

Analyzing a Feedback Mechanism

Name _____

Date _____ Class _____

1. What is a feedback mechanism?

2. Look at the Feedback mechanism in the diagram, if more heat being trapped by the greenhouse effect eventually results in bigger clouds, will the bigger clouds result in: (choose one)
 - a. More heat being trapped (Positive feedback loop) or
 - b. Less heat being trapped (Negative feedback loop)

3. Explain your answer to question 2.

4. Consider the following scenarios and decide whether you think they would result in a positive feedback loop or negative feedback loop. Check the appropriate boxes.

	Positive Feedback	Negative Feedback
Increased water vapor in atmosphere		
Increased ice melting		
Burning of forests for farming		

5. Illustrate the Ice melting loop.

6. Look at the Atmospheric Gases Involved in Global Change sheet.

	CO ₂	N ₂ O	Methane	CFC's
How many times increase since industrial revolution?				
How long does it stay in the atmosphere?				
Which gas has the highest Global Warming Potential?				

Problem ????????????????



Solving Activity

Analyzing A Feedback Mechanism

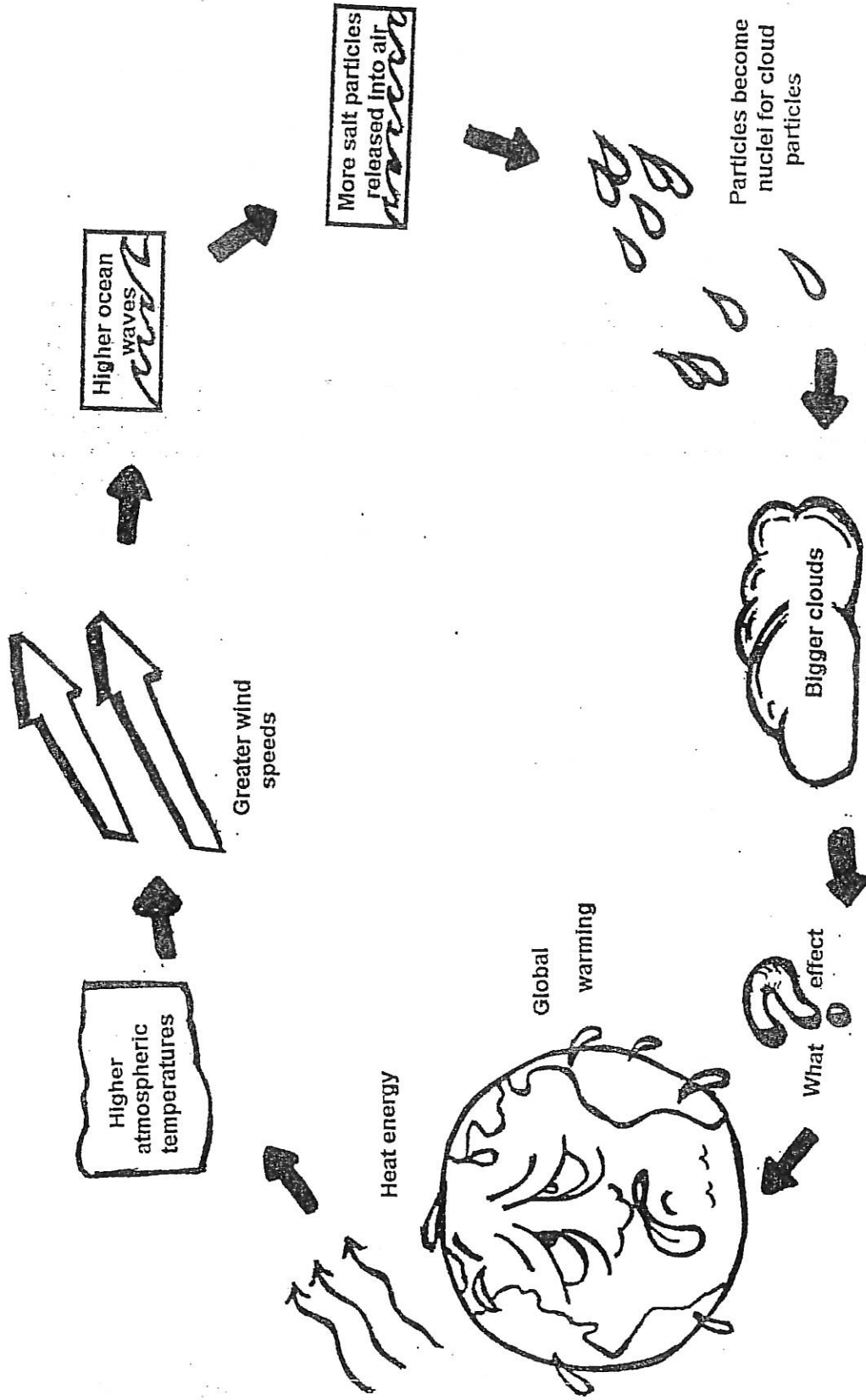
At an international conference on global climate change British scientists presented the following theory:

If the temperature of the Earth rises significantly as a result of an enhanced greenhouse effect (global warming) the speed of global winds will increase. Increased wind speed will cause a greater disturbance of ocean water, which in turn will cause larger clouds to form. The clouds might either increase or decrease the Earth's average global temperature.

This theory is an example of a *feedback mechanism*, in which one event causes a series of other events, which in turn influence the first event.

Imagine that you are a scientist at the conference and have been given a copy of a diagram illustrating the feedback mechanism described by the British scientists. Your job is to interpret the diagram, analyze how this particular feedback mechanism might influence global warming and report back to the conference members. Answer the questions below and use them as a guide to planning your presentation.

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ATMOSPHERIC TRACE GASES INVOLVED IN GLOBAL CHANGE

CARBON DIOXIDE (CO₂)

- Major involvement in atmospheric heating;
- Principal human sources are fossil fuel burning and deforestation;
- Balanced in nature: sources equal sinks;
- Exists in the atmosphere for 50-200 yrs.
- 1995 atmospheric concentration about 355 ppm;
- Pre-Industrial Revolution concentrations were about 280 ppm;
- Global Warming Potential of 1;

METHANE (CH₄)

- Major involvement in atmospheric heating; atmosphere;
- Principal human sources are rice culture, cattle, and fossil fuel and biomass burning;
- Principal natural sources are wetlands;
- Can exist for about 10 years in the atmosphere;
- Recorded at 1.72 parts per million in the present atmosphere;
- Before the Industrial Revolution, it's concentration was estimated at about .79 part per million;
- Global Warming Potential of 20;

NITROUS OXIDE (N₂O)

- Major involvement in atmospheric heating;
- Main human sources are fertilizers/ land use changes;
- Natural sources are soils and tropical forests;
- Estimated lifetime in the atmosphere of about 150 years;
- Present atmospheric concentration about .310 ppm;
- Before the Industrial Revolution the concentration about .288 ppm;
- Global Warming Potential of 300;

CHLOROFLUOROCARBONS (CFCs)

- Major contributor to the heating of the Earth;
- Main human sources are refrigerants, aerosol sprays, and industrial foam processes;
- No natural sources;
- Estimated lifetime in the atmosphere between 60-100 years;
- Present amounts are estimated at 0.00028ppm for CFC-11 and 0.00048 for CFC-12;
- Discovered in the mid-1920's; completely man-made;
- Global Warming Potential: CFC-11: 3500/CFC-12: 7300;