**Global Carbon Atlas**  Answers

**Data Collection**

**Instructions:** Visit the Global Carbon Atlas website. First, visit the Carbon Story and discover how the past defines us, what is happening in the present, and where the future may take us. Second, view real time data on CO2 emissions and consumption by country.

 Link: <http://globalcarbonatlas.org/>

**The Carbon Story: Click on “Outreach” from the above Website:**

**Enter the Past:**

1. For each year(s), record what humans are doing and the GtCO2 (gigatons of CO2) humans are responsible for at that time.

|  |  |  |
| --- | --- | --- |
| **Year (span)** | **Human Activity** | **GtCO2** |
| 800,000 BC | Hunter/gatherer | 0 |
| 14,000 BC | Settlements-cut forests for crops | 0 |
| 3,500 BC | Invent wheel-more transport | 0 |
| 1750 | Industrial age-use coal for steam  | 1 |
| 1781 | Trains-steam engines | 30 |
| 1824 | Greenhouse effect known | 80 |
| 1850 | Oil used as fuel | 120 |
| 1880s | High pressure gas cylinders-nat. gas | 220 |
| 1908 | Cars invented-Model T | 355 |
| **Year (span)** | **Human Activity** | **GtCO2** |
| 1950s | Air travel | 685 |
| 1970s | Motor vehicle travel increases | 990 |
| 1990 | 1st report by inter-gov. panel | 1465 |
| 2000s | Urbanization | 2150 |

2. As you followed the carbon story, what did you notice about the concentration of

 CO2, in ppm, as the years went on? (Hint: look at the Y axis on the graph at the

 bottom of the screen.) **increased or has doubled (200 to 400)**

Based on the trend you see, what do you predict the concentration to be 10 years in the future? **400-500 would make sense**

What type of growth does this look like? **exponential**

**Enter the Present: Visualizing Human Impact (click on ‘Present’ (left)**

Where does it come from?

3. Two-thirds of all emissions of CO2 come from? **Burning fossil fuels**

 Where does the rest come from? **Conversion of forests to pasture and crops**

 **(land conversion)**

Who produces it?

4. Half of all CO2 emitted since the Industrial Revolution came from what countries?

 **U.S. and Canada (North America)**

 But the emerging economies of whom account for an increased amount of 13%?

 **China and India**

Where does it go?

5. Only half of emissions remain in the atmosphere. The rest is removed by?

 **Ocean and land vegetation**

When was it emitted?

6. CO2 began its increase around what year? **1750**

 What event does this coincide with? **Industrial revolution**

**Enter the Future: What’s next? (click on ‘Future’ (on left)**

Choose your own future between 2012-2100 by moving the cursor up and record the following:

 An example of possible student answers is given below:

7. Based on where the cursor is, the concentration of CO2 is **400 ppm** and the

 temperature rises **0.9-2.3°C**.

 Now click on ‘Go and See the Consequences’:

 What has happened to the water? **Sea level rises 0.3-0.5m; 1/3 coral reefs degrade; storminess and storm surges increase; species richness shifts to mid-high latitudes from tropics**

 What has happened to the land? **1/3 less permafrost; glaciers 40% smaller (little ones gone); lower crop yields of rice, wheat, and maize; most (movable) species okay; carbon stored in vegetation increases**

 What has happened to the atmosphere? **Heat waves intensify and last longer; wet areas get wetter and dry get drier; global precipitation increases**

Answers to the following will vary:

8. Move the cursor once more or change the concentration of CO2, picking a different

 outcome.

The concentration of CO2 is now \_\_\_\_\_\_\_\_ppm and the temperature rises \_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

 Now click on ‘Go’ and See the Consequences:

 What happened to the water?

 What happened to the land?

 What happened to the atmosphere?

**Real Time Emissions Data: Click on ‘Emissions’ at top of page:**

Once it loads, Map View pops up. Click on ‘OK, I get It’ then proceed:

9. Click ‘Type’ and choose ‘Territorial’ and then click ‘Units’ and pick ‘tCO2 per person’

 (t means tons).

The United State produces **17** tCO2 per person.

 What is the United States overall rank? **#11**

 We aren’t in the top 5 (may be surprising). So who is? (click on the grey bands under tCO2 to see)

#1- **Qatar** #2- **Trinidad and Tobago** #3- **Kuwait**

 #4- **Brunei Darussalam** #5- **Aruba**

10. Switch the Units to MtCO2 (megatons of CO2). This is for the entire country.

 The United States produces **5233** MtCO2.

 Are we #1? **No** If not, which country is? **China**

Why do you think this is the case? **More people; fewer regulations for**

 **emissions control; technology to ‘scrub’ coal missing**

11. Move the orange ‘2014’ button, on the slider at the bottom, back to 2012. Click

 ‘Type’ then ‘Consumption’ and keep Units as MtCO2.

What does consumption mean in this case? **Using fossil fuels**

Who are the top 3 consumers?

#1- **China** #2- **U.S**. #3- **India**

Is this any different than the producers from question 10? **Not really**

Why do you think that is? **The biggest users of fossil fuels logically release**

 **the most CO2 when it is burned**

12. Move the orange ‘2014’ button back in time. What year does data become

 unavailable? **1989** Why would data suddenly become available after this year? **People noticed a possible problem; 1st intergovernmental panel report (see timeline) was produced in 1990**