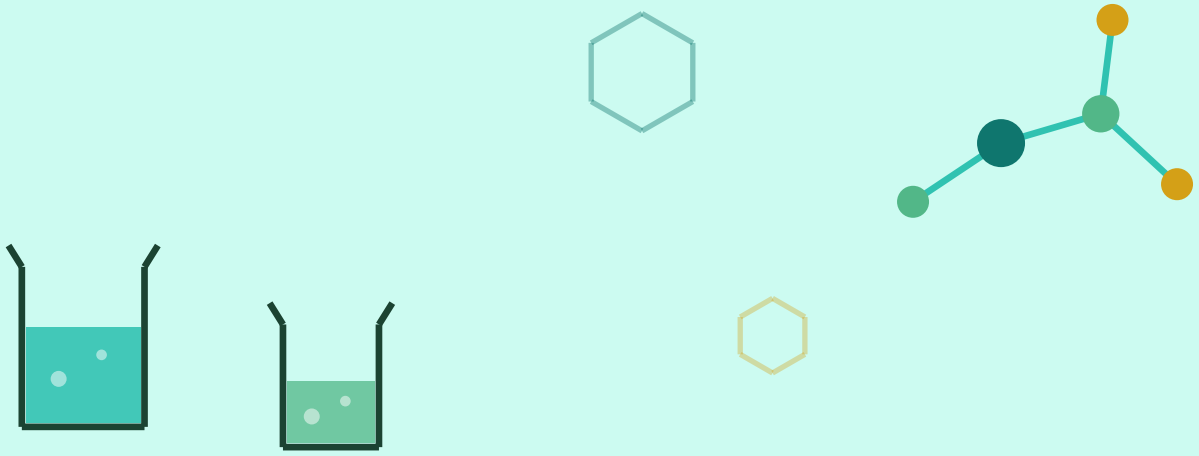

HIGH SCHOOL · GRADES 9–12 · AGES 14–18

Lab Activity: Bioplastic Properties

Comparing PHA Bioplastic to Conventional Plastic

In this hands-on lab, students compare physical and degradation properties of a PHA compostable sample against a conventional petroleum-based plastic sample, recording observations and drawing evidence-based conclusions.

LEARNING OBJECTIVE

Students will observe, measure, and compare material properties to evaluate claims about biodegradability using the scientific method.

MATERIALS NEEDED

- PHA compostable sample (cup, straw, or utensil)
- Conventional plastic sample (matching item)
- Water container & warm water
- Digital or kitchen scale
- Ruler or calipers
- Magnifying glass (optional)
- Lab notebook or data sheet

SAFETY NOTES

- Use only warm, not hot, water for soak tests
- Wear safety glasses when cutting or scoring samples
- Wash hands after handling samples
- Dispose of samples per teacher instructions
- Do not taste or ingest any materials

FOLLOW EACH STEP IN ORDER

Procedure

1

Baseline Measurements

Weigh and measure the length, width, and thickness of both samples. Record initial mass and dimensions in the data table on the next page.

2

Flexibility Test

Gently bend each sample to a 45-degree angle and release. Record whether it returns to shape, cracks, or holds the bend.

3

Water Soak Test

Submerge each sample in warm water for 15 minutes. Observe and record any softening, swelling, or surface changes.

4

Post-Soak Measurements

Re-weigh and re-measure each sample after soaking. Calculate the percent change in mass for each material.

5

Visual Inspection

Use a magnifying glass to examine surface texture before and after soaking. Sketch or describe observed differences.

RECORD YOUR OBSERVATIONS

Data Table & Analysis

DATA TABLE

PROPERTY	PHA SAMPLE	PLASTIC SAMPLE
Initial Mass (g)		
Post-Soak Mass (g)		
% Mass Change		
Initial Thickness (mm)		
Flexibility (returns / cracks)		
Surface Change After Soak		

ANALYSIS QUESTIONS

1. Which sample showed a greater change in mass after soaking? What does this suggest about water absorption?

2. Based on your flexibility test, which material would be more likely to break during shipping or use?

3. Do your results support the claim that PHA bioplastics behave differently in water than conventional plastic? Explain using your data.

4. How might industrial composting conditions (heat, microbes, time) produce different results than this classroom test?