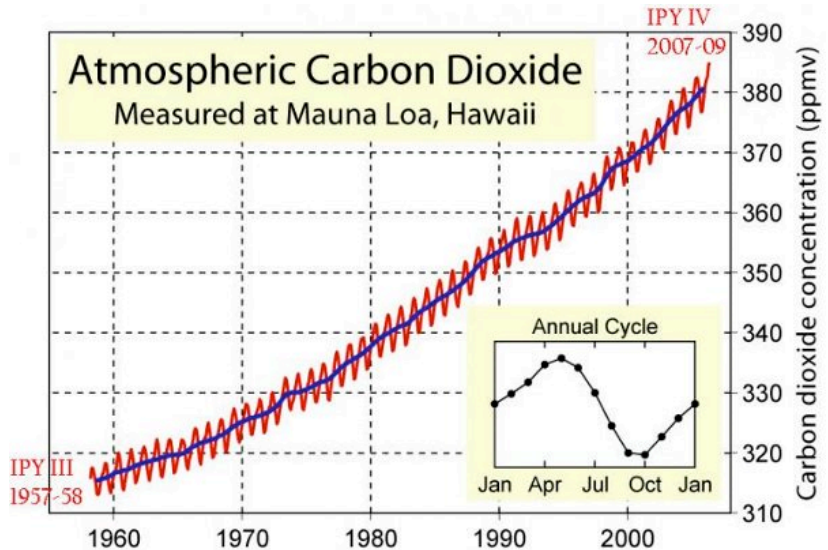


Teacher _____ Period: ____ Grade ____ Date _____ Your initials _____

HUMAN ENERGY SYSTEMS PRE-TEST

1. This graph shows changes in carbon dioxide in the atmosphere over a 47-year span in Hawaii. Other measurements in different places on the Earth show the same pattern.



a. Why do you think carbon dioxide levels go down in the summer and go up in the winter? Circle the best choice to complete each of the statements. How much of the annual cycle is...

... caused by HUMANS BURNING COAL AND GASOLINE?	All or most	Some	None
... caused by CHANGES IN PLANT GROWTH?	All or most	Some	None
... caused by NUCLEAR POWER PLANTS?	All or most	Some	None
... caused by CHANGES IN WIND AND WEATHER?	All or most	Some	None

Explain your choices. Why does atmospheric carbon dioxide go down every summer and go up every winter?

b. Why do you think carbon dioxide in the atmosphere goes a little higher each year? Circle the best choice to complete each of the statements. How much of the continual rise is...

... caused by HUMANS BURNING COAL AND GASOLINE?	All or most	Some	None
... caused by CHANGES IN PLANT GROWTH?	All or most	Some	None
... caused by NUCLEAR POWER PLANTS?	All or most	Some	None
... caused by CHANGES IN WIND AND WEATHER?	All or most	Some	None

Explain your choices. Why is there a little more carbon dioxide in the atmosphere each year?

2. Do you think that *driving a car* causes carbon atoms to go into the atmosphere? Yes No

Where do the carbon atoms come from? Choose the best answer.

- | |
|---|
| a. Nowhere. Driving a car does not make carbon atoms move to the atmosphere. |
| b. Combustion: The carbon atoms come from the heat and light energy of burning. |
| c. Biomass: Recently living plants or animals. |
| d. Soil carbon: Dead plants or animals in the soil. |
| e. Fossil fuels: Petroleum, coal, or natural gas. |

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Explain your choice. How does driving a car move carbon atoms from the source to the air?

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2. Do you think that *turning on a light bulb* causes carbon atoms to go into the atmosphere? Yes No
Where do the carbon atoms come from? Choose the best answer.

- | |
|--|
| a. Nowhere. Turning on a light bulb does not make carbon atoms move to the atmosphere. |
| b. Combustion: The carbon atoms come from the heat and light energy of burning. |
| c. Biomass: Recently living plants or animals. |
| d. Soil carbon: Dead plants or animals in the soil. |
| e. Fossil fuels: Petroleum, coal, or natural gas. |

Explain your choice. How does turning on a light bulb move carbon atoms from the source to the air?

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4. When someone eats a hamburger, which of the following processes are needed to produce the beef in the hamburger and deliver it to the person? Circle "needed" or "not needed" for each process.

Cellular respiration in plants	Needed	Not Needed
Cellular respiration in animals	Needed	Not Needed
Burning coal in power plants	Needed	Not Needed
Burning gasoline or diesel fuel in cars and trucks	Needed	Not Needed

Explain your answer. How is each of the processes that you chose "needed" or involved in producing and delivering beef?

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5. For each of the choices below, circle the choice that produces fewer carbon emissions. Then explain your choice.

<i>Your choice for fewer carbon emissions</i>	<i>Your explanation for your choice</i>
Coal burning power plant, OR Nuclear power plant	
Heating your house with natural gas, OR Heating your house with electricity	
Eating meat, OR Eating vegetables	

6. Answer these true-false questions:

True	False	Carbon is a kind of atom.
True	False	Carbon is a kind of molecule.
True	False	There is carbon in the air.
True	False	There is carbon in pure water.
True	False	There is carbon in the soil.