

Waste in Antarctica

Integration: Health (Environmental Health); Science; Social Studies; Art; Mathematics

Grade Levels: 3-6

Time: 2-3 class periods

Materials:

- Paper grocery bags
- Large garbage bags
- Disposable gloves (non-latex if there are allergies)
- Bathroom or health room-type scale
- *What's In the Garbage* handout
- Poster board and drawing supplies

Objectives:

Students will:

1. Examine the waste management procedures in Antarctica and their importance.
2. Discuss the steps Antarctic explorers must take to prevent pollution.
3. Investigate waste management in their daily lives.

Lesson:

Full Group

1. Ask students the following questions
 - a. "Do you ever think about the garbage that you produce?"
 - b. "What happens to the garbage that is produced where you live (landfill, incinerator, etc.)"
 - c. "What would happen if everyone just threw their garbage outside and left it there?" (the streets would be dirty, there would be disease and vermin, the area would be ruined).
2. Conduct a mini-lecture on waste in Antarctica.
 - a. Until the 19th century, human beings had never been to Antarctica.
 - b. When early explorers arrived, they were not concerned about how they treated the land.
 - c. Many times when they left Antarctica to return to their home countries, they left behind garbage, used equipment, abandoned stations, and dead animals.
 - d. Because Antarctica is like a huge freezer, the dead animals remained preserved.

3. Inform students that today, scientists and explorers in Antarctica are more concerned about what happens to Antarctica. They want to protect its environment.
4. Ask students for suggestions for how they think waste is managed in Antarctica.
5. Explain that there are four important ways that the research stations in Antarctica manage waste.
 - a. Reduce: making less garbage to begin with.
 - Less packaging is brought to Antarctica.
 - Only what is necessary is sent. The scientists do not want to waste.
 - b. Reuse: extending the life of a product by reusing it instead of throwing it away.
 - Everything that can be reused is reused.
 - Few disposable items are used in the stations.
 - c. Recycle: making a new product out of materials that would otherwise be thrown away.
 - Recyclable items have to be stored in a place where they will not blow around when the wind blows.
 - They must be stored until they can be shipped back to the scientists' countries.
 - d. Dispose
 - In some cases, such as wastewater and sewage, the waste must be disposed of.
 - The sewage is treated and then released into the water surrounding Antarctica.
 - Some waste is incinerated (burned) in high temperature incinerators. Only ash is left, which is shipped out of Antarctica.
6. Ask students what they think Antarctica would look like and what problems would arise if these procedures were not used. (dirty, animals may be harmed by disease and litter, water would be polluted by trash that fell in, etc.)
7. Discuss with students the fact that not only do the scientists in the research stations have to worry about waste, but explorers also have to be concerned.
8. Encourage students to imagine that they are explorers in Antarctica. Ask, "What are some examples of the waste that you may have as explorers?" (food, paper and packaging materials, fuel (cooking) tanks, human waste).
9. Ask students what they think explorers do with the garbage they produce.
10. Explain that explorers like Ann Bancroft and Liv Arnesen of the Bancroft Arnesen Expedition are very concerned about protecting Antarctica.
 - a. They re-package all of the food they bring with them so that there is very little paper or plastic.
 - b. All paper and plastic waste is shipped out of Antarctica when they leave.
 - c. They consume all of the food they bring with them.
 - d. The fuel drums, which earlier expeditions would leave on the ice, are shipped out of Antarctica.
 - e. Human waste is buried.

- f. There is no wastewater. Because the food and water freezes, the food must be eaten quickly and scraped from the bowl. The cooking gear cannot be washed. It is too cold for most bacteria to grow so they do not have to worry about getting sick from not washing the gear.
11. Tell students that as they can see, protecting Antarctica's environment takes work. Tell them that it is just important to protect the environment where they live.
 12. Have students perform the activity "What's In Our Garbage At School" to determine how much garbage one class produces in a day.
 - a. Have the class collect all the garbage they produce during one school day. If students move to other classrooms during the day, provide them with bags so that they may collect their garbage.
 - b. At lunchtime, the class should have its own garbage so that their garbage will remain separate from the other classes. Have students record their lunch garbage before throwing it away (this way no one will have to touch it later).
 - c. After one day's worth of garbage is collected, combine all the garbage and weigh it. Then go through the garbage piece by piece. Have students identify what it is and what material it is made of. Keep a record on the board. Then have students read their list of lunchtime garbage and record their data.
 - d. Have the students work in small groups to complete the *What's In the Garbage* handout.
 13. After completing the activity, ask students for their reaction to the amount of garbage that is produced in schools alone.
 - a. Remind students that this is just an estimate of the amount of garbage that is produced.
 14. Lead a discussion about the types of garbage that were found most often in the classroom. Focus on the amount of food that was disposed of at lunch.
 15. Have students come up with strategies on how to reduce the amount of garbage they create in school. Write the suggestions on the board.
 - a. As a class, decide on a strategy that they will work toward using to reduce the amount of garbage that is created in school.
 16. Divide the class into groups and instruct each group to create an awareness poster to hang in the school. The poster should make other students aware of the amount of garbage produced and give tips for reducing it.

EXTENSION:

- Have someone from the local recycling center or waste disposal center speak to the class about the importance of reducing.
- Take a field trip to a recycling center or waste disposal center.
- Obtain brochures and pamphlets on recycling from the local Department of Sanitation for students to share with their families.

Assessment:

Teachers will assess:

1. Student's recognition of the importance of waste management in Antarctica and where they live.
2. Student's ability to describe how explorers prevent pollution.
3. Student's mathematics skills (multiplication, ability to solve word problems).
4. Student's ability to synthesize information into an awareness poster.
5. Student's ability to work cooperatively.