Polymer Properties

Teach 1	Names of student(s) teaching:
Teach date: Teach time: Teach length: 45 minutes	Title of lesson: Polymer Properties (Day 2) Source (Kit, Lesson, Page #):

Concept statement/Main idea:
Polymers have many different properties. Those properties depend on how its waste can be recycled.

Standards for the lesson:
Students should know the difference between monomers and polymers. Along with, how they are relevant to our daily lives.

Objectives	Evaluation
Write objectives in SWBAT form	Write at least one question to match the objective you listed or describe what you will look at to be sure that students can do this.
SWBAT **differentiate** polymers by property.	
SWBAT **label** each waste according to their polymer type.	
SWBAT **match** which recycling number corresponds to the correct waste.	

Engagement

Estimated time: 10 minutes

Description of activity:

What the teacher does	What the student does	Possible questions to ask students — think like a student and consider possible student responses
The teacher will ask the students the difference between polymers and monomers. The teacher will display a plastic bag, a bottle, and a Styrofoam cup and ask the students if all of these will be put into the same recycling bin. There can also be more objects displayed and each student can predict which objects go into the same recycling bins.	The students will define monomers and polymers in their own words. Students will discuss in small groups whether the items displayed go into the same recycling bin or not. Students will also state why they think they go to the same bin or not.	Will you place all these items in the same recycling bin? Why or why not? Answers will vary depending on the students. Have you seen different types of recycling bins? What were they? Metal cans, plastic bottles, and paper

Resources needed:

Models of different polymer types

Safety considerations:

Exploration

Estimated time: 15 minutes

Description of activity:

What the teacher does	What the student does	Possible questions to ask students — think like a student and consider possible student responses

Teach will pass out the same or various different objects that represent each different type of polymer. Then they will ask each group of students to describe each object using rigidity, floatability, opaque, polymer name, and application.	The students will observe each polymer and describe them.	What does rigidity mean? The inability to be bent or forced out of shape. What does opaque mean? Not being able to see through it.

Resources needed:
Worksheet/chart to describe each item.

Safety considerations:
Students should not horseplay with the objects.

Explanation

Estimated time: 20 minutes
Description of activity:

What the teacher does	What the student does	Possible questions to ask students — think like a student and consider possible student responses
Teacher will go over the polymer names, abbreviation, and its properties and ask the students to label each sample with the proper polymer.	Students will work together to properly label the polymers they have.	What are the differences you see between each object? Were there objects you thought would be grouped together but weren't? What do you notice about the objects that are very rigid and opaque? What about those that are not rigid and clear?

Resources needed:
Chart of the polymers' properties

Safety considerations:

Elaboration

Estimated time: 20 minutes
Description of activity:

What the teacher does	What the student does	Possible questions to ask students — think like a student and consider possible student responses
The teacher will pass out a card sort for the students to do (10 min). Then with the polymers the students have in each group, they will race to put them in proper cubbies with labels. Teachers should be monitoring the whole time!	Students will do a card sort that matches polymer properties and the type of recycling that goes with it. After getting the card sort checked, the students will place it back in the plastic bag. Students will have a race in putting their wastes in the appropriate bin.	

Resources needed:
Card sort WS
Bins with labels

Safety considerations:
Have the students fast walk. No running.

Evaluation

Estimated time:
Description of activity:

What the teacher does	What the student does	Possible questions to ask students — think like a student and consider possible student responses

Resources needed:

Evaluation Quiz

Safety considerations:

Material Acronym Polymer Name	Plastic ID Code	Examples of Products
PET Polyethylene Terephthalate		Soft drink and water bottle packaging
HDPE High Density Polyethylene		Ice cream containers, detergent bottles, plastic shopping bag
PVC Polyvinyl Chloride		Pipes, garden hoses
LDPE Low Density Polyethylene		Plastic Food wrap
PP Polypropylene		Lunch boxes, microwave containers, straws
PS Polystyrene		Plastic cutlery, plastic glassware

Soft drink and water bottle packaging
Ice cream containers, detergent bottles, plastic shopping bag
Pipes, garden hoses
Plastic Food wrap
Lunch boxes, microwave containers, straws
Plastic cutlery, plastic glassware

Name: _____

Evaluation

1. What are the three properties that determine the polymer type?
    a. Size, malleability, weight
    b. Rigidity, floatability, opaque
    c. Color, brittleness, luster

2. If an object has high rigidity, can float, and is opaque, which polymer is it?
    a. PETE
    b. PVC
    c. PS
    d. PP

3. What are the advantages and the purpose of separating recyclable wastes? Why do we have to separate them?

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3. What are the advantages and the purpose of separating recyclable wastes? Why do we have to separate them?

The purpose of separating the recyclable wastes is because they have different properties which may lead to being decomposed in different manners. So by categorizing recyclable wastes through properties, it allows materials to be decomposed easier.