Simple climate model lab ver. 2 Worksheet
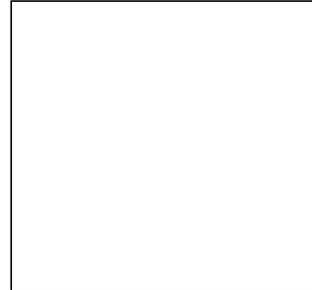
GROUP NAME:_____   GROUP LOGO:

GROUP MEMBERS: _____

You are one of a number of modeling groups asked to make temperature projections for the future. You are given four different scenarios, which represent different ways in which human society respond to changes in temperature. They are named RCP3, RCP45, RCP 6, and RCP 85. Your goal is to use your models to calculate temperature projections for 2100 and 2200 for the four different scenarios.

Getting to know your model

First, open up climatemodel2.xlsx. And get to the first page named 1880-2006, and change the values in the orange boxes, under Free Parameter. While you can change any of the three parameters, make sure that 'Depth of the upper ocean in meters' is set to 300 when you start doing your experiments.

What does changing the noise R' do to your model temperature?

What does changing the feedback parameter *b* do?

Testing the model
Still on the 1880-2006 page.

You are given all of the forcing parameters (man-made and natural) for the 20th century. What combination of noise and *b* gets you a temperature record that most closely resembles the temperature change observed over the 20th century?

b =

noise =

Copy the figure of that you made with the values you listed above and paste the figure here as a picture. (To do this, right click where you want to paste your figure and select the Paste option: Picture.)

Paste figure here.

Making future projections
Now that you have determined what value of climate sensitivity and noise gets you the closest representation of the warming since 1880, use those same parameter values to make temperature projections for 2100.

RCP3
Go to the page RCP3 and enter your values of b and noise to see what kind of temperatures you find at 2100.

What is the temperature change at 2100?

Copy the figure showing the warming from 2007 to 2100 and paste it as a Picture below.

Now, before you go on to the next page, find the Excel file named climatemodel_GROUP.xlsx. Rename the file so that GROUP is replaced with your group name. Then open the Excel file. Copy the temperatures that you obtained from 2007 to 2100 and paste them under RCP3.

*Now, we'll repeat what we did for **RCP3** for the different emission scenarios: RCP45 and RCP6.*

RCP45

Go to the page RCP45 and enter your values of b and noise to see what kind of temperatures you find at 2100.

What is the temperature change at 2100?

Copy the figure showing the warming from 2007 to 2100 and paste it as a Picture below.

*Open the Excel file climatemodel_GROUP.xlsx. Copy the temperatures that you obtained from 2007 to 2100 and paste them under **RCP45**.*

RCP6

Go to the page RCP45 and enter your values of b and noise to see what kind of temperatures you find at 2100.

What is the temperature change at 2100?

Copy the figure showing the warming from 2007 to 2100 and paste it as a Picture below.

*Open the Excel file climatemodel_GROUP.xlsx. Copy the temperatures that you obtained from 2007 to 2100 and paste them under **RCP6**.*

Last part...

Now, save this worksheet and the Excel file climatemodel_GROUP.xlsx. Send both of these to your teacher. And you're done!

If you still have time, you can see what RCP85 gives you. You can also see what happens to the temperature projections if you let b get to become smaller and smaller. Or what happens when noise is cranked up to 5 or even 10?