Using Climate Models to Promote the Understanding of Global Climate Change in Middle and High School Classrooms

Creating a Conceptual Model of the Earth's Climate System

Please take 10 minutes to complete steps 1 and 2 of the following activity.

1. With a partner or group create an inventory of the components of the Earth's climate system.

2. Next, define relationships (interactions, feedbacks) between the climate system components that you have identified.
   - Relationships can be demonstrated using solid lines connecting the components.
   - Show directionality of the interactions by adding arrows to the connecting lines.
   - Think about whether some interactions are bi-directional and whether components interact with more than one other component in the system.

[presentation]

3. Identify components of the climate system that change over time.
   - Think about the time scale. Over what time scale are the changes occurring?
   - *For example: Human time scale? Daily, seasonal, annual, decadal, centennial? Geologic time-scale (millions to billions of years)?*
   - *Are they periodic? If so, cyclic or sporadic?*

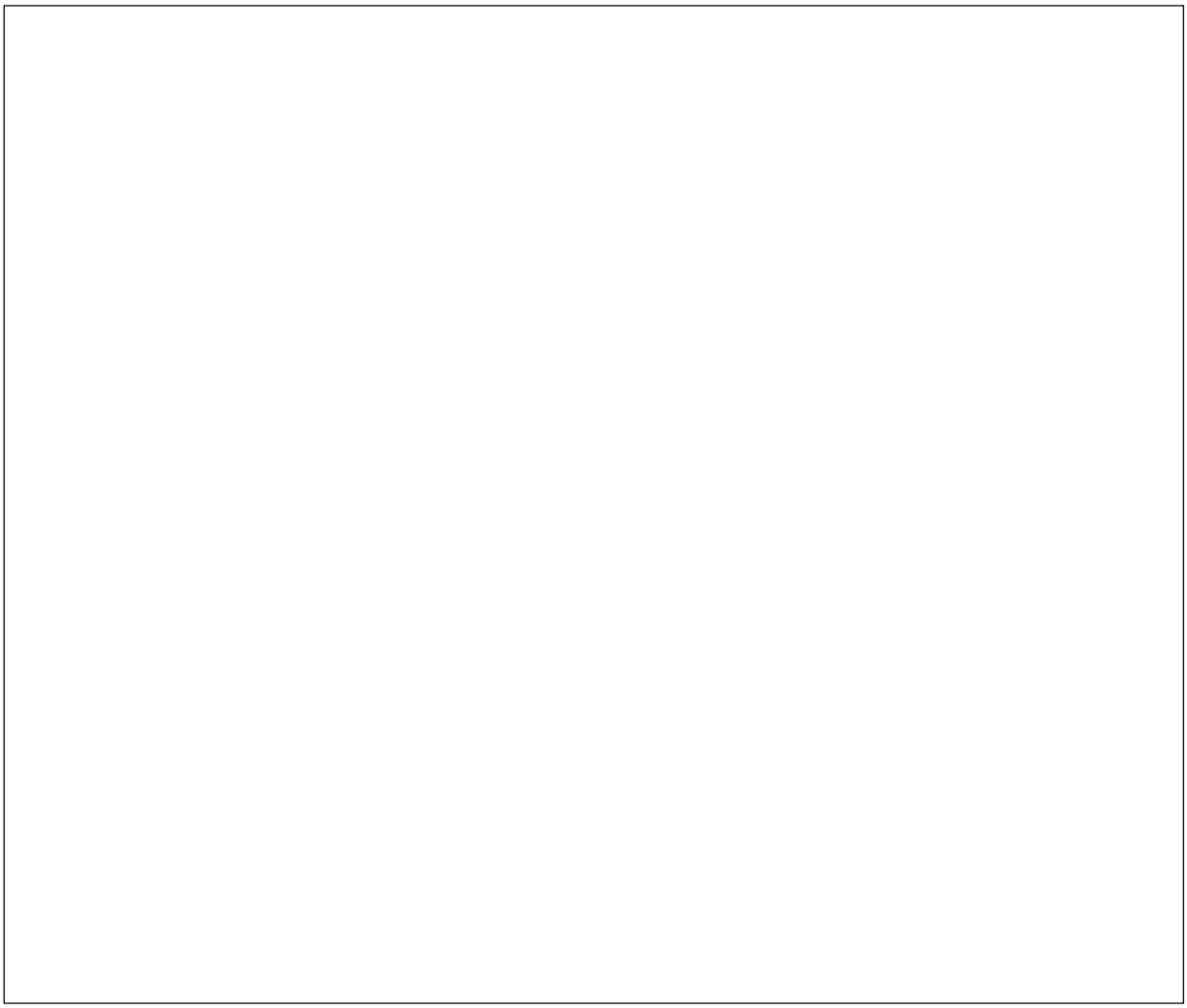
[presentation]

4. Re-evaluate your original model of the Earth system's climate.
   - What would you change or add to your original model?
- Create a consensus model for the entire class. (*A consensus model is the conceptual idea where all the participants agree on one model that is representative of their cumulative understanding of the topic*.)

5. Based on the consensus Earth system climate model, can you make one or two predictions and testable claims about changes in climate? *For example: Did it happen in the past? Is it happening now? Can it impact the future events?*

6. How can we use a computational model, like a Global Climate Model (GCM) to more accurately analyze (answer) such questions and generate evidence in support of our claims?
   - EzGCM Exercise (abridged version)

EARTH'S CLIMATE SYSTEM



7. Make a prediction we can test with a climate model:

I predict _____will impact the future climate

because_____

_____

My testable claim/claims are _____

_____