Enzyme Action Lab

Summary

Students use enzyme solutions to observe the effects of enzymes on different types of food.

Time Frame

2 class periods of 60 minutes each

Group Size

Small Groups

Materials

- student page

(attached)

3 test tubes

beaker or test tube racks

foods (proteins such as egg white, carbohydrates such as hard candy and potato, fats such as butter) The foods should be firm and not dissolve easily in water.

water

acid

4 enzyme solutions (pepsin, invertase, amylase, and pancreatin) stoppers

Background for Teachers

Time Needed:

one 50 minute period for set-up, one 50 minute period for follow up observations and conclusions. <u>Background knowledge:</u>

This experiment can be done with any enzymes available, including those found in contact lens cleaning packets or meat tenderizer. If commercially available enzymes are used, you may select any that you wish to use. The enzymes listed below would "digest" a variety of foods:

Pancreatin: a mixture of the fat dissolving enzyme, lipase, the protein enzymes such as protease, and those that break down carbohydrates like amylase. The enzymes in pancreatin may come from pork or beef. Pancreatic enzymes are not standardized, and contain a variety of enzymes, including trypsin, chymotrypsin, lipase, amylase, colipase, and ribonuclease. Amylase: converts starch to sugar.

Pepsin: The predominant stomach enzyme is pepsin which breaks down proteins into short chains of amino acids which can be used by the body.

Invertase: breaks down sugar

It is important to discuss with students the differences between enzymes in a living organism and enzymes in a test tube. The action of enzymes often relies on other substances and complex reactions that cannot be mimicked in a test tube.

Identify what will qualify as "digestion" in the test tubes. Foods that dissolve or soften in water need to be avoided so that the breakdown of the foods by enzymes is more clear.

Instructional Procedures

Students watch as the teacher sets up the control for this experiment. Other instructions are on the student page (attached).

Assessment Plan Scoring Guide:

1.	Students perform experiment and collect data	4
2.	Students correctly analyze data	4
3.	Students make thoughtful conclusion	4

Bibliography

Lesson Design by Jordan School District Teachers and Staff.

Authors

Utah LessonPlans