Teacher Sheet 1

CRITICAL THINKING ACTIVITY: THE CLIMATE CHANGE MYSTERY BOX

OBJECTIVES: Students will:

- Demonstrate ability to interpret symbols
- Describe the factors contributing to climate change
- Make connections between human behavior and environmental changes

MATERIALS:

- **Student Sheets**
- **MYSTERY BOX** Items
- Paper and pencil
- Calculators

PROCEDURE:

1. Read through and discuss the background information on the **Student Sheets**. Explain to students that this activity will provide them with an easy introduction to the science behind climate change and how they can be part of the solution.
    - Have students answer the questions that follow the information sheet and discuss them before doing the activity.
2. Gather students to stand in a circle. Explain to them that you will ask certain people to take an item out of the box. They may not look in the box before they put their hand it. When they have taken their object out they are to look at it, hold it up and state what it is. When all the items are out of the bag, quickly review all of them.
3. Ask the students holding the objects if they have any ideas on how their particular objects might be connected to climate change. If a student has no idea, ask other members of the group/class to contribute.

4. When all the symbols have been identified, group them into causes of climate change and solutions for climate change. Try to re-create the climate change story – fossil fuels and over- consumption causing a rise in temperatures, what's being affected, what can be done to solve the problem.
5. Ask students to contribute any other knowledge they may have about the reasons for climate change and ask them to offer more ideas on ways to slow or halt global warming.

APPLICATION:

1. Have students select one of the activities below to show their understanding of the concepts discussed.

- Select and write about one metaphor from each category – causes, what's being affected and solutions.
- Create a skit or short play about the causes, effects and solutions of climate change.
- Give three examples of actions that could be taken at school.
- Explain why a tree is good symbol of all three sides of climate change – causes, impacts and solutions.
- Have students determine how far they travel to school each day, then determine the "miles per gallon" of the family car, city bus or school bus they travel in. Using this information, students calculate how much fuel is used to bring them to and from school every day. Students then combine their individual fuel use to discover how much fuel is used every day in order for them to travel to school.

  - ✓ If students use a bicycle, they can determine how much they save every day.
  - ✓ If students come on the city bus, they should divide the fuel used by the passenger capacity of the bus to determine their fuel use.
  - ✓ If students come on a school bus, have them calculate for the bus and for individual cars to determine how much fuel they are saving.

Teacher Sheet 3

IDEAS FOR MYSTERY BOX ITEMS

OBJECT	SYMBOLIC FUNCTION
Light bulb	Simple actions such as turning off lights when not in use (or leaving them on) can have big impacts on energy use.
Toy car	Overuse of private vehicles leads to needless burning of fossil fuels.
Toy recycling truck	Recycling helps to conserve the world's natural resources so you don't have to use as much energy to create something new
Stuffed polar bear	Polar bears are among the first animals to suffer from climate change as thinning pack ice from warming temperatures makes hunting difficult.
Solar panel	Using non-fossil fuel resources helps cut down on the production of harmful greenhouse gases.
Stuffed or picture of: animal, plant, insect /endangered species book	Plants and animals all over the world face serious problems as warming global temperatures change climates and ecosystems more rapidly than they are able to adapt. Unlike animals and insects, plants are unable to move.
Thermometer	The average global temperature is rising higher with every passing year.
Image or toy of the sun	The sun fuels our planet's comfortable atmosphere but when the sun's rays are trapped in our atmosphere by greenhouse gases, global warming takes place.
Image of a seashore	Sea levels are predicted to rise as much as 1.5 meters as ocean waters warm and expand. This will flood millions of people & animals from their homes & kill plants and other organisms that are unable to relocate.
Image of a tropical island	Many small island nations are facing complete inundation from rising sea levels.
Picture of a storm	Increasing global temperatures are may change weather patterns and result in more storms and extreme weather events.
Piece/picture of limestone	This represents a carbon sink–a place where carbon is safely stored in the earth.
Plastic pop bottle/packaging	Plastics are made from fossil fuels. The extraction and processing of fossil fuels coupled with the production of plastics represents a huge amount of carbon being released from carbon sinks and into the atmosphere.
Picture/piece of coral	Rising ocean temperatures are predicted to kill off coral – itself an important carbon sink.
Toy tree/	Trees are an important carbon sink absorbing atmospheric

a branch/leaf	carbon. Harvesting and burning the world's forests releases carbon into the atmosphere. Planting trees helps to reload the planet's ability to store carbon.
Toy bicycle or bus	Using alternative, sustainable forms of transportation cuts down on the burning of fossil fuels and greenhouse gases.
Empty spray can	CFC's, often used for propulsion in spray cans, are among the most powerful of the greenhouse gases.
Item representing locally grown food	How we eat affects the environment. Consuming food grown locally and seasonally uses less fossil fuels for transportation than items that travel long distances.
CD	Plastics are common in our everyday life, made from fossil fuels.
A plastic spoon/fork	Disposable items and packaging are made from fossil fuels.
Picture of a shoe	Walking is great transportation – we can all do something one step at a time.
Packet of seeds	Growing your own food, planting greenery. Less travel for food source and adds to sources of carbon sinks
Piece of synthetic material-fleece/nylon	Man-made materials for clothing are made from fossil fuels.
Picture of a person/toy doll	People are part of the environment and have impacts on climate change, but can also be part of the solution.
Salmon (picture or toy)	Local impacts will affect salmon populations because of both decreases in summer water levels and increases in summer water temperatures.
Plastic bag	Plastics are made from fossil fuels. The extraction and processing of fossil fuels coupled with the production of plastics represents a huge amount of carbon being released from carbon sinks and into the atmosphere. Re-use your plastic bags, and then recycle them.