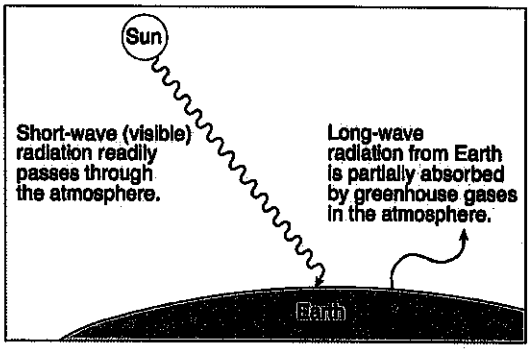
Environmental Science Students

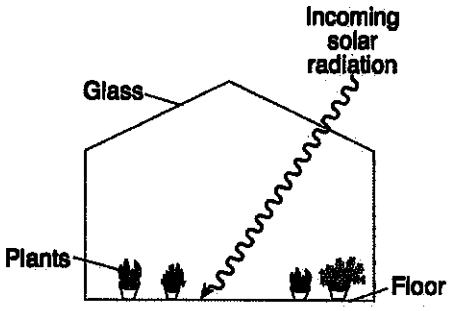
REGENTS EARTH SCIENCE
Global Warming Worksheet

Name _____

Date _____ **Period** _____

Activity 1: Read the passage below and answer the following questions using complete sentences:





Greenhouse Effect

The warming of Earth's surface and lower atmosphere tends to intensify with an increase in atmospheric carbon dioxide. The atmosphere allows a large percentage of the visible light rays from the Sun to reach Earth's surface. Some of this energy is reradiated by Earth's surface in the form of long-wave infrared radiation. Much of this infrared radiation warms the atmosphere when it is absorbed by molecules of **carbon dioxide**, **water vapor** and **methane**. A similar warming effect is produced by the glass of a greenhouse, which allows sunlight in the visible range to enter, but prevents infrared radiation from leaving the greenhouse.

The absorption of infrared radiation causes Earth's surface and the lowest layer of Earth's atmosphere to warm to a higher temperature than would otherwise be the case. Without this "greenhouse" warming, Earth's average surface temperature could be as low as –73°C.
The oceans would freeze under such conditions.

Many scientists believe that modern industrialization and the burning of fossil fuels (coal, oil, and natural gas) have increased the amount of atmospheric carbon dioxide. This increase may result in an intensified greenhouse effect on Earth causing significant alterations in climate patterns in the future. Scientists estimate that average global temperatures could increase by as much as 5°C by the middle of the 21st century.

1) The lowest layer of Earth's atmosphere has undergone a large increase in temperature due to the presence of greenhouse gases. **State the name of this temperature zone layer**.

_____

2) State **a type of radiation** that most likely be absorbed by greenhouse gases.

_____

3) List the names of the greenhouse gases in this article.

_____

4) State one possible change humans could make to significantly reduce the amount of greenhouse gases added to the atmosphere each year.

_____

_____

Activity 2: Regents Questions:

5) Global warming is most likely occurring due to an increase in
   A) ultraviolet radiation and x-rays reflected from Earth
   B) carbon dioxide and methane gases in the atmosphere
   C) oxygen and nitrogen gases in the atmosphere
   D) visible light and radio waves reflected from Earth

6) Two of the greenhouse gases that may be responsible for the increased ice melting in Greenland are
   A) hydrogen and helium
   B) carbon dioxide and methane
   C) oxygen and silicon
   D) nitrogen and oxygen

7) An increase in which gas in Earth's atmosphere will most significantly increase global temperatures?
   A) methane B) oxygen C) nitrogen D) hydrogen

8) Evidence supports the idea that increases in carbon dioxide and methane in Earth's atmosphere are major contributors to global warming. This is based primarily on the fact that carbon dioxide and methane are excellent absorbers of
   A) microwaves
   B) gamma rays
   C) infrared radiation
   D) visible light

9) An increase in the amount of which atmospheric gas is thought to cause global climate warming?
   A) carbon dioxide
   B) oxygen
   C) nitrogen
   D) hydrogen

Questions 10 and 11 refer to the following:

Average temperatures on Earth are primarily the result of the total amount of insolation absorbed by Earth's surface and atmosphere compared to the amount of long-wave energy radiated back into space. Scientists believe that the addition of greenhouse gases into Earth's atmosphere gradually increases global temperatures.

10) Identify one major greenhouse gas that contributes to global warming. _____

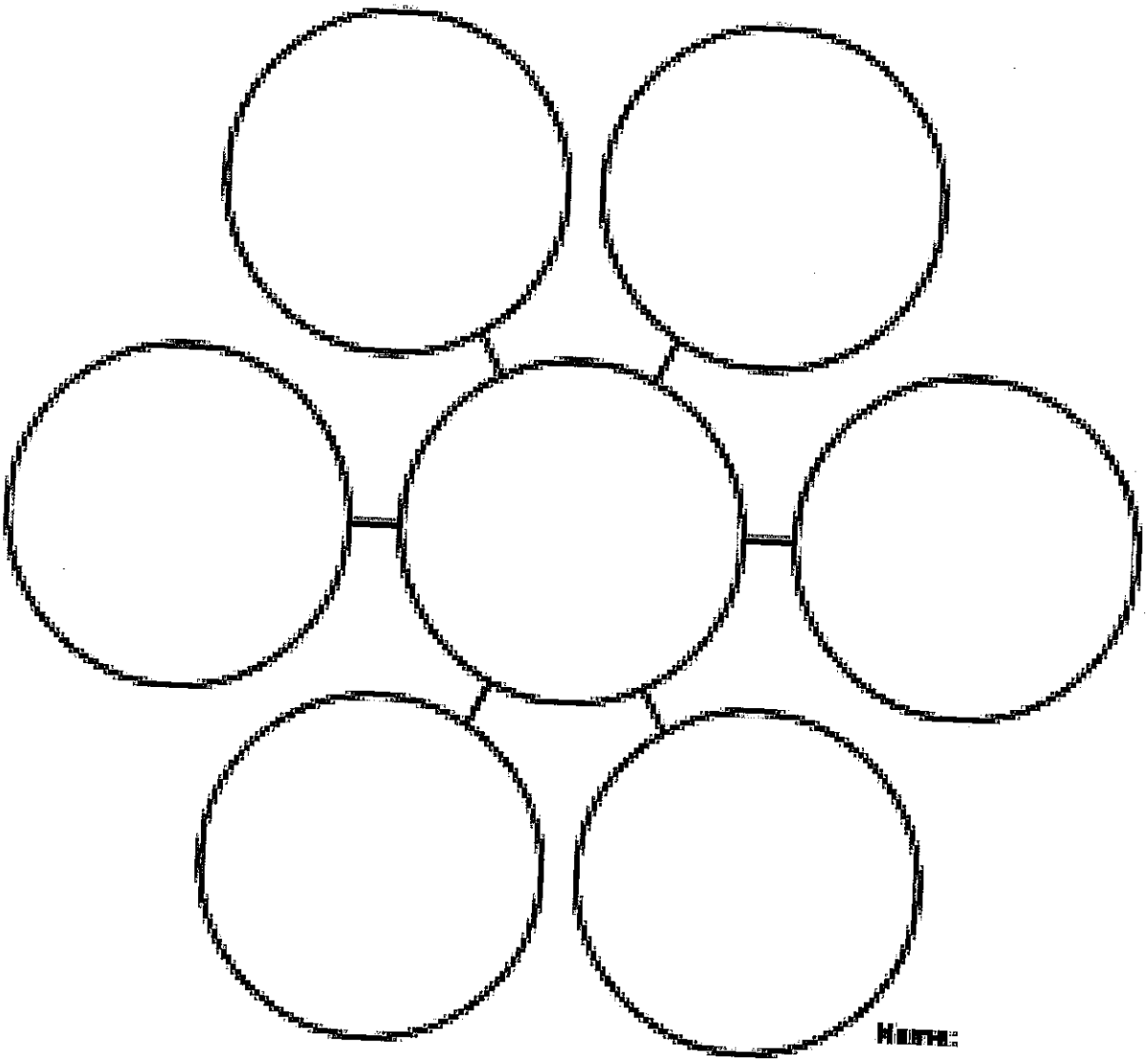
11) Using the given information, explain how increasing the amount of greenhouse gases in Earth's atmosphere increases global temperatures.

_____

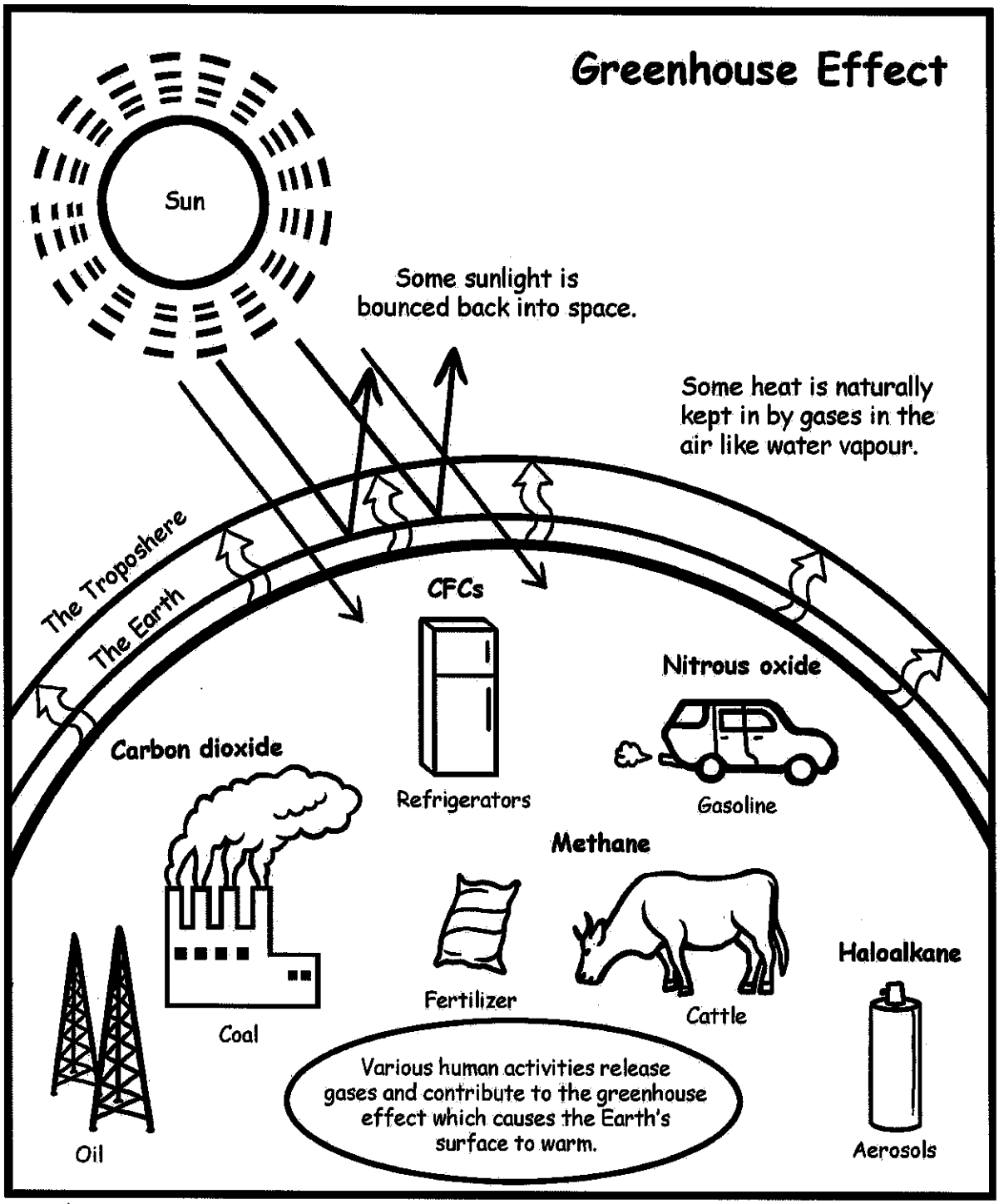
_____

_____

EFFECTS OF GLOBAL WARMING



Greenhouse Effect



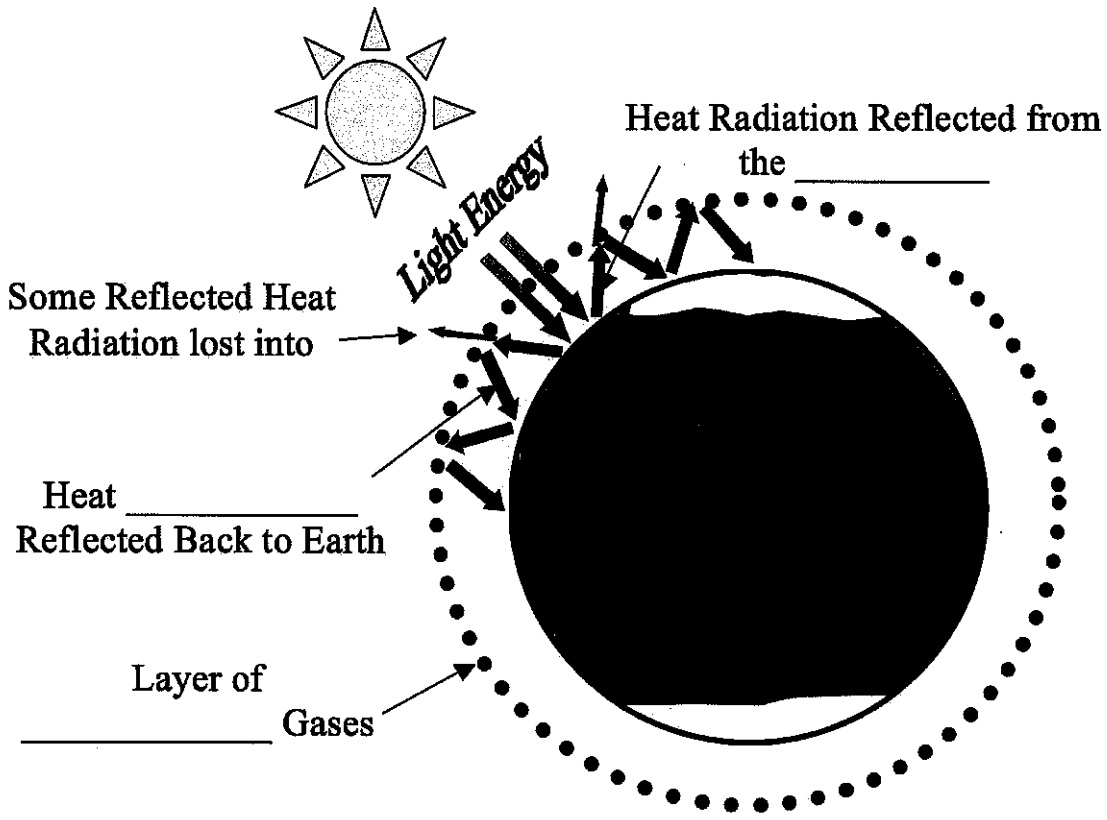
Name: _____ **Date:** _____

Aim 31: The Greenhouse Effect

What are the greenhouse gases?	
What do greenhouse gases do?	_____ the atmosphere by trapping _____.
What is the greenhouse effect?	The _____ of the atmosphere because of insulation by _____
How does the greenhouse effect work?	Incoming _____ from the sun _____ the Earth and is _____ by the greenhouse gases, warming and insulating the Earth like a "**blanket**"
Is the greenhouse effect a good thing?	_____!! Because it maintains _____
So why is the greenhouse effect considered a *bad* thing and is linked to global warming?	_____ of the greenhouse effect is a bad thing. Since there are more and more greenhouse gases in the atmosphere, more _____ is trapped which makes the earth _____. This is called _____.

Fill in the blanks on the diagram below and label it using the following key words

Sun Atmosphere Greenhouse Radiation Space Earth



How are humans affecting the levels of greenhouse gases?

Human activities have significantly raised the levels of many greenhouse gases in the atmosphere. **Carbon dioxide** specifically is the gas that has greatly increased due to **human activities**. Prior to the industrial revolution, the greenhouse gases were balanced. Once the revolution occurred, there have been more fossil fuels burned, deforestation & other human activities that lead to an increase in the greenhouse effect.

CAUSE	EFFECT
Burning fossil fuels from factories (oil, coal, natural gas)	Releases _____ into the atmosphere
Deforestation (cutting down trees)	_____the amount of plants and trees that would _____ this _____ during _____

Overall, higher temperatures can also make the water of the seas and oceans _____. It also causes the ice to _____ (polar bears are endangered, it can affect a farmer's _____ and affect the survival of _____

1. What do the greenhouse gases do?

2. Describe below what would happen to the Earth if we had TOO MUCH or TOO LITTLE greenhouse gases.

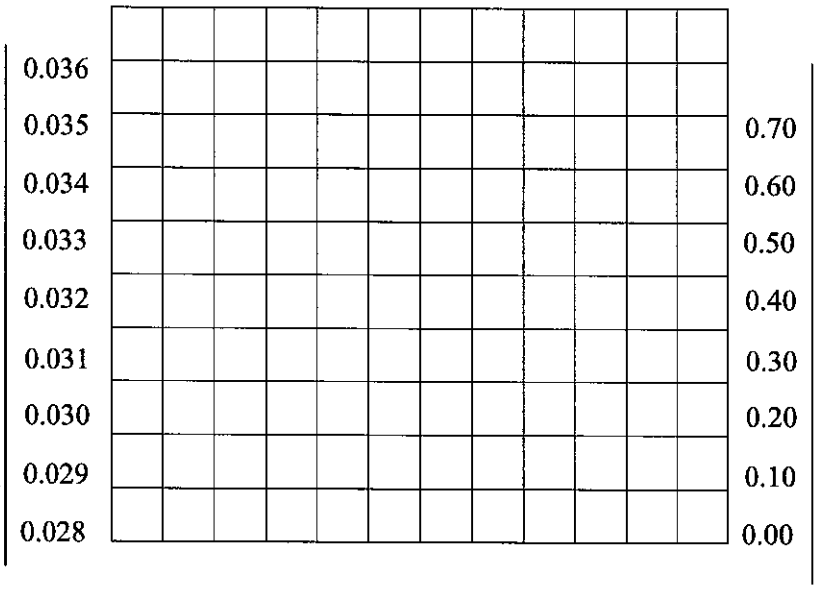
Name: _____ Date: _____

Aim 30 Lab: Graphing the Greenhouse Effect

Using the table below complete the graph.

1. **TITLE** the graph
2. **LABEL** and create a **SCALE** for the **X AXIS**
3. **PLOT** the points in the graph. You will have **TWO LINES.** Use the **LEFT Y AXIS** to plot a line for **% CO2.** Use the **RIGHT Y AXIS** to graph the **TEMPERATURE RISE.**
4. **LABEL OR COLOR CODE YOUR LINES**
5. **SURROUND** the plots with a small circle
6. **CONNECT** the plots

Year	% CO_2 in Atmosphere	Temp. rise °C
1700	0.028	0.00
1750	0.028	0.00
1800	0.028	0.00
1850	0.029	0.05
1900	0.030	0.15
1950	0.032	0.25
2000	0.036	0.60



Analysis Questions:

***State the relationship between temperature and carbon dioxide as the years progress*

_____

_____

_____

1. What are the main causes of a rise in Carbon Dioxide?

_____

_____

2. What would be the effect on the climate if there were more Greenhouse Gases in the atmosphere?

_____

5. What would be the effect on the climate if there were fewer Greenhouse Gases in the atmosphere?

_____

6. What would <u>you</u> do to try and stop global warming increasing?

_____

_____

_____

7. What will be the effects of global warming on the planet?

_____

_____

_____

_____

_____

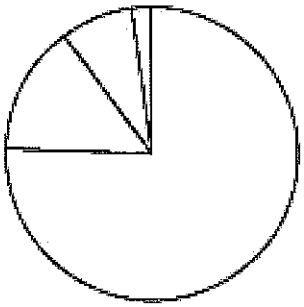
GREENHOUSE GASES

GREENHOUSE GASES

Name:

Date:

Investigate MAN MADE SOURCES of Greenhouse Gases



- ☐ 75 % Carbon Dioxide
- ☐ 14% Methane
- ☐ 8% Nitrous Oxide
- ☐ 2% Fluorinated Gases

Colour the pie chart

Greenhouse Gases by type, sourced from human activities.
Based on emissions data from 2011.

Research: What key human activities contribute to the following sources of greenhouse gas emissions?

Carbon dioxide (CO_2)

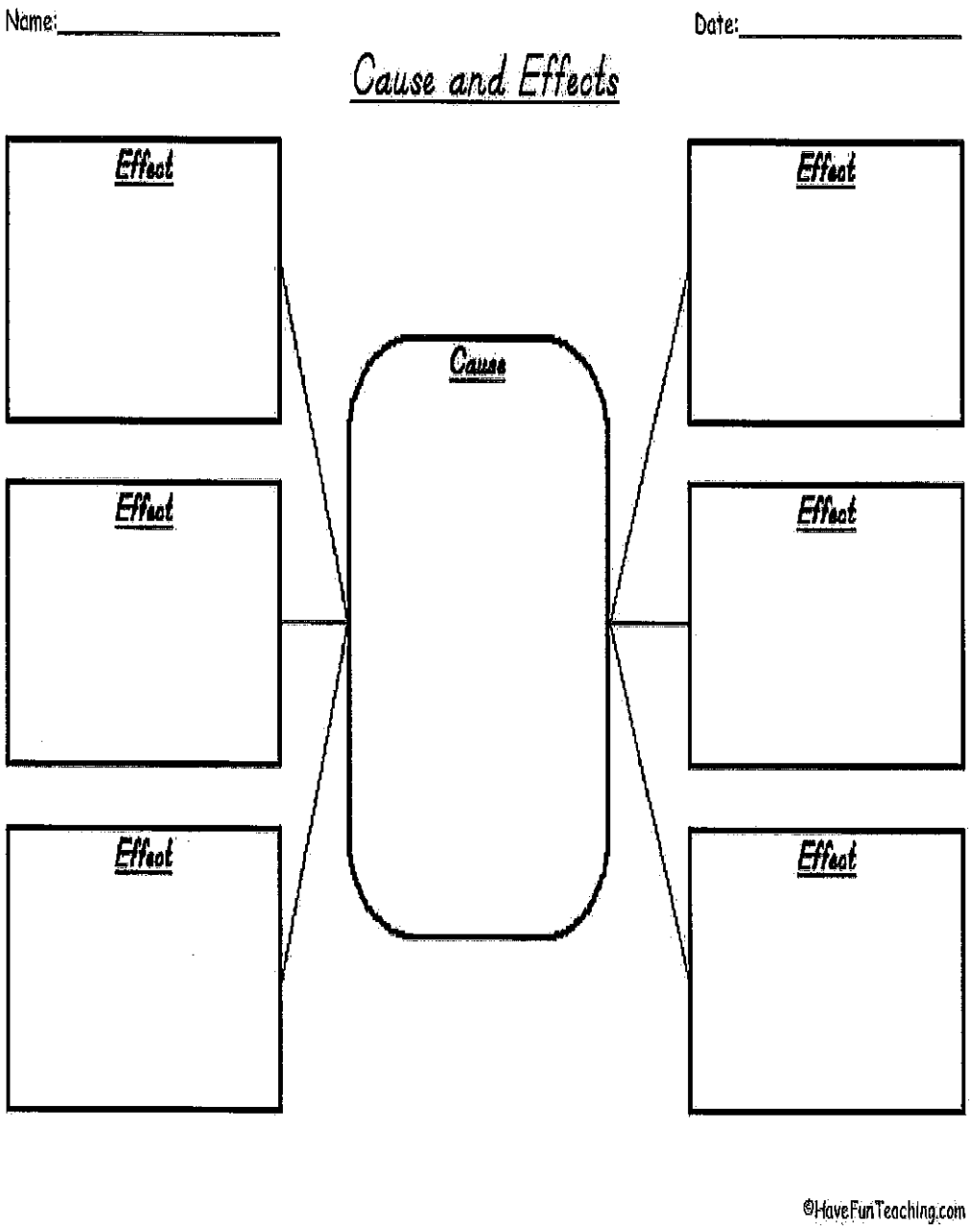
Methane (CH_4)

Nitrous Oxide (N_2O)

Fluorocarbons (F gases)

1. Outline the difference between global warming and climate change.
2. Explain the difference between the greenhouse effect and the enhanced greenhouse effect.
3. Name two important carbon sinks.
4. Study the diagram of the enhanced greenhouse effect. List five human activities that add
   greenhouse gases to the environment.
5. Study the diagram of the global carbon cycle.
   (a) List the locations with the three highest concentrations of carbon.
   (b) How can trees both contribute to, and reduce, the amount of atmospheric carbon?

State the negative effect of Greenhouse gases



Climate Change and Human Health – Write any ten statements

Global Warming – 1

What is global warming?

Global warming is the general term used to describe an average increase in the temperature of the Earth.

How is global warming caused?

Global warming may be a direct result of human activities.

The greenhouse effect is one aspect of global warming.

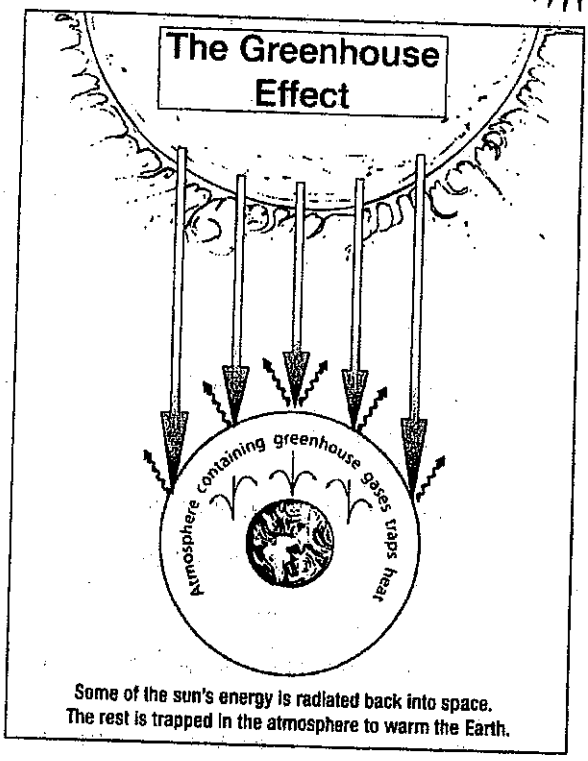
The temperature of the Earth can rise as a result of an increase in the amount of greenhouse gases in the atmosphere. Gases such as carbon dioxide, nitrous oxide and methane trap energy from the sun, preventing the heat from going back out into space and letting the Earth cool. This is the same effect created in a greenhouse, where glass panels are used to trap the sun's warmth to grow plants.

Burning fossil fuels (coal, oil and gas) for industrial and domestic use releases the majority of gases into the atmosphere. Homes and industry are powered by electricity, which is mainly produced by burning fossil fuels in power plants. Cars and trucks use fossil fuels to provide energy. Animals, such as dairy cattle, and rubbish in landfills produce a gas called methane. As the population of the world increases, so do greenhouse gases.

Trees convert carbon dioxide to oxygen and release it into the atmosphere. As more trees are cut down (deforestation), it becomes more difficult to cope with the greenhouse gases, which further adds to global warming. Trees also regulate and cool the world's climate. As more trees are cut down, climate changes become more unpredictable.

What effects does global warming have?

Global warming causes climate change. Climate is the pattern of weather conditions occurring in a given place over a long period of time. Climate change is a naturally-occurring event, but it is the rapid rate of change created by humans that is causing concern among many scientists. Changes to climate may have many effects, including an increase or decrease in rainfall, temperatures in an area becoming warmer or colder, rising sea levels, altering delicate ecosystems, and affecting the ability to predict weather patterns for farming. Changes to climate will affect all plants and animals on Earth!



Some of the sun's energy is radiated back into space. The rest is trapped in the atmosphere to warm the Earth.

Not only do greenhouse gases contribute to climate change, they also cause health problems, such as an increase in skin cancers, respiratory problems due to poor air quality, heat stress, and a possible increase in diseases such as malaria.

How can the problem of global warming be solved?

The Earth has warmed by 1°F (0.38°C) in the last 100 years. Scientists expect an increase in average global temperatures of between 2°F (0.76°C) and 6°F (2.3°C) in the next 100 years. The most important way to alleviate global warming is by reducing the amount of greenhouse gases being produced. This can be done by reusing and recycling resources, using alternative power sources, planting trees, and encouraging people to take care of the environment.

Global Warming – 2

Fact File

The temperature at the middle of the last ice age, about 18,000 years ago, was only 7°F (2.7°C) cooler than it is today!

Use the text on page 45 to complete the cloze.

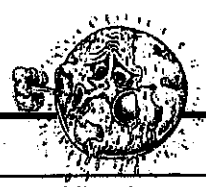
1. Global warming is the general term used to describe an _____[a] increase in the _____[b] of the Earth. It is caused by the activities of _____[c] The more people there are, the more _____[d] gases are produced.

Greenhouse gases are a _____[e] contributor to the problem of global warming. Greenhouse gases _____[f] the heat from the sun preventing it from going back into _____[g] and cooling the Earth.

Some greenhouse gases include _____[h], nitrogen oxide and _____[i]. Most greenhouse gases are produced by _____[j] fuels used in homes and _____[k] and in transportation vehicles. Methane gas created in landfills also adds to greenhouse gases.

Chopping down trees leaves the greenhouse gas carbon dioxide in the air, because carbon dioxide is not being converted to _____[l]. Global warming causes _____[m] change. Even though climate changes occur naturally, many scientists are concerned about the _____[n] of change. Climate change affects rainfall, temperatures in a specific _____[o], _____[p] levels, delicate ecosystems, and farming. In fact, _____[q] plants and animals on Earth will be affected! The health problems for humans due to global warming may include an increase in skin cancers, _____[r] problems due to poor air quality, _____[s] stress and a possible increase in diseases such as malaria.

Scientists expect global temperatures to increase by as much as _____[t] in the next one hundred years. The solution to alleviating global warming is to _____[u] the amount of greenhouse gases by recycling and reusing resources, finding other _____[v] of power, planting _____[w] and encouraging people to take care of the _____[x].



Biology: Unit 3

Introduction to Biodiversity: Which Ecosystem is More Diverse? Name: _____

Period: _____

Part A: What is biodiversity?

1. Define biodiversity in your own words: _____
   _____
2. Why is biodiversity important? _____
   _____

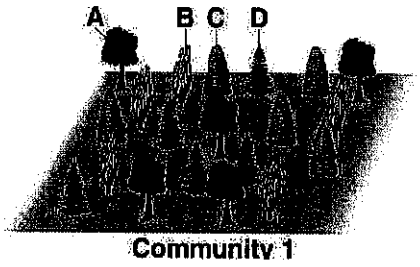
Part B: Calculating Biodiversity Indices

Ecologists use biodiversity indices to determine if a community or ecosystem is diverse: 1) species richness, relative abundance, Shannon-Weiner Index, species evenness, and Simpson Index. Ecologists will use more than one index to calculate the level of diversity. In our class, we will use species richness and relative abundance.

Species Richness = the number of different species in a community

Relative Abundance = the number of individuals in a species/the total number of individuals in a species.

Example:



Community 1

Community 1:
Species Richness = 4
Relative Abundance of Species A = 4/16 = 25%
Relative Abundance of Species B = 4/16 = 25%
Relative Abundance of Species C = 4/16 = 25%
Relative Abundance of Species D = 4/16 = 25%


Community 2

Community 2:
Species Richness = 4
Relative Abundance of Species A = 16/20 = 80%
Relative Abundance of Species B = 1/20 = 5%
Relative Abundance of Species C = 1/20 = 5%
Relative Abundance of Species D = 2/20 = 10%

1. Calculate the species richness (the) and relative abundance (the proportion each species represents of the total individuals in the community) for each of the following communities.

Community A

Species Name	Number of Individuals	Relative Abundance
White Oak	300	
Slippery Elm	350	
Black Walnut	298	
	Total # of Species =	Species Richness =

Biology: Unit 3

Community B

Species Name	Number of Individuals	Relative Abundance
White Oak	35	
Slippery Elm	78	
Black Walnut	309	
Red Maple	12	
	Total # of Species =	Species Richness =

Community C

Species Name	Number of Individuals	Relative Abundance
White Oak	450	
Slippery Elm	475	
Black Walnut	402	
Red Maple	423	
Bur Oak	435	
	Total # of Species =	Species Richness =

2. Rank each of the communities in order of least to greatest Species Richness.

3. Rank each of the communities in order of least to greatest Relative Abundance.

4. Develop a CER (Claim, Evidence, and Reasoning) to determine which community is most diverse.

Guiding Question: Which community is most diverse?	
Claim: Community _____ is most diverse because	
Evidence:	Reasoning:

Name: _____

Environmental Health

Our environment is all around us. It is what sustains us and it is our responsibility to maintain its health. If we do not, our health will be affected.

Directions: Research examples of each type of pollution. Write an example, or two, for each and how we can alter the effects for the heath of our environment.

Air Pollution _____

Soil Pollution _____

Water Pollution _____

Noise Pollution _____

My pledge to keep my environment healthy:

_____

_____

DRAW TWO EXAMPLES FOR EACH TYPE OF POLLUTION. MAKE IT COLORFUL AND ATTRACTIVE!!

RESOURCES

Differentiate renewable and non-renewable resources (Any 6)

T- Chart

1. What are 10 natural resources? Draw an example for each resource.
2. What are characteristics of natural resources?
3. What are examples of natural resources?
4. What is importance of natural resources?
5. How are natural resources formed?
6. What are the functions of natural resources?