

What is Plastic Made From?

Student worksheet—*Answer key*

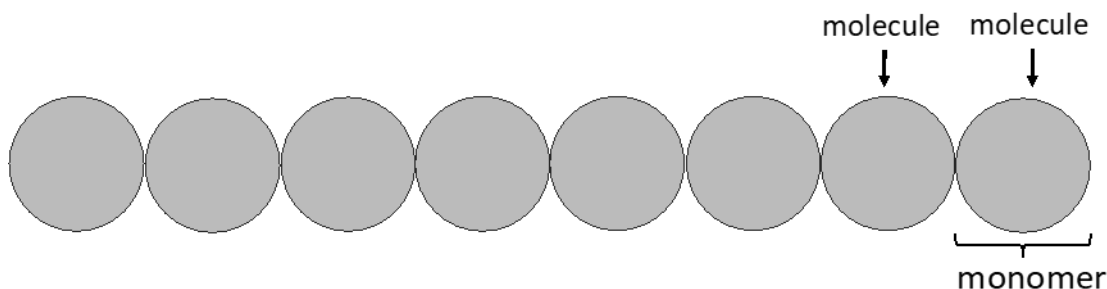
Word Bank

Chain	Cross-linking	Natural polymer	Polymerization
Chemical reaction	Molecule	Plastic	Synthetic polymer
	Monomer	Polymer	

1. Before the experiment

- a. Describe in your own words what a polymer is. Use some words from the word bank when writing your answer. Make a diagram of a polymer to accompany your description.

Polymers are produced by polymerization reactions and are very large molecules that consist of many repeating molecular subunits called monomers.



2. During the experiment

- a. Describe the properties of your reactants.

Milk:

White, odorless, liquid, ...

Vinegar:

Acidic, clear, fluid, sour taste and smell, ...

What is Plastic Made From?

Page 2

Student worksheet — *Answer key*

- b. What happened when you added the vinegar to the hot milk? Write down your observations.

After adding the vinegar to the hot milk, solid white chunks became visible in the reaction mixture. The remaining liquid looks yellow.

- c. How does the product of your reaction, the curd, feel? Did its consistency change over time while kneading? Write down your observations.

The curd first feels soft, wet, and crumbly. During kneading, the curd becomes smoother, less crumbly, and feels more like playdough. The curd can be shaped and molded into different shapes.

- d. What does your final casein-plastic object look like? Describe some of its properties below.

The final casein-plastic object is solid, feels smooth, and has a certain shape and color (the original color is white, like milk, but can be changed with food coloring). It might still smell like vinegar. (Student answers might vary depending on the plastic object they created.)

- e. Look at your answers for 2a and 2d. How did the properties of milk and vinegar—your starting materials for the plastic production—change during the polymerization reaction?

The biggest change is that the liquid reactants (milk and vinegar) turned into a solid that could be molded into different shapes. The color of the original casein plastic is white like milk and the casein plastic still has a faint sour smell from the vinegar.

What is Plastic Made From?

Page 3

Student worksheet — *Answer key*

3. After the experiment

- a. In three to five sentences, write down how you think the invention of plastic has changed the world.

Student answers will vary.

- b. How could the negative impacts of plastic be reduced? List at least three ideas.

Student answers will vary.