



CC5769

GRADES
5-8

READING
LEVELS
3-4

Climate Change Series

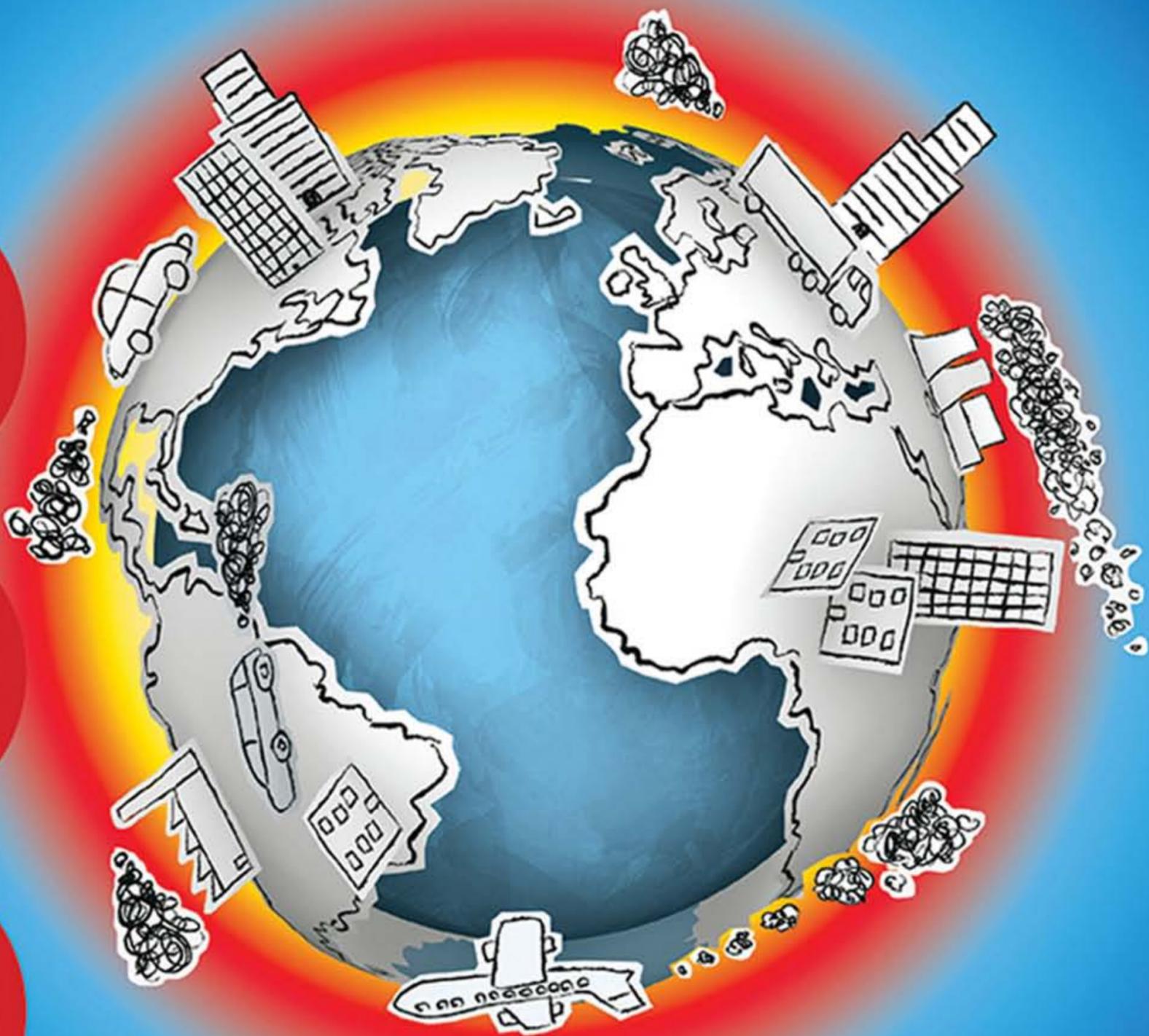
Global Warming CAUSES

High-Interest • Low-Vocabulary

Aligned to
your
State
Standards

Curriculum
Based
Activities

Based on
Bloom's
Taxonomy



 Reproducible

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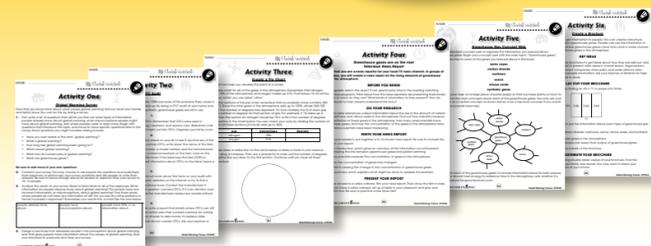
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Greenhouse Gases: Water Vapor

1. Write each word beside its meaning.

vapor	process	evaporate	ice caps
poles	shrink	albedo effect	cycle

- a) a series of events that happens over and over again
- b) the solid sheets of ice covering the North and South poles of Earth
- c) an activity in nature that is always going on
- d) the land at the top and bottom of Earth's axis
- e) the effect of reflecting radiation from the Sun on the average temperature of Earth
- f) a material in the gaseous state
- g) to change from a liquid to a gas
- h) to lose material and become smaller

2. Fill in the chart below with examples of water in each of its states.

State of Water	Examples
liquid	
solid	
gas	



Earth's Atmosphere

You breathe air all the time in order to stay alive. Have you ever thought about what is in the air, or where it comes from? The thin layer of air that surrounds Earth is called the **atmosphere**. Life on Earth depends on the atmosphere.



The atmosphere contains matter that plants and animals need. In the atmosphere, matter is in the gaseous state. You may remember that matter can take the form of solid, liquid, or gas. In a **gas**, the particles of matter are spread far apart. Gases do not have a definite shape. The particles in a gas can spread out to fill an area.

What is the atmosphere?



What types of gases are in the atmosphere?

Most of the atmosphere is made up of nitrogen (78%) and oxygen (21%). The oxygen comes from plants, which take in carbon dioxide and give off oxygen. The amounts of nitrogen and oxygen in the atmosphere do not change much over time. The atmosphere contains many other gases in small amounts. These gases include water vapor, carbon dioxide, methane, and ozone. The amounts of most of these gases can change from place to place, and can change over time.



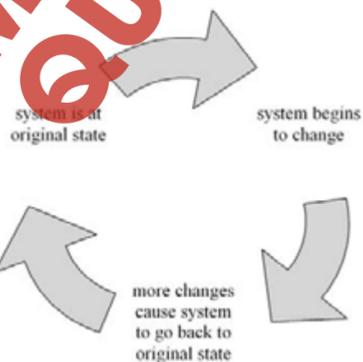
Greenhouse Gases: Water Vapor

1. Circle the word **TRUE** if the statement is TRUE **OR** Circle the word **FALSE** if it is FALSE.

- a) Greater cloud cover would lead to a higher albedo effect.
TRUE FALSE
- b) The kind of changes that bring back balance are called positive feedback.
TRUE FALSE
- c) In nature, water is always changing state.
TRUE FALSE
- d) Water vapor is the most common greenhouse gas in the atmosphere.
TRUE FALSE
- e) Melting ice caps create a higher albedo effect.
TRUE FALSE
- f) Global warming has already begun to melt the polar ice caps.
TRUE FALSE

2. Study the diagram below. Circle the phrase that tells what the diagram represents.

positive feedback negative feedback water cycle



Global Warming

3. Answer each question with a complete sentence.

- a) What is the relationship between greenhouse gases and global warming?

- b) How would melting ice caps change the albedo effect? What effect would this change have on global warming?

Research

- 4. What path does heat energy take between the Sun, Earth's surface, and Earth's atmosphere? Reread this section to trace the path of heat energy from the Sun, to Earth's surface, to greenhouse gases in the atmosphere. Using the library or internet resources, find out more about:

- The difference between short-wave radiation and long-wave radiation, and the role that each type of radiation plays.
- What happens to greenhouse gases after they absorb radiation.

Create a diagram or model that shows the path that heat energy takes between the Sun, Earth's surface, and Earth's atmosphere. Include short written descriptions telling how greenhouse gases warm Earth's surface and lower atmosphere.



How does an object's color affect how much radiation the object absorbs?

You will need:

- 4 thermometers
- 4 shoe boxes (or boxes of similar size)
- White, yellow, green, and black construction paper

This activity must be done on a sunny day.

Different surfaces on Earth reflect and absorb different amounts of the Sun's radiation. Some surfaces, like thick clouds and ice, reflect a lot of radiation. Other surfaces, such as asphalt and soil, absorb a lot of radiation. The color of a surface plays a big role in determining how much radiation the surface will absorb.

Cover four different shoe boxes with different color paper: white, yellow, green, and black. Place a thermometer inside each shoe box. Record the temperature reading on each of the thermometers. Then place all of the shoe boxes in a sunny location for a few hours. While the sun is still on the boxes, take each thermometer out and immediately record the temperature reading in the chart below. Which box had the highest temperature? Which box had the lowest temperature? Based on your data, draw conclusions about how color affects the amount of radiation that an object absorbs.

Box Color	Temperature



Crossword Puzzle!

WORD LIST

albedo	fertilizer	methane
atmosphere	gas	nitrogen
carbon dioxide	global warming	oxygen
cycle	greenhouse	ozone
energy	heat	synthetic
evaporate	hydrogen	

Across

- the thin layer of air that surrounds Earth
- temperature is a measure of this
- ___ gases absorb radiation from Earth's surface
- a series of events that happen over and over again
- radiation is a form of this
- the rise in the average temperature at Earth's surface (two words)
- the second most common gas in the atmosphere
- a substance that helps plants grow

Down

- a greenhouse gas released by termites
- effect caused by reflection of Sun's radiation
- a main ingredient in smog
- one of the elements in both methane and water
- liquid water changes to gas
- a substance made only by humans
- a gas released by burning fossil fuels (two words)
- the most common gas in the atmosphere
- state of matter that has no definite shape or volume



Comprehension Quiz

30

Part A

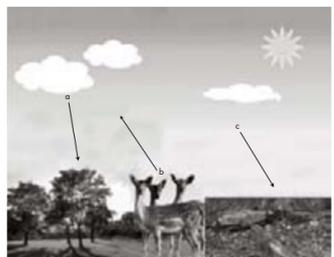
Circle the word **TRUE** if the statement is TRUE OR Circle the word **FALSE** if it is FALSE.

- Nitrogen and oxygen are the most common gases in the atmosphere.
TRUE **FALSE**
- In a gas, the particles of matter are close together.
TRUE **FALSE**
- Without the atmosphere, the average temperatures on Earth's surface would be much colder.
TRUE **FALSE**
- Heat energy travels from the Sun to the Earth in the form of radiation.
TRUE **FALSE**
- The kind of change that brings back balance in a system is called positive feedback.
TRUE **FALSE**
- Fossil fuels are formed from the remains of plant and animals that lived millions of years ago.
TRUE **FALSE**
- Residence time describes the amount of time it takes to complete a biogeochemical cycle.
TRUE **FALSE**
- Farms are a source of the greenhouse gas methane.
TRUE **FALSE**

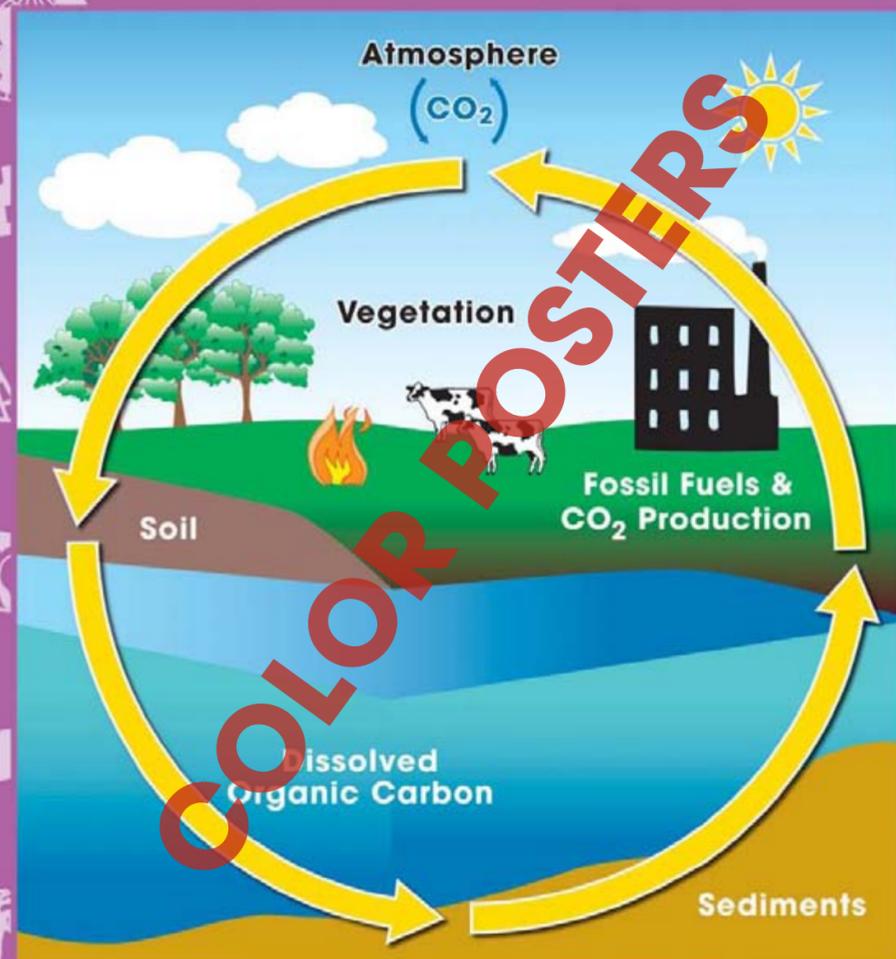
Part B

Label the diagram by doing the following:

- Label the diagram to show some of the processes in the **carbon cycle**.
1 decay
2 photosynthesis
3 respiration
- What is the main human source of carbon dioxide in the atmosphere?



The Carbon Cycle



NAME: _____



Greenhouse Gases: Carbon Dioxide

1. Most cars, trucks, and buses run on gasoline. Where do you think gasoline comes from? Write your ideas on the lines below.

2. Match each word to its definition. You may use a dictionary to help you.

1	released	a substance formed from two or more other substances	A
2	compound	the act of making a substance	B
3	food chain	the force on a material, often due to the weight of another material pressing down on it	C
4	pressure	let go	D
5	volcano	the order in which living things eat other living things	E
6	formation	parts of a once-living thing	F
7	remains	a mountain through which lava erupts	G

EASY MARKING ANSWER KEY

1. Answers will vary

burning coal, oil, wood, natural gas

2.

- 1 D
- 2 A
- 3 E
- 4 C
- 5 G
- 6 B
- 7 F

the rocks melt and erupt from volcanoes, releasing carbon dioxide back into the atmosphere

1.

- a) TRUE
- b) FALSE
- c) TRUE
- d) TRUE
- e) FALSE

2.

- a) 3
- b) 1
- c) 4
- d) 2
- e) 5

3.

Circled:

- respiration
- driving a car
- decay
- volcanic eruption
- breathing
- burning coal in a power plant

Underlined:

- photosynthesis
- ocean animals forming shells
- growth of trees



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