

Pre-Lab, Skills, and Standards Alignments

ENZYMATIC FOOD PRODUCTION

Students will use enzymes to produce cheese and juice, demonstrating how biological catalysts can increase production in food industries. They will also observe enzyme-substrate specificity, and quantify how efficiently enzymes speed up chemical reactions.

Lab Length: 1 hour

Suggested Pre-Lab Teaching

- Central Dogma (genes to proteins)
- Enzyme Function

Lab Skills

- Conduct an investigation following a multi-step protocol.
- Observe enzymes acting as catalysts of chemical reactions.
- Measure small volumes of liquid using transfer pipets, and graduated cylinders.
- Collect data to compare control and experimental results.

Conceptual Knowledge/Skills

- Describe the structure and function relationship between enzymes and their substrates.
- Use lab result data to draw conclusions about factors that affect enzyme efficiency and function.

New York State Science Learning Standards/NGSS

Science and Engineering Practices	Disciplinary Core Ideas	Cross Cutting Concepts
<p><u>Analyzing and Interpreting Data</u> Analyze and interpret data to determine similarities and differences in findings.</p> <p><u>Constructing Explanations and Designing Solutions</u> Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.</p>	<p><u>PS1.B: Chemical Reactions</u> Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different particles and these new substances have different properties from those of the reactants. (MS-PS1-2)</p>	<p><u>Patterns</u> Macroscopic patterns are related to the nature of microscopic and atomic level structure.</p> <p><u>Cause and Effect</u> Cause and effect relationships may be used to predict phenomena in natural or designed systems.</p> <p><u>Influence of Science, Engineering, and Technology on Society and the Natural World</u> The use of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions.</p>