Name: _____

Part 1

Is It Hot in Here?

1. In the past, we've learned that the terms climate and weather are not interchangeable. In your own words, describe how climate and weather differ.

_____

_____

_____

As a class, we will now define the terms:

2. Weather: _____

_____

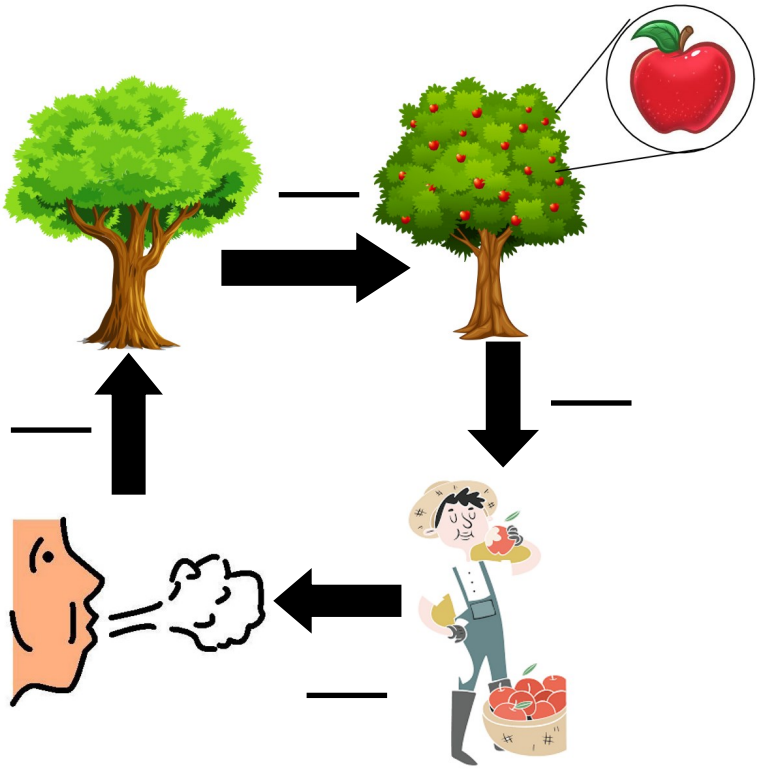
3. Climate: _____

_____

4. Can energy be created or destroyed? YES NO (Circle one)

5. Can matter be created or destroyed? YES NO (Circle one)

6. All living things contain _____ atoms, which are not _____ nor _____ when they move from one organism to another. Instead, they are _____.



7. Using the diagram to the left, number each arrow (1-4) and write the carbon transfer that occurs for that step on the lines below.

Step 1: _____

_____

Step 2: _____

_____

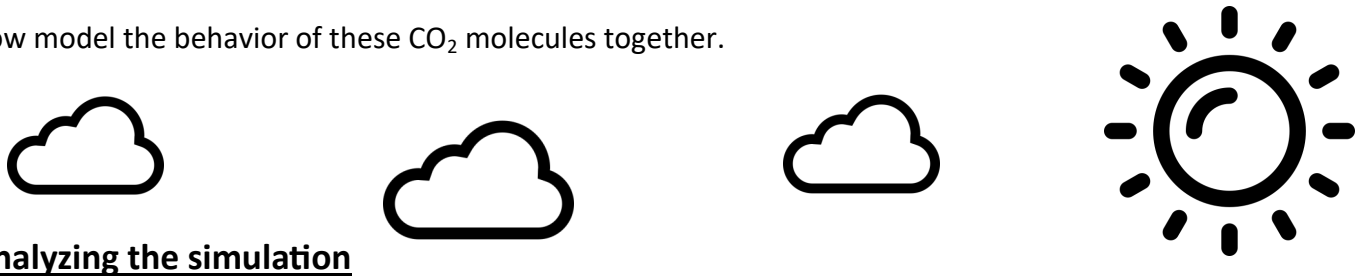
Step 3: _____

_____

Step 4: _____

_____

One way that carbon can exist in the atmosphere is in the form of carbon dioxide (CO_2) molecules. We will now model the behavior of these CO_2 molecules together.



Analyzing the simulation

8. What did the people who permanently stayed in the atmosphere represent? _____

9. What did the person in the center represent? _____

10. What did the people who came into the atmosphere and touched the earth represent, and where did they come from? _____

11. What happened to the energy once it touched the earth?

_____

12. Which molecules can interact with the energy? (Circle all that apply) CO_2 N_2 O_2

13. When were the molecules able to stop (trap) the energy from escaping the atmosphere?

_____

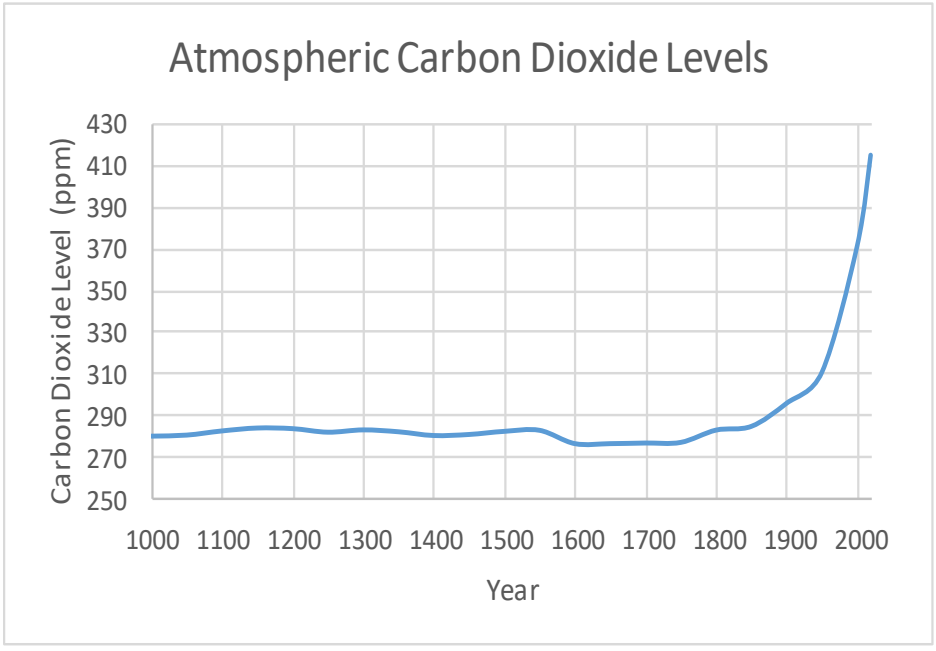
14. What is the purpose of the CO_2 in the atmosphere? _____

15. Is this beneficial to our environment? YES NO (Circle one)

16. Why or why not? _____

Part 2

Look at the graph below.



17. What is measured on the x-axis?

_____

18. What is measured on the y-axis?

_____

19. What trend does this graph show?

_____

_____

_____

_____

20. Do you think the graph (on page 2) is showing United States specific data, or is it showing a worldwide trend? _____

21. Why? _____

_____

22. How can we change our simulation to match the information presented on the graph?

_____

Let's test our simulation again to include our changes!

23. Explain what happened during the second run of the simulation.

_____

Relationship between CO_2 levels and heat

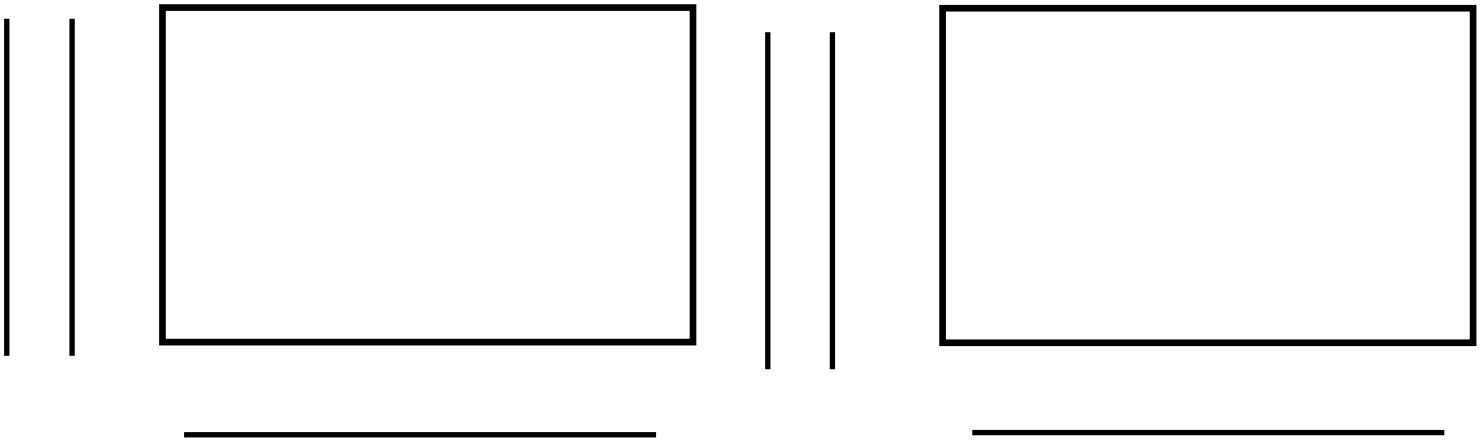
24. Adding CO_2 molecules to the atmosphere traps more less heat in the atmosphere. (Circle one)

25. Trapping more heat in the atmosphere should lead to higher lower temperatures. (Circle one)

26. Let's brainstorm where we could look for evidence to prove that the Earth's temperature is rising?

_____

_____



27. Did scientists observe these things? YES NO (Circle one)

What's causing this?

Look back at the graph on page 2.

28. In what year did the CO_2 levels start to drastically increase? _____

29. We know that matter cannot be created or destroyed. So what are some factors that might have caused the global rise in CO_2 levels?

_____ _____

_____ _____

30. Any process or activity through which CO_2 is released into the atmosphere is called a _____.

31. A reservoir that takes up CO_2 from another part of its natural cycle is called a _____.

32. A process that does not change the overall level of CO_2 in the atmosphere is called _____.

Ask your teacher for a graph. With your group, you will now explore 1 factor that is either a **source** or is **carbon neutral.**

33. What information is plotted on your graph? _____

_____

34. Does your graph show a trend? If so, what is it? _____

_____

35. How do you think that your graph is related to global CO_2 levels and how will this influence global temperature? (Make sure to use the words "source" or "carbon neutral.")

_____

_____

_____

_____

_____

_____

Part 3

Obtain the article that corresponds to your graph from your teacher and complete the following tasks:

A. Analyze the graph(s) and associated reading to determine if your factor is carbon neutral or a CO_2 source, how your factor affects CO_2 levels, and answer questions 36-39.

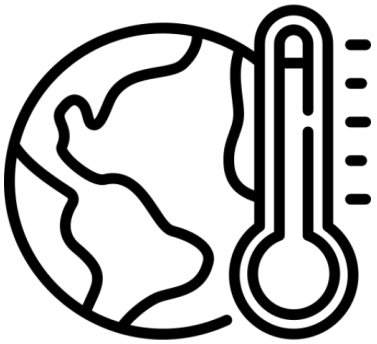
B. Be able to act out the portion of the carbon flow that your factor affects. This will need to include:

i. How carbon flows (is conserved)

ii. How energy interacts with carbon dioxide

iii. Your prediction on how this will affect the temperature and why

iiii. How people can reduce the effects if your factor is a source or explain how your factor is carbon neutral



Analyzing our carbon factor

36. Our factor is _____ which is a CO_2 source carbon neutral .
(Insert factor) (Circle one)

37. Look back at question 35. Did your reading support or dispute your hypothesis about global CO_2 levels and temperatures and why?

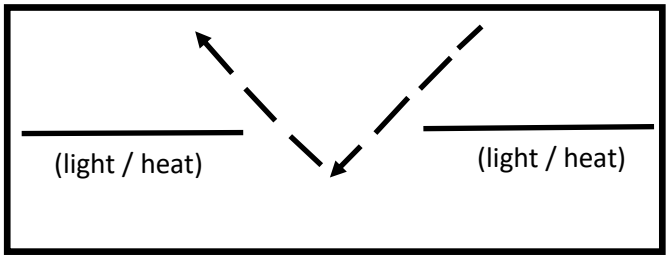
_____

_____

_____

_____

38. Draw a picture in the box on the next page to describe the flow of carbon for your factor.
- Label the steps by using numbered, solid arrows to show where carbon is transferred (similar to the apple tree example on page 1).
- Use dashed arrows to show the light/heat energy path. You need to show how light/heat energy interacts with CO_2 or objects related to your factor.
  - Refer to the diagram to the right to see the dashed arrows. Label on the diagram which arrow represents light and which represents heat.
- If the energy is stopped, write "trapped".



Draw your picture in the box below.

39. In words, describe the part of the carbon flow that your factor affects.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

In your description, please include the following words:

- ☐ Carbon flow(s)
- ☐ Source or Carbon Neutral
- ☐ Light
- ☐ Heat
- ☐ Trapped
- ☐ Temperature

In your group, decide how you will act out your factor's carbon flow. You will have access to the cards we used in our original simulation as well as blank cards. You can label the blank cards with factor-specific objects to help your classmates visualize your carbon flow. You as a group will need to narrate the carbon flow, so if you need more people to stand in as objects or molecules, you may enlist the help of **no more than three** of your classmates.

In your presentation, please describe what your factor is, any important vocab words your classmates should know, how your factor affects CO_2 levels and global temperatures, and at least one way to reduce CO_2 emissions if your factor is a source.

You may write a script/notecard to help you, but it should not take more than 4 minutes.

Part 4

Carbon factor presentations to the class

Group 1: _____ which is a CO_2 source carbon neutral
Factor (Circle one)

One piece of information that I learned from this group:

_____

_____

Group 2: _____ which is a CO_2 source carbon neutral
Factor (Circle one)

One piece of information that I learned from this group:

_____

_____

Group 3: _____ which is a CO_2 source carbon neutral
Factor (Circle one)

One piece of information that I learned from this group:

_____

_____

Group 4: _____ which is a CO_2 source carbon neutral
Factor (Circle one)

One piece of information that I learned from this group:

_____

_____

Group 5: _____ which is a CO_2 source carbon neutral
Factor (Circle one)

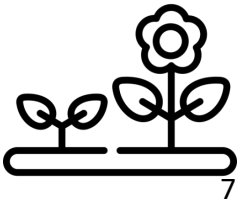
One piece of information that I learned from this group:

_____

_____







Group 6: _____ which is a CO_2 source carbon neutral

Factor (Circle one)

One piece of information that I learned from this group:

_____

_____

Reflection Questions

35. Have humans affected the amount of CO_2 in the atmosphere? YES NO (Circle one)

36. Have humans contributed to the rise in global temperatures? YES NO (Circle one)

37. If people in the United States use a lot of electricity and drive their cars every day, does this have an effect on the people in Canada? Why or why not?

_____

_____

_____

38. To solve the global warming problem, who will need to be involved? _____

_____

39. What is one thing that you as a 6^{th} grader can do to reduce the amount of CO_2 that you produce?

_____