STEAM Challenge: Predict the Future!

7-8.CT.1 - Compare the results of alternative models or simulations to determine and evaluate how the input data and assumptions change the results.

Learning Objective: We can compare two different climate change simulation models and evaluate how changing input assumptions (e.g., CO_2 levels, temperature rise, or deforestation rates) affect future climate predictions.

MIT's Climate Interactive

NASA's Climate Time Machine

- Worksheet for recording observations (or a shared digital document)
- Graph paper or spreadsheet software (optional)

Ask students to explore the key variables in each model (e.g., greenhouse gas emissions, temperature rise, sea level changes).

Instruct each group to run both simulations using different assumptions:

- **Scenario A:** High CO_2 emissions (no reduction in fossil fuel use)
- **Scenario B:** Moderate CO_2 emissions (some policy changes)
- **Scenario C:** Low CO_2 emissions (significant reductions and sustainability efforts)

Students should record the projected outcomes for temperature rise, sea levels, and extreme weather events.

Have groups compare the differences in the models' outputs.

Discuss:

- How did changing the input assumptions affect the outcomes?
- Did both models produce similar results? Why or why not?
- What factors might make one model more accurate than another?

If time allows, students can present their findings to the class.

Students write a short reflection (3-5 sentences) on how assumptions impact simulation results.

Groups submit their recorded data and conclusions.

Climate Simulation Challenge Worksheet

Name: _____ **Date:** _____

Step 1: Select Your Models

1. **Model 1 Name:** _____
   - Website or Source: _____
2. **Model 2 Name:** _____
   - Website or Source: _____

Step 2: Modify Inputs and Record Observations

Scenario A: High CO_2 Emissions (No Reduction in Fossil Fuel Use)

Model	Projected Temperature Increase	Projected Sea Level Rise	Other Key Observations
Model 1			
Model 2			

Scenario B: Moderate CO_2 Emissions (Some Policy Changes)

Model	Projected Temperature Increase	Projected Sea Level Rise	Other Key Observations
Model 1			
Model 2			

Scenario C: Low CO_2 Emissions (Significant Reductions & Sustainability Efforts)

Model	Projected Temperature Increase	Projected Sea Level Rise	Other Key Observations
Model 1			
Model 2			

Step 3: Compare and Analyze

1. How did changing the input assumptions affect the outcomes?
    - _____
    - _____
2. Did both models produce similar results? Why or why not?
    - _____
    - _____
3. Which model do you think is more reliable? Explain your reasoning.
    - _____
    - _____
4. What additional factors do you think should be included in climate simulations?
    - _____
    - _____

Final Reflection

Write 3-5 sentences on how assumptions impact simulation results and why modeling is important for understanding climate change.

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