Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# The Effect of Humans on the Atmosphere

**Purpose**

The purpose of this lab is to increase understanding of ways to reduce the greenhouse effect.[[1]](#endnote-2)

**Background Information**

Although you may understand the cause and effects of global warming due to the greenhouse effect, you may not establish the connection between your own behavior and its impact on the atmosphere!! By keeping a “CO2 Journal”, you will establish this connection, while at the same time, discovering what you can do to reduce global warming as part of society.

**Procedure**

 **Materials**

**![C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmf]()Sequence of Steps**

* + - 1. Respond to the pre-lab questions below.
1. ![C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmf]()For one week, you will determine your amounts of carbon dioxide production in daily activities.
2. ![C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmf]()Each day, you need to record your daily transportation, home energy, and waste behaviors. Write your numbers in the Carbon Dioxide Journal. Some of the information for your journal can be found in your home utility bills, cars, school bus odometers, and maps.
3. ![C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmf]()When a week is up, total your amounts, and record them on the Carbon Dioxide Calculations page. Calculate an estimate of your direct carbon dioxide emissions. Remember, this is only an estimate! Many things are assumed such as, all members of your household use energy equally and that production of electricity uses an average ratio of fossil fuels to nuclear and renewable sources.
4. On the calculations sheet, determine the lbs of carbon dioxide that you used for each source. Then add them up to determine the total weekly direct carbon dioxide emissions released by you! Write this in the “totals” section.
5. Multiply the total for your week by 52 since there are 52 weeks in a year to determine how much carbon dioxide you would emit annually.
6. Use your annual emissions value to determine the amount of indirect production of carbon dioxide you release in one year. These indirect emissions include everything from the energy needed to make your pencil, to the fuel used to go purchase your groceries! Typically, your indirect production of carbon dioxide is roughly equal to you direct production.
7. Compare your total carbon dioxide emissions with the global average! Even if you are less than the average, it still might not be low enough to stop global warming!
8. Use this information to determine ways that you can reduce your emissions of carbon dioxide and help stabilize our atmosphere!

**![C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmf]()**

**Pre-Lab Questions**

1. What is the greenhouse effect? Describe and list at least 3 facts you know about the greenhouse effect.
2. What is the chemical composition of the atmosphere?
3. How has the composition of Earth's atmosphere evolved (changed) over geologic time?

**Carbon Dioxide Journal**

**Car Mileage**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|  |  |  |  |  |  |  |

**Bus Mileage**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|  |  |  |  |  |  |  |

**Train/Subway Mileage**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|  |  |  |  |  |  |  |

**Home Energy – Check Your Family’s Utility Bills!!!**

|  |  |
| --- | --- |
| Kilowatt-hours used in one month |  |
| Hundreds of cubic feet of gas used in one month |  |
| Gallons of heating oil used in one month |  |
| Pounds of trash thrown away in one week |  |
| Pounds of trash recycled in one week |  |

**Carbon Dioxide Calculations**

**TRANSPORTATION**

**By Car**

1. Miles traveled during the week: \_\_\_\_\_\_
2. Miles per gallon of that car: \_\_\_\_\_\_
3. Gallons of gasoline used (a ÷ b): \_\_\_\_\_\_ x 22 lbs / gal = \_\_\_\_\_\_ lbs CO2

**By Bus**

a) Miles traveled during the week: \_\_\_\_\_\_ x 0.7 lbs / mile = \_\_\_\_\_\_ lbs CO2

**By Train or Subway**

a) Miles traveled during the week: \_\_\_\_\_\_ x 0.6 lbs / mile = \_\_\_\_\_\_ lbs CO2

**HOME ENERGY**

**Electricity**

a) Kilowatt-hours of electricity used in a month: \_\_\_\_\_\_

b) Kilowatt-hours used in a week (a ÷ 4): \_\_\_\_\_\_

c) Kilowatt-hours used per person (b ÷ # of people in household):

 \_\_\_\_\_\_ x 1.5 lbs / kWh = \_\_\_\_\_\_ lbs CO2

**Natural Gas**

a) Hundreds of cubic feet of gas (ccf or therms) used in a month: \_\_\_\_\_\_

b) Therms used in a week (a ÷ 4): \_\_\_\_\_\_

c) Therms used per person (b ÷ # of people in household):

 \_\_\_\_\_\_ x 11 lbs / Thrm = \_\_\_\_\_\_ lbs CO2

**Heating Oil**

a) Gallons of heating oil used in a month: \_\_\_\_\_\_

b) Gallons used in a week (a ÷ 4): \_\_\_\_\_\_

c) Gallons used per person (b ÷ # of people in household):

 \_\_\_\_\_\_ x 22 lbs / gal = \_\_\_\_\_\_ lbs CO2

**Waste**

a) Pounds of trash thrown away: \_\_\_\_\_\_ x 3 lbs / lb = \_\_\_\_\_\_ lbs CO2

b) Pounds of trash recycled: \_\_\_\_\_\_ x 2 lbs / lb = \_\_\_\_\_\_ lbs CO2

**TOTALS**

a) Total of weekly direct CO2 emissions: \_\_\_\_\_\_ lbs

b) Total annual direct CO2 emissions (a x 52): \_\_\_\_\_\_ lbs

c) Total annual CO2 emissions (b x 2): \_\_\_\_\_\_ lbs

*Global Average: 9,000 lbs CO2 emitted annually!!*

**Carbon Dioxide Reduction**

You are to aim for a 20% reduction in your emissions now that you know how to control them!! Figure out what steps you can take to meet that goal. Try and find ways to cut down. What would be a more efficient way to get around? How could you use less electricity? Less gas? Less oil? And what about recycling more? Write at least one paragraph (10 sentences long) explaining how you can reduce your emissions. Ask your parents, read the newspaper, or look on the Internet if you need to!

*Remember… You are partially in control of what affects our atmosphere!*

1. (2008) People Changing the Atmosphere. Atwater High School Agriculture Department. [↑](#endnote-ref-2)