Name _____ Teacher _____ Date _____

4.4: Global Computer Model Worksheet

A. Collect and record results for Global Computer Model

Try using the Global Computer Model (http://carbontime.bscs.org/sites/default/files/simulations/HES_Simulation/index.html) to predict how changes in fluxes will affect the Atmospheric Carbon Pool. You can refer to the Global Computer Model Handout for directions about how to control the initial settings and read the results for each run.

Run #1: Continue the current pattern

Check first to see what the model predicts if the fluxes all stay about the same as they were in 2017 for the next 50 years.

Initial Settings	Results of Run	
Time of change: **2018-2068** (the whole period of the model) Photosynthesis: **120** GtC/yr Cellular respiration: **119** GtC/yr Combustion: **6.5** GtC/yr	Size of the Atmospheric Carbon Pool In 2023 _____ In 2043 _____ In 2068 _____	Will the size of the Atmospheric Carbon Pool pass 1100 GtC? Before 2068? Yes No After 2068? Yes No About what year? _____

Run #2: Reduce fossil fuel combustion

Try seeing what will happen if humans immediately reduced our use of fossil fuels. Choose a lower setting for the Combustion flux, then see what happens.

Initial Settings	Results of Run	
Time of change: **2018-2068** (the whole period of the model) Photosynthesis: **120** GtC/yr Cellular respiration: **119** GtC/yr Combustion: _____GtC/yr	Size of the Atmospheric Carbon Pool In 2023 _____ In 2043 _____ In 2068 _____	Will the size of the Atmospheric Carbon Pool pass 1100 GtC? Before 2068? Yes No After 2068? Yes No About what year? _____

Run #3: Reduce fossil fuel combustion after 10 years

Suppose humans waited for 10 years before reducing our use of fossil fuels. Choose a lower setting for the Combustion flux and delay the start of the change until 2028, then see what happens.

Initial Settings	Results of Run	
Time of change: **2028-2068** (starting after 10 years) Photosynthesis: **120** GtC/yr Cellular respiration: **119** GtC/yr Combustion: _____GtC/yr	Size of the Atmospheric Carbon Pool In 2023 _____ In 2043 _____ In 2068 _____	Will the size of the Atmospheric Carbon Pool pass 1100 GtC? Before 2068? Yes No After 2068? Yes No About what year? _____

Run #4: Keep the size of the Atmospheric Carbon Pool below 1100 GtC

Find some values for the initial settings that will keep the size of the Atmospheric Carbon Pool from *ever* getting above 1100 GtC. What would it take to accomplish that goal?

Initial Settings	Results of Run	
Time of change: _____**-2068** (you choose the starting time) Photosynthesis: _____GtC/yr Cellular respiration: _____GtC/yr Combustion: _____GtC/yr	Size of the Atmospheric Carbon Pool In 2023 _____ In 2043 _____ In 2068 _____	Will the size of the Atmospheric Carbon Pool pass 1100 GtC? Before 2068? Yes No After 2068? Yes No About what year? _____

B. Questions about Patterns

1. What determines if or when the Atmospheric CO_2 Pool passes 1100 GtC—the estimated size of the "dividing line" between moderate and severe climate change?

2. In the long run, the photosynthesis and cellular respiration fluxes will probably stay close to balanced. What does that mean that humans need to do to keep the Atmospheric CO_2 Pool less than 1100 GtC?