Plastics in Society

Objectives:

Students will understand important characteristics about plastics and how these properties affect the fate of plastic as marine debris. They will connect their personal use of plastics with the problems of marine debris, and design ways to minimize the improper disposal of plastics.

Concept:

Plastics are a unique and relatively recent technology created by linking monomers together. A variety of polymers and chemical additives are used to make a range of plastics with diverse characteristics. Different types of plastics have different properties that affect the likelihood that the plastic will end up as marine debris and also how the plastic may affect the marine environment. Individuals have great power as plastic users to change their own consumption and disposal habits and influence others to minimize plastic waste.

Materials:

- Science notebooks
- Pencils
- Handout: Estimated Life Span of Plastic Products
- Handout: Plastic Number Chart
- Handout: CoastWalk Plastic Data
- Variety of plastic products
- Laptop/computer and projector or SmartBoard
- Rubric: Plastic Pollution Action Plan

Introduction:

Ask students to look around the room and take note of all the plastic. Think about all the things we use every day that are made of plastic.

Play a game of plastic Scattergories to brainstorm these items with the students.

To do this, think of a category of plastics, or a place they are used. Topics could include "Plastics used in clothing" or "drinks served in plastic," etc.

Split the students into groups and have each group brainstorm items in that category in a given amount of time- 30 seconds to three minutes.

At the end of every round, have groups share their lists. Each group gets points for each unique response they come up with.

Discuss how prevalent plastic is in society and explain that over 100 billion pounds of plastic was produced in 2013.

Show students the Estimated Life Span of Plastic Products to illustrate that once plastic is produced, it sticks around for a long time.

Procedures & Activities:

Examine different plastic products and look for the number on the bottom.

Divide students into groups of 2-4 people.

Provide students with the Plastic Number Chart and a variety of plastic items. The plastic recycling number on each product indicates the type of polymer and other chemicals in the plastic.

Ask students to sort their plastics by recycling number and then identify what polymers are used in what products.

Have them record this information in their science notebook.

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Then come together as a class to list the different products found for each category of plastic. Discuss how some types are more easily recycled while others are more difficult to recycle.

Also explain that some numbers of plastics contain or can accumulate toxins. Ask students to think about what this might mean for marine debris issues.

Have students work in their groups to hypothesize what types of plastics are most likely to become marine debris, writing their hypothesis in their science notebooks with an explanation of their reasoning. Have students consider how common each type of plastic is, where products of that type might be used, and how people dispose of them. For example, PETE (type #1) may be common in marine debris because many PETE products like soda bottles are used at the beach and on the water.

Present students with data from CoastWalk and have them determine if their hypothesis is supported or not supported by this data.

Wrap-Up:

Finally, brainstorm solutions to our plastic problem. Ask students to identify where we can cut down on plastic waste most easily (single use items).

Have each student identify one disposable plastic item they can cut back on or eliminate from their personal use.

Then, have students work in groups of 2-4 to develop an action plan to cut back on plastic pollution in their school or community.

Provide examples of successful efforts, such as plastic bag bans, plastic recycling, and reusable water bottles.

Give students the Plastic Pollution Action Plan Rubric so they are clear on the expectations.

Have students begin by identifying at least 3 sources of plastic waste in their school or community, and then give them 15-30 minutes to work as a group to create a draft action plan to minimize plastic waste from one of those sources.

Once all groups have developed an action plan, have groups present their ideas. Discuss the action plans as a class and decide on one to pursue.

Work as a class to revise the chosen action plan and implement it. Depending on the level of the class and the plan you choose, this may be a simple endeavor or may require further time both in and out of class.

Extensions & Lesson Connections:

Have students present or implement their action plan at the "Friends of the Sea Party" described in Unit 6.

Evaluation:

Observe student participation during group work. The successful sorting of plastic types can be used as a measure of cooperation and student understanding. Review student science notebook entries, including plastic type hypothesis. Evaluate these entries for completeness, effort, and understanding of the concepts. Use the Plastic Pollution Action Plan rubric to evaluate draft action plans and presentations.

