



# Environmental Impact

## Post-Visit Lesson

Grades: 6th - 12th grade

Class Time Needed: 45 minutes

**Big Idea** Students will learn ways to save energy and protect the Earth from increased greenhouse gases.

### Maryland Curriculum Standards

#### NGSS Earth and Space Science Framework

- Middle School: Ask questions to clarify evidence of the factors that have caused a rise in global temperatures over the past century.
- High School: Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.

### Materials Needed

Instructor needs:

- Crumpled paper balls (can have students help by having each student make 2-5 paper balls)
- Categories and Answers to "Go Green" Challenge (found in Teacher Resources section)
- Way to track points (ex: whiteboard)

Students need:

- Way to record answers during Go Green Challenge (example: dry erase board or notebook paper for each group)



## Teacher Resources

Go Green Challenge - Categories and Acceptable Answers for each round

Round 1: Name 3 of the top contributors to climate change

- Acceptable answers - power plants, cars, trucks, airplanes, buildings, homes

Round 2: Name 3 of the top ways to save energy at home

- Acceptable answers - add insulation, seal air leaks, properly program your thermostat, turn off lights when not in a room, turn off electronics when not in use, put computer in sleep mode

Round 3: Name 3 ways to "Go Green" at school

- Acceptable answers - remember to turn off the lights when you leave the classroom, recycle paper in the classroom, recycle cans, bottles and other recyclables in the cafeteria, when you print from the computer, print double-sided, write on the front and back of a sheet of paper

Round 4: Name 3 of the top most used lights in the home

- Acceptable answers - kitchen ceiling light, living room table and floor lamps, bathroom vanity, outdoor porch or post lamp, and bedroom nightstand

Round 5: Name 3 of the top ways you can save water at home

- Acceptable answers - fix leaks around the house, turn off the tap while brushing your teeth, wash only full loads of dishes and clothes, water your yard or garden only when needed

Bonus Round: Name 3 things you can compost

- Acceptable answers - cardboard rolls, clean paper, coffee grounds and filters, dryer and vacuum cleaner lint, eggshells, fireplace ashes, fruits and vegetables, grass clippings, hair and fur, houseplants, leaves, nutshells, shredded newspaper, tea bags



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## Lesson Procedure

### Introduction:

Before class, make a large number of golf-ball sized paper balls (using post-its or scrap paper).

Divide students into two equal groups. Have one group stand in a circle around the other group with both groups of students facing each other. The students in the middle represent Earth and the students on the outer circle represent greenhouse gases in the air.

The teacher will be the sun which will be moving around the outer circle throughout the activity. The Sun will shine "rays" onto the Earth by tossing paper balls into the middle circle. As rays enter the Earth's atmosphere, the center group of students must repel the Earth's rays by throwing the paper balls outside of the circle of students surrounding them. The outer group of students will act as greenhouse gases by blocking the "rays" from leaving Earth's atmosphere and tossing them back towards Earth (the inner group). The round ends when all the paper balls are outside both circles, showing they have "exited" the Earth's atmosphere.

For the second round, move some of the students from the Earth group to the greenhouse gases group. See if it takes longer for the round to end. For continued rounds, keep making the Earth group smaller and the greenhouse gases group larger.

Discussion questions: What does this game demonstrate? Did it seem like the Earth was suffering during the final round? What causes greenhouse gases to increase over time?

### Direct Instruction (Student Activity):

Have students create teams of 2-4 students. Each team should have a way to record/display their answers for each round.

Introduce the rules to the Go Green Challenge:

1. There will be 5 rounds (possible bonus round if time allows or a tie breaker is needed).
2. During each round, the Moderator/Score Keeper will name the category and each team must write down 3 answers to the category in one minute.
3. When the timer ends, each group must show the Moderator/ Score Keeper what they wrote down. For each correct answer, the team will get one point (up to three points possible per round). The Moderator/ Score Keeper will record the points earned during each round where all teams can see.
4. Before moving on to the next round, the Moderator/Score Keeper will read all the acceptable answers that could have earned points in that round.
5. The team with the most points after the final round is the winner.

### Conclusion:

Discussion questions -

- What can we do to mitigate human-caused climate change?
- What effects might we see where we live if climate change continues?

