Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ APES Lab

***Carbon Cycle and the Earth’s Atmosphere***

Adapted from Jeanine Gelhaus and Galen McKinley Carbon Cycle Lesson plan

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Introduction: Go to http:/carboncycle.aos.wisc.edu/

What do you know about the element carbon? (note some examples below)

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What about Carbon Dioxide? (note some examples below)

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

How is the amount of CO2 atmosphere added and removed? Give examples and explain with detail.

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Go to Tab “Carbon Cycle” and answer questions using the information here:

In figure 7.3

1. Which is the carbon source and which is the carbon sink?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What do they mean by carbon reservoirs?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Which reservoir is storing the most carbon? Give values from figure 7.3

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Explain why you think the highest storage is in this location?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Go to Tab “APPLET”

|  |  |
| --- | --- |
| Question | Answers (use Applet and tabs) |
| \*Notice the box in the middle. What is listed in the “sources” box? These contribute carbon to our atmosphere.  |  |
| Source 1. \_\_\_\_\_\_\_\_\_\_\_\_\_1. What are fossil fuels?
2. How do fossil fuels form?
3. How does the carbon found in those fossil fuels end up in the atmosphere?
 | a.b.c. |
| Land use is an additional source of carbon. The applet shows a forest burning. d. What does a burning forest have to do with an increase of carbon in our atmosphere? \*\*click on “land use” tab at top of page to ready more | d. |
| A carbon sink is the way that Earth can absorb and hold some of the carbon from the atmosphere.  |  |
| e. If “ocean uptake” is a sink for carbon, where do you think some of the carbon is being absorbed to or held?  | e. |
| f. What does “land uptake” mean?\*\* use the tab above to help.g. Where in the biosphere is some of the carbon absorbed and held?  | f.g.  |

1. Under the “sinks box you will find the “Control” box. Click on the Celsius button. Look at the graph on the right side of the page. You will see the axis change from Fahrenheit to Celcius. Now change it back to Fahrenheit.
2. Look at BOTH graphs. Fill in the table on the next page.

|  |  |  |
| --- | --- | --- |
|  | Graph on left side of page | Graph on right side of page |
| What is the title of the graph? |  |  |
| What information is found on the x axis? |  |  |
| What information is found on the Y axis?  |  |  |
|  |  |  |

1. Click on **Sources: Fossil Fuels**

Move the cursor over the left graph. (don’t click on it)

You will notice that the top line of the graph is highlighted. This shows you that you have activated the Fossil Fuels portion of that graph.

1. Click on **Land use.**

Again, move the cursor over the left graph. You will notice that second line on the graph has gotten darker to show you have activated that line. Now click on **OCEAN UPTAKE** and repeat this process. Finally click on **LAND UPTAKE**. Each time you clicked on a different source or sink you activated that section of the graph.

1. Go back and click on Fossil Fuels again.

As you move the cursor directly over that activated line you will notice that a box will appear above the line showing both the year and the amount of carbon added to the atmosphere from this source.

1. How is the orange line section different from the green line section?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What does the word “projected” mean? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Using the FOSSIL FUEL graph, answer the following questions:
3. How much carbon from fossil fuels was placed in the environment in 1971? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. In what year do we find approximately 15 PgC? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_yr \_\_\_\_\_\_\_\_
5. Click on LAND USE. What is the amount of carbon added to the atmosphere from land use in 2010? \_\_\_\_\_\_\_\_PgC/yr
6. As you slide your cursor along this line, what happens to the amount of carbon due to land use from 2010 to 2080? Does it increase or decrease?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Click on CARBON SINKS-OCEAN UPTAKE. How much carbon are the oceans projected to absorb by 2080? \_\_\_\_\_\_PgC/yr. This means it will take that amount OUT of the atmosphere and store it in the deep ocean (ocean and land lines run together. Be careful to identify OCEAN uptake.)
2. Notice the “zero” line. What does it mean if the data is above that line? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What does it mean if the data is below that line? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Click on SINKS:OCEAN UPTAKE. Use your cursor and move over the graph line. What is the projected carbon uptake by the land in 2020? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Click on SINKS: LAND UPTAKE: Use your cursor and move over the graph line. What is the ACTUAL land uptake in 1990? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is the projected land uptake in the year 2100\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_?