology has the potential to help us solve some of Earth's environmental problems. We now have the technologies that can help us learn more about the planet and measure changes accurately enough to do something about it, as we are doing in the Okavango Delta. Thanks to the innovation we have seen in computers and communication systems (like cellular networks and the Internet), we can now have a profound impact in protecting these places, sharing the beauty of them with people everywhere, and making the most out of the limited resources that scientists and conservationists have.

Giraffes search for food in the Okavango. With a population in the wild of more than 100,000 individuals, giraffes are not considered threatened. Like most megafauna, however, their population is declining.



As the third-largest land mammal on Earth, the hippopotamus is not to be taken lightly. Bulls are highly territorial in water. Pods, or groups, of hippopotamuses can be among the most dangerous animals in the Okavango.

NGL:

What is one of the most significant environmental challenges to biodiversity in the Okavango Delta?

Selbe:

One of the biggest challenges to the Okavango Delta has to do with the source of the floodwaters—the inlet waters. The Delta starts in Angola, flows through Namibia, and then fans out into a massive delta in the middle of the Kalahari Desert. The Okavango is home to critically important species of elephants, hippos, lions, and many of those other charismatic megafauna (very large animals) that draw so many of us to sub-Saharan Africa. If anything were to happen to that inlet water due to mining activity, pollutants, or building of dams, then it could fundamentally change the floods that supply water to those animals.

Protection of those inlet waters would be the most important way to ensure healthy biodiversity in the Okavango. One of the best ways to do that would be to declare the areas upstream as protected reserves as well. This could help to limit development and stop pollutants from entering the water. It would also help stop poaching and provide wildlife corridors for the animals of the Delta to use. (Wildlife corridors are natural regions connecting animal populations that are separated by human activities such as urban or agricultural land development.) If we can extend this sort of protection through Namibia and Angola, it could have incredible implications on the animals of the region.

NGL:

How do the efforts of you and the other members of the Okavango Delta team help protect biodiversity?

Selbe:

Our team works to protect biodiversity in a number of ways. First, we conduct a yearly wildlife census on mekoro (dugout canoes, or canoes made from a hollowed tree trunk) because that mode of transportation allows us to get an unparalleled idea of species numbers and behaviors. During that census, we take habitat photographs and collect environmental data (water quality, air quality) that we can correlate with our wildlife sightings and GPS coordinates. As the conservation technologist, I also create environmental monitoring stations, which I call "the Internet of Earth things," that send back data in real-time and allow us to monitor the water even when we aren't in the field.

NGL:

What's the most exciting adventure you've had in the Okavango Delta region?

Selbe:

Deep in the wild during our expeditions, we encounter exciting adventures on a daily basis. We have been charged by hippos and elephants, had hyenas surround our tents, rowed over massive crocodiles, and watched lions walk through our camp. We are experienced in dealing with these sorts of scenarios and we are careful, but they are each adventures unto themselves. The most scary thing is dealing with the hippos. They are fiercely territorial creatures and will charge you full speed if you get too close. When a semiaquatic 3,000-pound animal charges at you at full speed while you are in a canoe, you remember that vividly. Thankfully we have always ended up safe in the end.

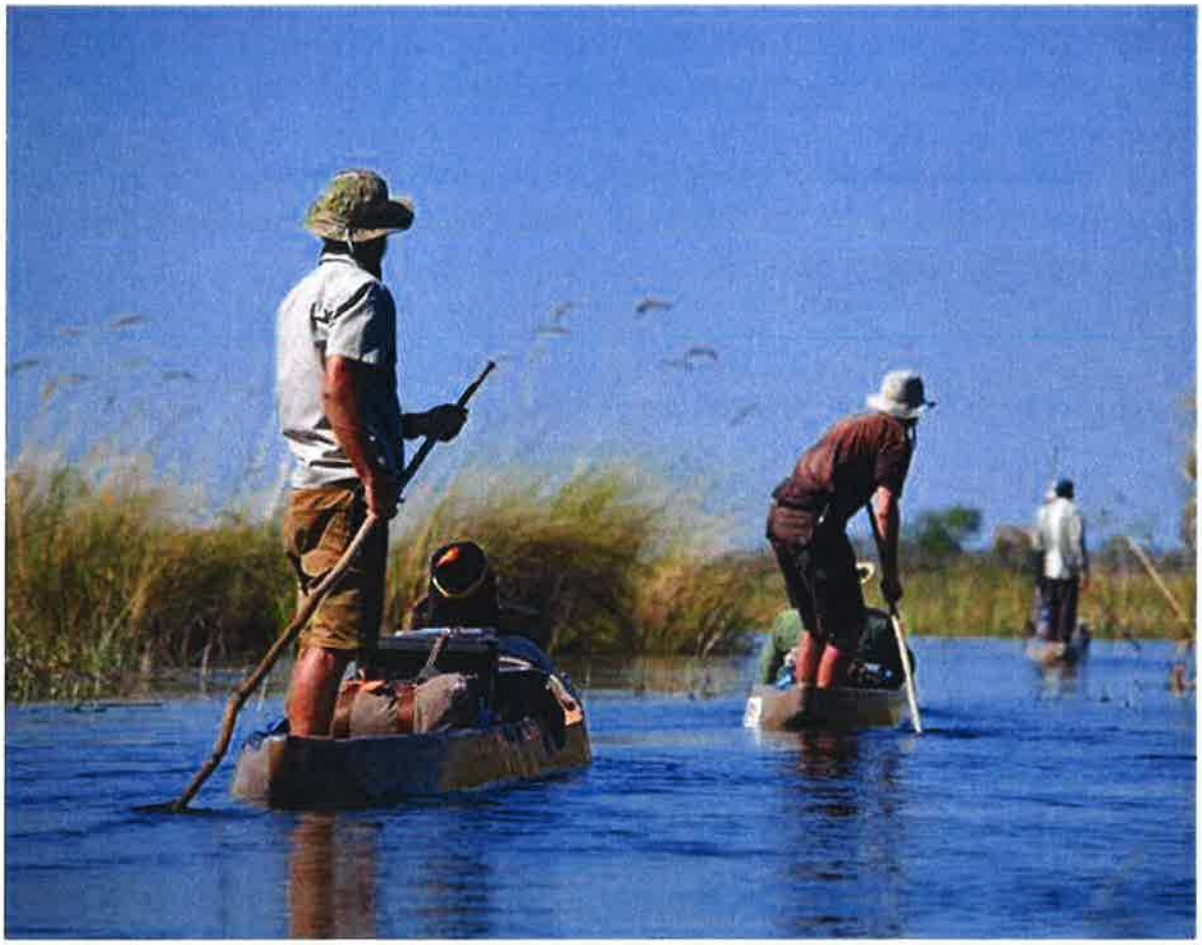
NGL:

Your Okavango Delta "team" is diverse and multi-talented. Could you explain how people with a wide range of specialties and backgrounds play a role in your efforts?

Selbe:

The entire birth of our Into the Okavango project came from an interdisciplinary approach. Steve Boyes, the expedition leader, is a charismatic conservation biologist and one of the most inspiring advocates of protecting the delta. Jer Thorp, the data artist, is a brilliant individual who has fundamentally changed how we visualize and share the data we collect. As the conservation technologist, I bring in an understanding of sensors and hardware that can profoundly change how we do science in the region. Every member of our team brings capabilities like this into the effort. It is very inspiring to be surrounded by such incredible people!

Local members of the expedition taught Boyes, Selbe, and others the basics of how to pole the mekoro—dugout canoes that have been the Bayei's preferred mode of transportation for centuries. Today most mekoro are made of fiberglass to conserve trees.



NGL:

How does technology play a role in the work you do in the Okavango?

Selbe:

A large part of my job is figuring out how to use new technologies to protect these places. It can vary, from sensors to drones to smartphone apps, all depending on the problem that needs to be solved. I was one of the first to start working in this field, so my work has developed alongside other conservationists. There is plenty of potential for it to have profound impacts on how we protect the planet, provided that we do it sustainably and focus on helping the communities that live near the implementation areas.

> *"We have unprecedented opportunities to improve the world. But only if we act in time."*
>
> — *Shah Selbe*

NGL:

How does forming relationships with people help you accomplish your goals in the Okavango?

Selbe:

All of the work we do is done side-by-side with the people of the delta. Our guides on the mokoros are members of the Bayei tribe, people who call the delta home. We work closely with local scientists, politicians, conservationists, and tourist industries to support our project and build an optimistic future for the Okavango. Without those relationships, we wouldn't be able to do any of the work we do.

NGL:

When you are in the Okavango, what do you miss the most about home?

Selbe:

When we are camping so far away from civilization, we start to miss pretty basic stuff that we normally take for granted. I think, for me, that tends to be hamburgers and tacos! You start to crave those pretty badly when being away from them for so long. I also miss my family since it is pretty difficult to find time to talk with them when you are beyond any cellular signal.

NGL:

What is the most enjoyable part of doing fieldwork?

Selbe:

I love everything about being in the field. There is a certain amount of resourcefulness that you have to adopt in order to make things work out there. It is daily problem-solving that also involves innovating on the spot to meet your science objectives or stay safe. There is also a camaraderie that comes from being out with the team that you can't quite experience unless you go through something like that. It is incredible.

NGL:

What can a high school student do to help protect biodiversity and the environment?

Selbe:

Everyone can help protect the environment. The easiest way is to start to learn more about the products you use and foods that you eat, and to try to make better choices that have less of an impact on the environment. There is quite a lot of power in market pressure, so if enough of us stop using something that is environmentally damaging, companies may stop making it.

There are also many volunteer opportunities available for both biodiversity and environmental protection, some of which can be done from home (like tracking data). And it always helps to learn more about the world through science so that you have a better understanding of sustainability.

A group of Hambukushu women fish with baskets. Like the Bayei, the Hambukushu people are an indigenous tribe of the Okavango.

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Name: _____ Block: _____ Into the Okavango: An Explorer's Interview

Your answer should be at least two sentences for each question.

1. What are the advantages of using an interview format for this feature?

2. How is Earth's biodiversity at risk?

3. What are the problems that threaten the environment, include human activities?

4. What are some solutions that could significantly impact Earth's environmental problems? (2)

5. What is one significant environmental challenge facing the Okavango Delta?

6. What are the efforts by the team to protect the Okavango Delta biodiversity?

7. Talk about the technology being used and its role in the Okavango delta.

8. How can you help protect biodiversity and the environment?

Environment and Sustainability Evaluation

Directions: Based on the "Into the Okavango: An Explorer's Interview" construct an essay. The first paragraph should include a paragraph regarding who Shah Selbe is, what he does. The second paragraph should be about biodiversity. Explain what biodiversity is, why it is important and why it is at risk. The third paragraph should be more your opinion. If you were in Shah Selbe shoes would you enjoy doing the work in the Okavango Delta? Why or why not? Describe another profession similar to what Shah Selbe is. Would you enjoy that profession more? Why or why not?

https://eslplus.wordpress.com/2013/06/09/comprehension-activity-ecological-footprints/

Comprehension activity: "Ecological footprints" Review

Posted on June 9, 2013 by Madhurima Nag

I believe that when it comes to teaching language, it is very important to consider discussing about varied topics with students. Streamlined discussions do not work anymore. You need to be entertaining as well as informative. So, I have selected this topic because it not only gives and idea about the environment but also makes you know why it is shrinking day by day, thus giving the students an idea about environmental pollution. I have attached a couple of questions at the end of the passage. You can suggest some as well.

"Environmentalists have been concerned about the impact that individuals have on our planet, and many people wonders what they can do to help protect the environment. A good place to start is by reducing one's ecological footprint. An ecological footprint is an estimate of how much land, water and other natural resources are being used by a person or a group. Because resources are easily accessible in developed countries like the United States, people in these countries tend to have large ecological footprints. For example, they may take long showers, leave their computers on for the whole day, and buy new things they don't need because the items are on sale. The consequences of large ecological footprints can be disastrous.

One of the worst effects of large ecological footprints is the loss of natural resources, such as oil, water and wood. These resources are being consumed so fast that the Earth does not have time to renew them. According to Adam Grubb, co-founder of Energy Bulletin, 85 million barrels of oil are produced daily in the world. People use oil to run their cars, heat their homes and create products such as clothes, paint and plastic. In "Forest Facts", the United Nations Environment Programme (2011) reveals that "36 million acres of natural forest are lost each year." As more people consume products like oil and wood, these natural resources will become even scarcer.

Large ecological footprints also led to higher greenhouse gas emissions. The mining of oil, natural gas, and coal, as well as the use of these resources in electrical power plants and automobiles, releases dangerous gases into the air, where they trap heat. As a result, the earth gets warmer.

Another result of large ecological footprints is the increased pollution of rivers and streams. A great deal of waste if thrown into rivers and streams daily. Because of pollution, the water in many water bodies is becoming or has already become unsuitable for human consumption. It is our responsibility to find ways to decrease our impact on our planet. Even small changes can make a difference and help to protect the environment. If we do not start reducing our ecological footprints right away, it may be too late for future generations to contain the damage."

QUESTIONS:

1. In your own words, what is an ecological footprint? Provide examples of activities that could cause a large and a small ecological footprint.
2. According to the passage, what are the three major consequences of large ecological footprints?
3. "We do not inherit the Earth from our ancestors; we borrow it from our children" is a Native American proverb. How is this proverb related to the essay?

1.
2.
3.

My Ecological Footprint

name: _____ Period: ___

Information:
We have studied what is meant by "Ecological Footprint" and have determined our own footprint and understand where we can do better in our own lives to make our footprint smaller. In this activity, you will draw in your own components, choosing to include those things you think are important in reducing your ecological footprint. For example, instead of a mansion with a swimming pool and tennis court, you may draw a modest one-story house with no pool.

Directions:
Below you will see the components of the Ecological Footprint which represent the amount of *land* needed for each component often expressed in acres or hectares. A symbol has been drawn for each component. In the empty footprint on the back of this page, you will draw in a representation of how you might manage your own footprint next to the symbol. For example, for the energy land component, you might draw a solar panel to show that you would *like* to use solar energy and wind energy for your energy needs. What kind of car, train or bicycle would you use for transportation? For the built land, draw the type of house that you would find acceptable to you and the environment. Include other buildings you would find desireable in your perfect world. For the bio-productive land, what do you think you would want to allot land for: cows to graze so you can eat beef, and drink milk? Would you want to allot land for growing fruits and vegetables? How about trees for paper and fiber? Draw those items if you think they are important. Do you eat alot of fish and sea-food? Would you want to use the ocean for the fish you eat? Please remember that land for habitats is not measured in the overall footprint calculation, but if you think it is important, draw in the habitats. You may want to go to the internet and google-in "ecological footprint" for examples of how others have filled in the footprint symbol.

1. **Energy Land:** energy production. Represents the amount of land needed for refineries, windmills, solar devices, trees to absorb CO_2 emitted from the burning of fossil fuels, etc.

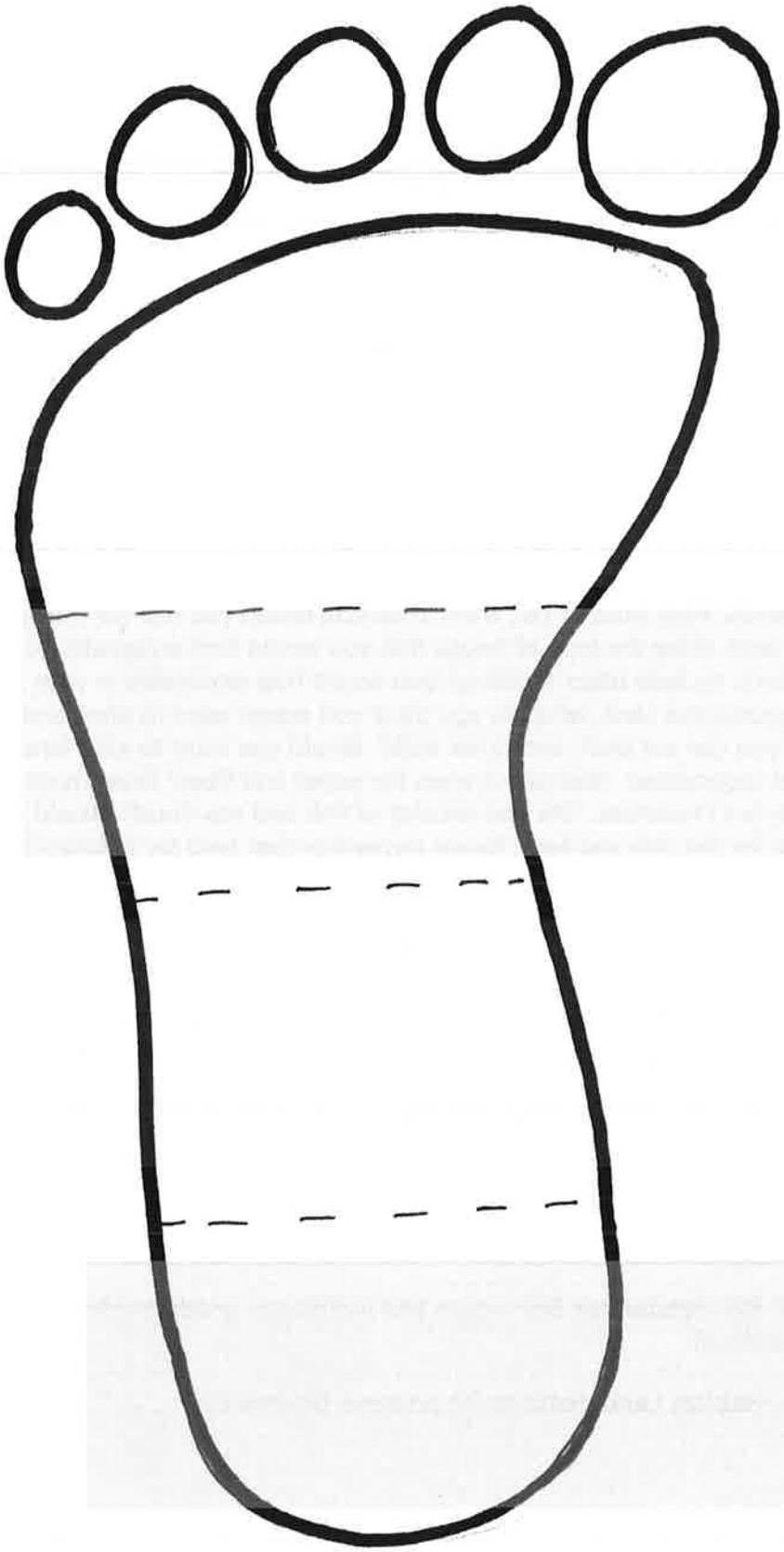
2. **Bio-productive Land**: goods production (food, fiber, timber, clothing, medicines). Includes land for grazing, crops, growing a trees for paper and fiber, etc.

3. **Built Land**: human infrastructure (includes homes, malls, churches, schools, roads, industrial structures, etc)

4. **Bio-productive Sea**: ocean and freshwater goods production (fish, other seafood)

5. **Habitat Land**: habitats (to preserve biodiversity)

EVALUATION



Renewable VS. Nonrenewable Resources - Review

Natural resources are things, materials, substances and components found in the natural environment. They exist "naturally" or innately in the world and are not the result of human manipulation or creation. There are two types of natural resources: renewable resources and nonrenewable resources.

Renewable resources can regenerate if they are alive or be replenished by biochemical cycles if they are nonliving. Theoretically, there is an "infinite" amount of these resources. Water, sunlight, plants, animals and wind are examples of renewable resources.

Nonrenewable resources cannot be regenerated or replenished by natural processes. There is a finite amount of nonrenewable resources, so once used up, they are forever gone. Fossil fuels such as coal, oil and natural gas, minerals, metals and fissile material are examples of nonrenewable energy.

Fossil fuels are resources created from the remains of once living organisms that lived hundreds of millions of years ago. Technically, fossil fuels are continually being made but the process is extremely slow and we use fossil fuels much faster than they are created. For this reason, we classify fossil fuels as a nonrenewable resource.

Renewable resources can become nonrenewable resources if they are used faster than they can be replenished. If the resource no longer exists, there is nothing to regenerate or be replenished. For example, if we cut down trees faster than we grow them, trees can become a nonrenewable resource because there are no trees to regenerate.

© Stephanie Elkowitz

Questions 1. What are natural resources?

2. What is the difference between a renewable and nonrenewable resource?

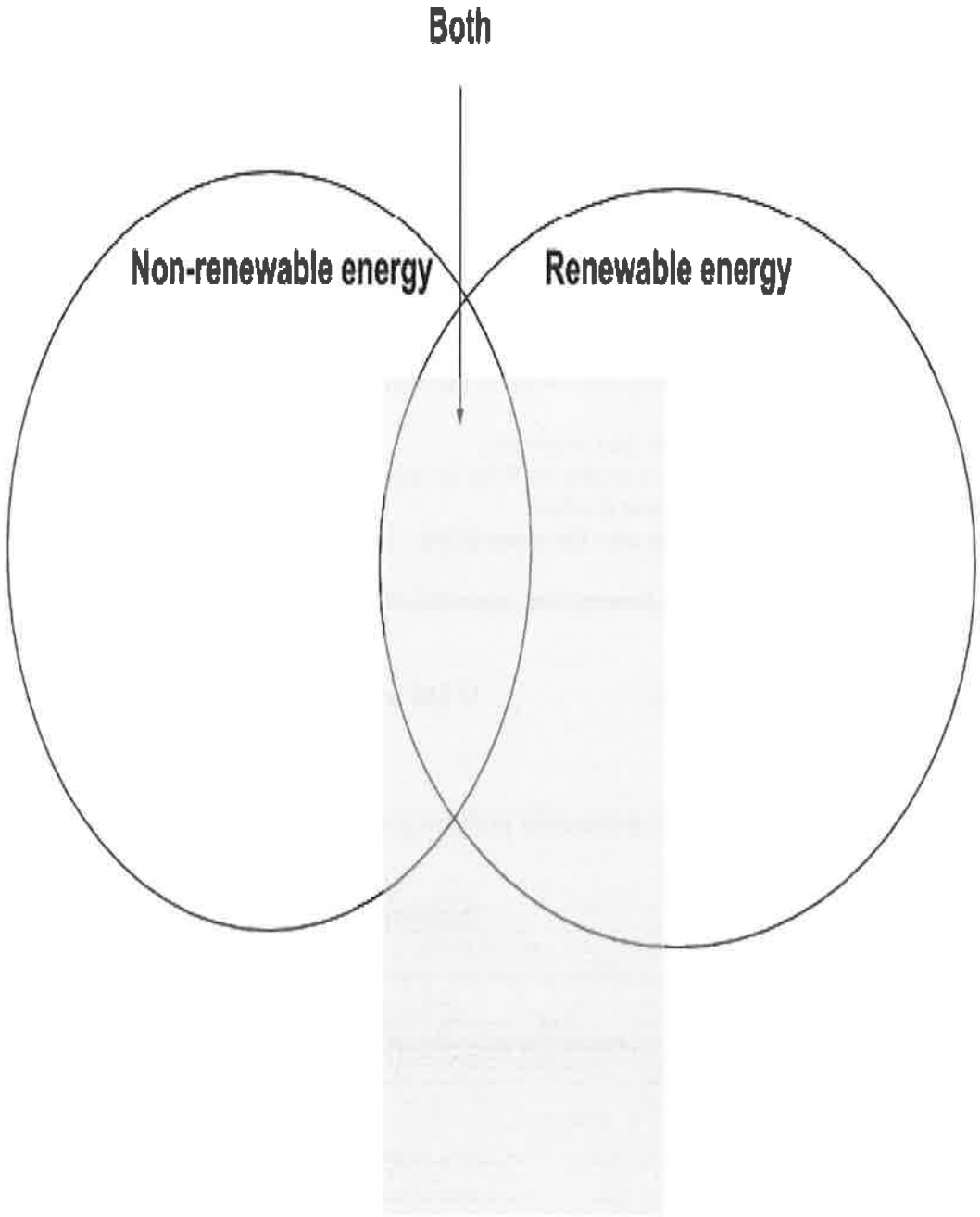
3. If fossil fuels are continually being made, why are they considered nonrenewable?

4. How can a renewable resource become a nonrenewable resource?

Compare and Contrast Resources- Evaluation

Directions: Use the words below to fill in the chart. Then add your own additional thoughts or ideas as to how renewable and non- renewable are the same and different. Add how the environment is affected by the drilling or obtaining of the resources. Also, add how the environment is affected by the using of the resources.

Word Bank: sunlight, coal, oil, wind, natural gas, can produce electricity, cause air pollution, causes wind pollution, causes land pollution, wood, water, can be replaced within your lifetime, can not be replaced with in your lifetime, fossil fuels, gives us power.



Name _____ Date _____ Env Sci

Renewable and Non-Renewable Energy Evaluation

Directions- drag the shaded box over the correct answer

Multiple Choice

1. _____ Which of the following is not a renewable energy?

A.Coal C.Geothermal
B.Solar D. Wind

2. _____ Which alternative energy source uses rays from the sun to create energy?

Geothermal Wind
Solar Hydroelectric

3. _____ Use of geothermal energy involves

Using dams to generate power Drilling underground for fossil fuels
Harvesting heat energy from ground geysers
Using wind turbines to harvest kinetic energy

4. _____ Which of the following energy source is considered renewable?

Uranium Natural Gas
Ground Oil Solar

5. _____ Some automobiles are fueled by natural gas. What is the advantage of using natural gas rather than gasoline as transportation fuel.
There is a significantly larger supply of natural fuel available.
Natural gas is a renewable energy source that is produced from corn and other agricultural products.
Natural gas only gives off water vapor as a waste product.
Natural gas combustion releases less pollutants into the atmosphere.

6. _____ Between 1960 and 1970, world oil consumption approximately doubled. Which of the following explanations is consistent with this increase?

A.The number of passengers per car increased. D.The number of cars on the road increased.
B. People drove less, conserving gasoline.
C.The price of gasoline increased.

7. _____ Which of the following is a major environmental problem associated with the use of nuclear power to generate electricity?

Production of greenhouse gases such as CO_2 Production of acid rain
Disposal of radioactive waste
Destruction of the rain forest

8. _____ Nuclear fission uses what mineral to generate the majority of its energy?

Carbon Uranium
Magnesium Iron

Name _____ Class _____ Date _____

Skills Worksheet

Active Reading

Section: Climate and Climate Change

Read the passage below and answer the questions that follow.

You know that the temperature and precipitation change with the seasons. But do you know what causes the seasons? The seasons result from the tilt of Earth's axis (about 23.5° relative to the plane of its orbit). Because of this tilt, the angle at which the sun's rays strike the Earth changes as the Earth moves around the sun.

During summer in the Northern Hemisphere, the Northern Hemisphere tilts toward the sun and receives direct sunlight. The number of hours of daylight is greatest in the summer. Therefore, the amount of time available for the sun to heat the Earth becomes greater. During summer in the Northern Hemisphere, the Southern Hemisphere tilts away from the sun and receives less direct sunlight. During summer in the Southern Hemisphere, the situation is reversed. The Southern Hemisphere is tilted toward the sun, whereas the Northern Hemisphere is tilted away.

IDENTIFYING MAIN IDEAS

One reading skill is the ability to identify the main idea of a passage. The main idea is the main focus or key idea. Frequently, a main idea is accompanied by supporting information that offers detailed facts about main ideas.

Read each question and write the answer in the space provided.

1. How much does Earth tilt on its axis?

_____

2. The number of hours of daylight is greatest when?

_____

3. Where is the Northern Hemisphere in relation to the sun in summer?

_____

In the space provided, write the letter of the term or phrase that best answers the question.

_____ **4.** Which of the following sentences best states the main idea of the passage?

a. The amount of time for the sun to heat Earth becomes greater.
b. The seasons result from the tilt of Earth on its axis.
c. The Southern Hemisphere is tilted away from the sun.
d. Temperature and precipitation change with the seasons.

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RECOGNIZING SIMILARITIES AND DIFFERENCES

One reading skill is the ability to recognize similarities and differences between two phrases, ideas, or things. This is sometimes known as comparing and contrasting.

Read each question and write the answer in the space provided.

5. What season is it in the Northern Hemisphere when the Southern Hemisphere is tilted toward the sun?

_____

6. What season is it in the Southern Hemisphere when the Northern Hemisphere is tilted away from the sun?

_____

RECOGNIZING CAUSE AND EFFECT

One reading skill is the ability to recognize cause and effect.

Read each question and write the answer in the space provided.

7. What causes the seasons?

_____

_____

8. How does the tilt of Earth affect sunlight?

_____

_____

9. How does the amount of time in which the sun can warm Earth affect the seasons?

_____

_____

10. Where is the Southern Hemisphere in relation to the sun when it is summer in the Northern Hemisphere?

_____

_____

11. Where is the Northern Hemisphere in relation to the sun when it is summer in the Southern Hemisphere?

_____

_____

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ISBN 9781305637429

Name: _____ Date: _____

Chapter 16 Post-test

Directions: fill in the colored text box with the correct letter

1. Which of the following is produced in the stratosphere when oxygen interacts with ultraviolet radiation?
   a. heat
   b. wind
   c. water
   d. ozone
   e. CFCs

2. _____ are chemicals or substances emitted directly into the air from natural processes and human activities at concentrations high enough to cause harm.
   a. Secondary pollutants
   b. Primary pollutants
   c. Industrial emissions
   d. Volatile inorganic compounds
   e. Suspended particulates

3. _____, a combination of rain, snow, dust, and other particles with a pH lower than 5.6, is likely to form when coal-burning plants emit sulfur.
   a. Suspended particulate matter
   b. Sulfuric acid
   c. Acid deposition
   d. Nitric acid
   e. Photochemical acid

4. Photochemical smog can be reduced by _____.
   a. increased sunshine
   b. lower temperatures
   c. climate change
   d. decreased traffic
   e. more VOCs

5. Which of the following is NOT predicted by current global climate change models?
   a. higher global temperatures
   b. higher sea levels
   c. more extreme heat waves
   d. loss of glaciers
   e. more extreme rainfalls

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ISBN 9781305637429

6. Which of the following will best serve to repair the stratospheric ozone layer?
   a. ban the use of fossil fuels
   b. switch to renewable energy sources
   c. eliminate the use of CFCs worldwide
   d. eliminate coal-burning power plants
   e. more public transportation

7. What is the indoor pollutant found in carpet, furniture, and building materials?
   a. methane
   b. asbestos
   c. VOCs
   d. acid deposition
   e. formaldehyde

8. Why is it difficult to make any statement about climate based on data from the past decade?
   a. The past decade has been extremely abnormal.
   b. Climate change is defined as weather changes that have persisted over three or more decades.
   c. The past decade has been extremely normal.
   d. Climate change is defined as weather changes that have persisted over ten or more decades.
   e. An abnormally large number of volcanoes have injected ash into the atmosphere since 2000.

9. Levels of atmospheric _____, a potent greenhouse gas, have risen enormously since the beginning of the Industrial Revolution in 1750.
   a. methane
   b. carbon monoxide
   c. nitrogen oxide
   d. smog
   e. ozone

10. Geoengineering could slow global warming, but it could also result in the continued production of this greenhouse gas that is absorbed by oceans and causes ocean acidification.
   a. argon
   b. sulfur dioxide
   c. ozone
   d. carbon monoxide
   e. carbon dioxide

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11. NASA scientists predict that by 2059, up to 45% of the world's land area could be experiencing extreme _____ due to an increase in kinetic energy in the atmosphere.
    a. acid deposition
    b. pollution
    c. flooding
    d. drought
    e. hurricanes

12. Which of the following identifies a realistic way to slow atmospheric warming?
    a. take steps to initiate a new ice age
    b. take more accurate temperature measurements
    c. reduce the burning of fossil fuels
    d. eliminate the burning of fossil fuels
    e. lower sea level by several feet

13. The potential massive release of methane from thawing Arctic permafrost and from the Arctic seafloor represents _____.
    a. ocean acidification
    b. global warming
    c. a climate change tipping point
    d. geoengineering
    e. natural emissions

14. If no action is taken, when will atmospheric concentrations of CO_2 likely surpass the climate change tipping point of 450 ppm?
    a. within 1 year
    b. within 100 years
    c. within 50 years
    d. within 1,000 years
    e. within a few decades

15. How could a hole in the ozone layer accelerate atmospheric warming?
    a. The oceans would become overheated from excess solar energy.
    b. Long-wave radiation from the sun will reach Earth.
    c. Ultraviolet radiation could destroy CO_2-consuming photosynthetic organisms in the oceans.
    d. Increased sunlight could create dangerous levels of smog.
    e. An ozone hole represents one of the climate change tipping points.

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Types of Pollution -Review

.ittering often comes to mind when there is talk of pollution. However, there is more to pollution than just ttering. Pollution comes in different forms. Each type of pollution affects a different aspect of the earth. Types ›f pollution include air pollution, water pollution, soil pollution, light pollution, and noise pollution. All of these ypes of pollution together make environmental pollution.

\ir pollution is commonly caused from the exhaust coming out of motor vehicles and from industrial factories. It ;an also be caused from the burning of solid waste. Air pollution can cause acid rain and the thinning of the ›zone layer of the atmosphere, which protects humans from harmful rays from the sun. Smog is one form of air ›ollution. It looks brown and hazy as it hangs in the air. Smog contains chemicals and gasses that can be langerous to people's lives. One chemical in smog is ozone, which can harm humans and even plants.

Vhen sewage or other toxic chemicals contaminate water, it is called water pollution. Water pollution can occur ı surface water, like lakes, rivers, or oceans. It can also occur in groundwater. Water pollution is dangerous to ›lants and animals, but also to people. Many people use groundwater for drinking, but unfortunately, many ›eople around the world do not have access to safe drinking water. Pesticides and poor sanitation often cause vater pollution. The harmful chemicals can run off into surface water or seep into the groundwater. Landfills can ;ontain toxic chemicals, which pollute groundwater by seeping into it.

Soil pollution is also caused in part by pesticides. The decreased fertility of soil is called soil pollution. Farmers ıse pesticides to protect their crops from pests that would otherwise destroy their crops. Pesticides limit ›rganisms in the soil from producing waste, which normally would enrich the soil. Poor drainage, acid rain, and nining can also reduce soil fertility. Hazardous waste can pollute soil when it is buried underground, instead of ›eing properly disposed. Soil pollution is dangerous because fertile soil is necessary to provide food for the vorld.

Two types of pollution that are not as well known as air, water, and soil pollution are light pollution and noise ›ollution. Light pollution is when human activity produces artificial light that disrupts the environment. Light ›ollution can disrupt animal behavior. Birds that migrate, frogs, and sea turtles can be confused by light ›ollution. Also, light pollution can block the view of the stars at night. Noise pollution can be harmful, too. Noise ›ollution is when noise from machines causes discomfort in people or animals. It can come from airplanes, ;ars, trains, factories, or construction machinery. Noise pollution does not do as much harm on the air, water or and, but it can cause hearing loss in humans.

Each part of the environment depends on the other parts. Having one part polluted will affect the other parts ıegatively. That is why it is important to prevent all types of pollution, and not just the most well known types. \ll pollution has negative affects on the environment.

Questions:

. Explain what environmental pollution is. _____

_____

2 Why is smog harmful? _____

_____

3. How is water pollution caused?

_____

_____

4. Explain how light pollution affects migrating animals. _____

_____

5. Is it better to just focus on one type of pollution? Explain why or why not?

_____

_____

6. Do you think pollution has affected our world negatively?

_____

_____

_____

_____

7. What do you think we should do to combat pollution? _____

_____

_____

_____

_____

_____

_____

_____

_____

Pollution Poster- Evaluation

Select a type of water, land, air pollution that affects **The World**.

Circle your selection!

Criteria for poster

1. Write a creative wanted post **WITHOUT** using the words water, land or air pollution anywhere on the front!

EX: "We're on the lookout for _____! His/her offenses against the environment include_____!"

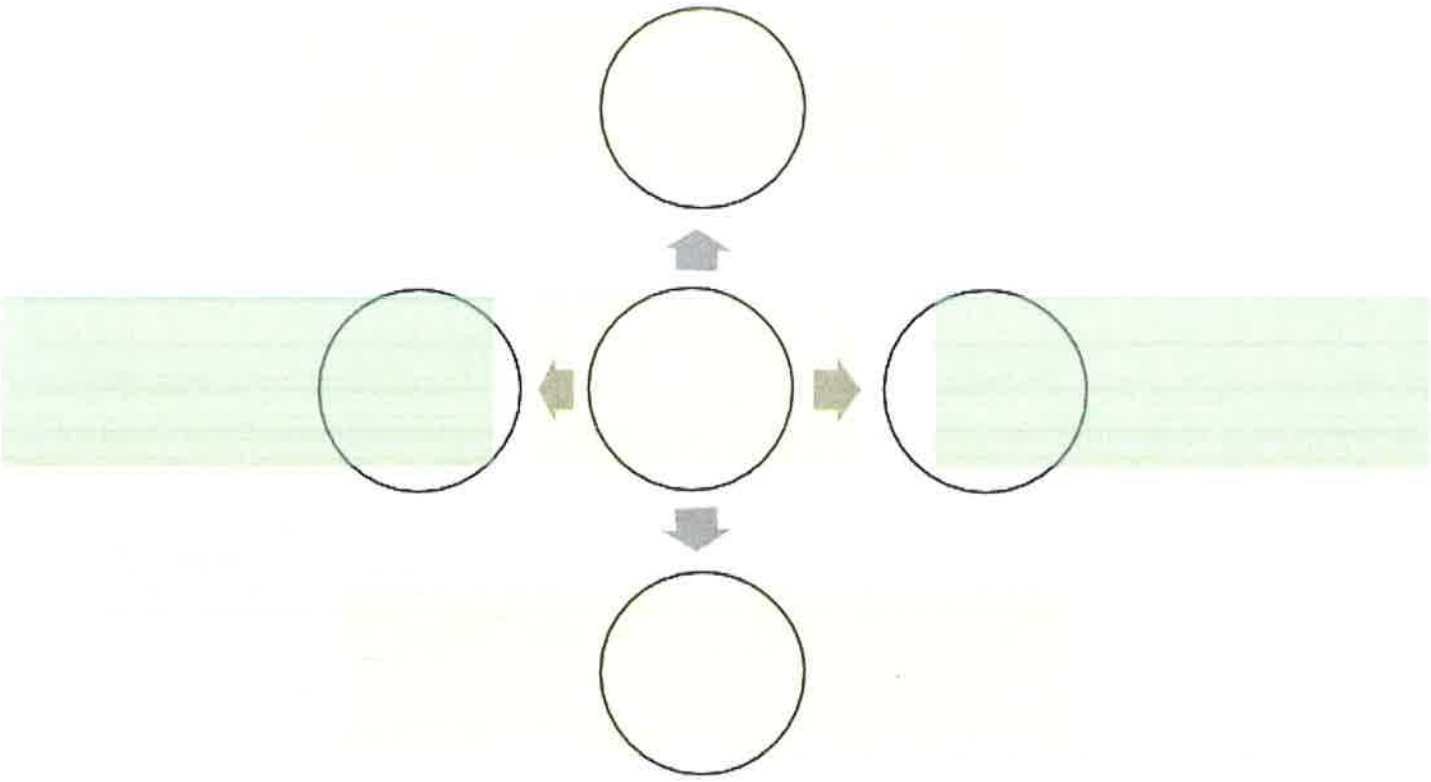
2. NEAT & COLORED picture taking up the entire box provided.

3. Include how it affects SPECIFC wildlife (plants and/or animals).

4. What can you do to help?

5. Reward for caught person/company.

Before you start organize your ideas below using the circle map.....



WANTED!

2

3

4

1

Reward!

5