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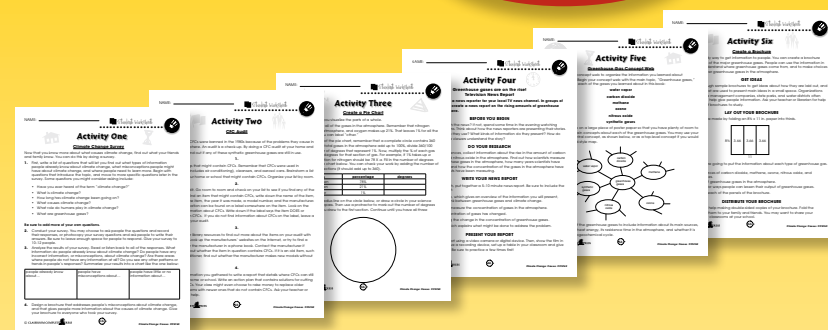


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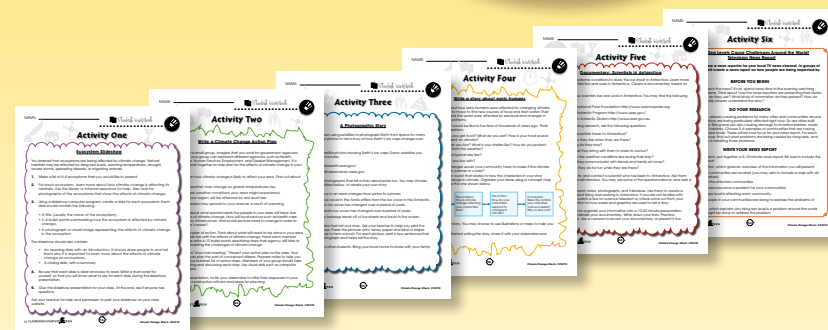
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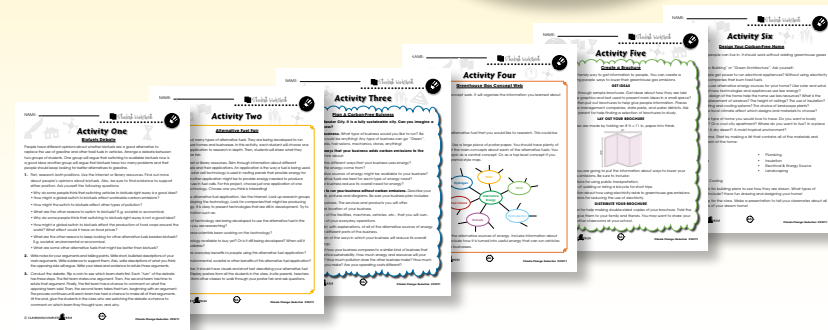
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Global Warming

Answer the questions in complete sentences.

1. Have you ever heard of the term **global warming**? What do you think it means? How does it differ from climate change?

2. Match the term on the left to its definition on the right. You may use a dictionary to help you.

1	average	a form of heat energy that can travel through empty space	A
2	escape	to take in	B
3	radiation	a measure of the middle value of a set of data	C
4	surface	a series of events that happen over and over again	D
5	absorb	a group of related things that act together to form a whole	E
6	cycle	to break away from or get free of	F
7	natural	the outer edge of a body	G
8	system	a substance that can be found on Earth	H



Greenhouse Gases: Water Vapor

There is more water vapor in the atmosphere than any of the other greenhouse gases. More **water vapor** in the atmosphere leads to warmer temperatures. This then causes more water vapor to be absorbed into the atmosphere. This process that leads to more and more change is called a **positive feedback**. As Earth warms up, the polar ice caps start to melt and shrink. The water from the ice caps evaporate into the atmosphere. This creates a lower albedo effect and leads to more warming.



What happens to the size of Earth's ice caps when global temperature rises?



Water is always moving between the atmosphere and Earth's surface in a process called the **water cycle**. Water can exist on Earth in three states: solid, liquid or gas. Water is always changing from one state to another. With more water vapor in the atmosphere, more will condense into clouds. The clouds reflect the Sun's radiation from reaching Earth's surface. The greater albedo effect of the clouds could cool Earth. This kind of change that brings back balance is called a **negative feedback**.

Keep in mind that the more water vapor you have in the atmosphere, the more radiation it absorbs from Earth. This causes the atmosphere to heat up. In order for this water vapor to condense into clouds, the air needs to cool. As air cools, clouds are formed. Water falls back to the Earth as rain or snow. You can see how as a greenhouse gas, water vapor is difficult to narrow down how it affects climate change.



Greenhouse Gases: Carbon Dioxide

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

- a) Photosynthesis takes carbon out of the atmosphere.
TRUE **FALSE**
- b) Carbohydrates are compounds made of carbon and nitrogen.
TRUE **FALSE**
- c) Decay is the breakdown of once-living things.
TRUE **FALSE**
- d) Limestone is a carbon-rich rock made of the shells of tiny ocean animals.
TRUE **FALSE**
- e) Volcanoes take carbon out of the atmosphere.
TRUE **FALSE**

2. Number the events from 1 to 5 in the order they occur in the use of fossil fuels.

- a) Over millions of years, heat and pressure change the remains into fossil fuels.
- b) Living things die and their remains become buried under ground.
- c) People pump fossil fuels from deep beneath Earth's surface.
- d) More layers of soil and rock form over the buried remains.
- e) Oil, coal, and natural gas are burned to power automobiles and factories.

3. **Circle** the processes that add carbon to the atmosphere. **Underline** the processes that take carbon out of the atmosphere.

- | | | |
|-------------------------------------|-------------------------------|------------------------------|
| photosynthesis | respiration | ocean animals forming shells |
| driving a car that runs on gasoline | decay | volcanic eruption |
| breathing | burning coal in a power plant | growth of trees |

Greenhouse Gases: Ozone

3. Answer each question with a complete sentence.

a) Explain how ozone gets into the troposphere by **NATURAL** processes.

b) Explain how burning gasoline in cars and trucks leads to the increase of ozone in the troposphere.

Research

4. Working as a class, divide a world map into regions. You may want to use continents as your regions. Break into smaller groups. Assign each group to research a region. Using the library or Internet resources, find out about areas in your region that have problems with smog. Mark these areas on the world map using push pins or sticky notes. Write a short statement about the problems that each area faces.

Take turns reading your statements until all of the areas on the map have been covered. Have a class discussion. Brainstorm ways in which people or technology can change in order to put less ozone into the atmosphere.



Design Your Alternative Fuel Dream Car

If you could have any car, what would it be? Would you like a rugged, off-road truck? Maybe a sports car? In this activity, you will find a way to make your dream car "green."

First, research different vehicles that are already made. Look at magazines or the Internet. Find photos of vehicles that appeal to you. Don't forget to look at "concept" cars. These are futuristic vehicles designed by car makers.

Next, list the elements that you would like in your dream vehicle. Think about the following questions:

- What do you want the vehicle to look like?
- Where do you want to drive your vehicle?
- How many passengers do you want your vehicle to carry?
- What do you want the inside of the vehicle to be like?
- What special features do you want in your vehicle?

Now, research ways to make all of the parts of your vehicle "green." Think about the following questions:

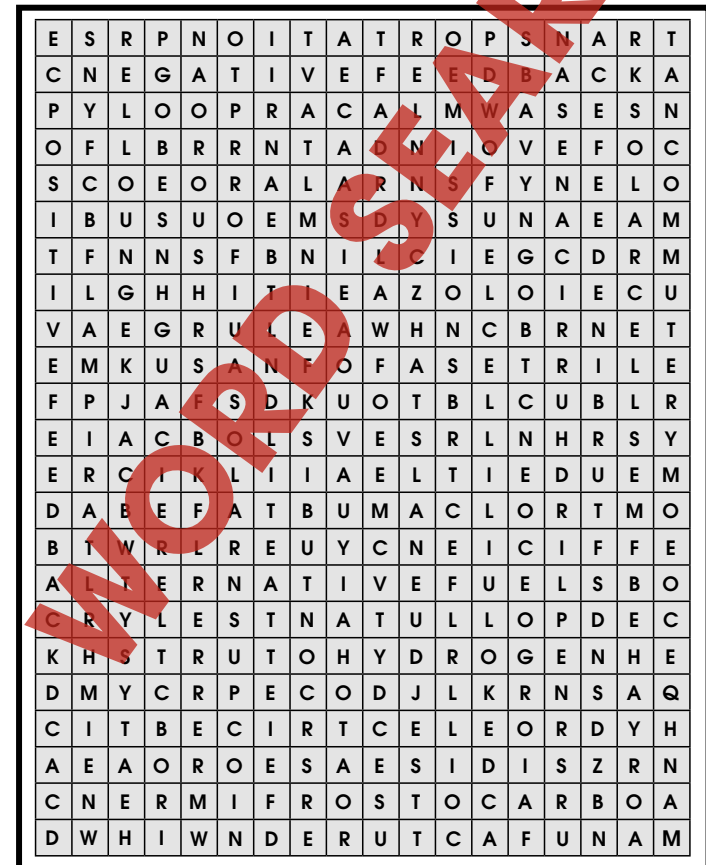
- How will your vehicle be powered? Is there a way to power your vehicle with little or no greenhouse gas emissions?
- What materials do you need to build your vehicle? What choices can you make for materials that would result in less pollution, waste and greenhouse gas emissions? Don't forget that you need materials for the vehicle's frame, tires, seats, dashboard, carpet, and any other special parts it may have.
- What design features could you incorporate to lessen your vehicle's need for power? For example, a heavier vehicle takes more power to move. What other features of your vehicle could help lessen its need for power?

Finally, design your vehicle. Use drawings and labels to explain your design features. Create a poster to display your design. Invite your classmates to look at your poster and ask questions. For an extension, you may also want to build a model of your vehicle.

Word Search

Find all of the words in the Word Search. Words are written horizontally, vertically, diagonally, and some are even written backwards.

- | | | | |
|-------------------|---------------|-------------------|----------------|
| alternative fuels | emissions | manufactured | solar |
| biofuel | fossil fuel | Masdar | solar cells |
| carpool | fuel cell | negative feedback | transportation |
| commuter | hybrid | pollutants | turbine |
| dam | hydroelectric | positive feedback | urban |
| efficiency | hydrogen | renewable | wind |



Comprehension Quiz

30

Part A

8

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

- Most greenhouse gas emissions come from burning fossil fuels.
TRUE **FALSE**
- If people stop emitting greenhouse gases today, Earth's average temperature will start to go down right away.
TRUE **FALSE**
- Alternative fuels release more greenhouse gases than fossil fuels.
TRUE **FALSE**
- Renewable sources of energy are replaced by nature faster than they are used up.
TRUE **FALSE**
- Hydroelectric generators change energy from sunlight into electricity.
TRUE **FALSE**
- A product made with recycled materials most likely used less energy to make than the same product made with raw materials.
TRUE **FALSE**
- Products that are manufactured are made by people using raw materials.
TRUE **FALSE**
- Buying fruits and vegetables grown near where you live is one way to help lower greenhouse gas emissions.
TRUE **FALSE**

Part B

5

List five transportation choices that result in less greenhouse gas emissions than driving individual vehicles.

Alternative Energy Automobiles



Toyota Prius hybrid car



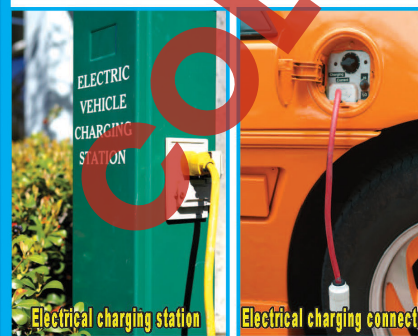
Electric motor

Gas engine

Hybrid engine



Electric Taxi



Electrical charging station



Electrical charging connector



Hydrogen fuel connector

BMW hydrogen-car

NAME: _____



Climate and Human Health

1. Have you ever experienced a heat wave? How did you stay cool and protected from the heat? What steps can be taken?

2. Write each word beside its meaning.

- | | | | |
|---------|----------|-----------|-----------|
| disease | bacteria | drought | flood |
| rescue | lung | pollution | radiation |

- a) A long period without rain in which plants dry out and die.
- b) To help people who are in danger.
- c) A group of living things whose bodies have only one cell.
- d) Waste made by humans that gets into the environment.
- e) The part of the body that takes in oxygen from the air.
- f) The transfer of heat energy through space.
- g) When a usually dry area gets covered with water.
- h) A condition in which parts of the body are not working well.

1. Answers will vary.

Bacteria, fungi and viruses.

A condition in which the body's temperature becomes dangerously high.

1.

1 B

2 D

3 F

4 A

5 C

6 E

2.

Answers will vary.

3.

a) Warmer temperatures allow disease-causing organisms to survive in more areas of the world.

b) Higher air temperatures can cause a higher concentration of ozone gas near Earth's surface.

1.

Sea level is the line along which the ocean meets the land. Rising sea level causes more land to be covered by water.

2.

Answers will vary.

3.

Answers will vary.



EASY MARKING ANSWER KEY

2.

- a) drought
- b) rescue
- c) bacteria
- d) pollution
- e) lung
- f) radiation
- g) flood
- h) disease



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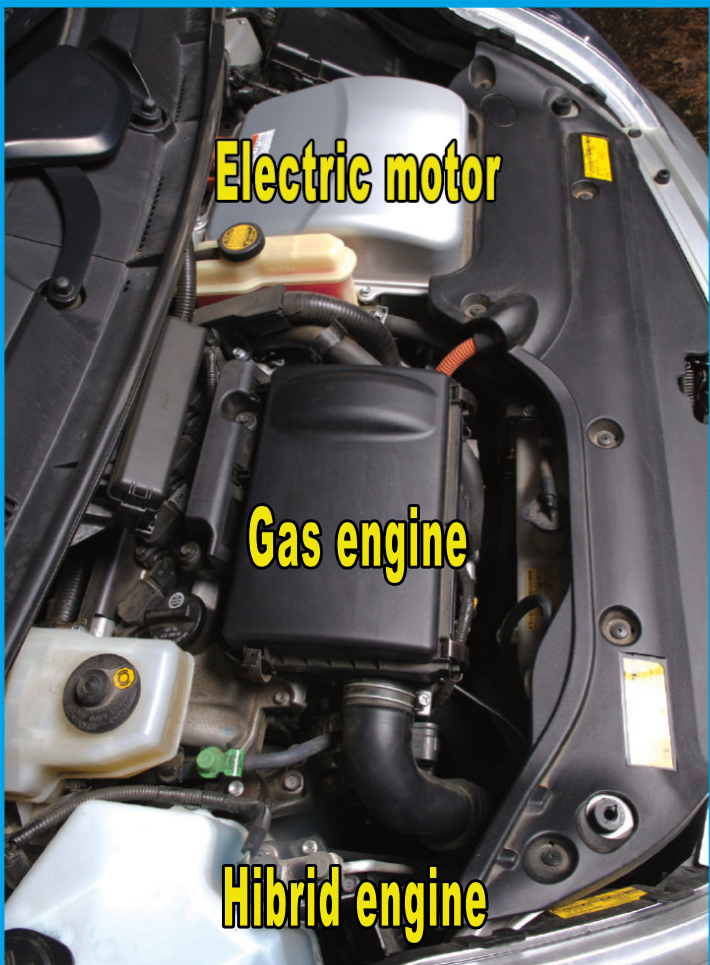
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Gas engine

Hibrid engine



Electric Taxi



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Electrical charging station



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