ThINQ!™ Biofuel Enzyme Reactions Kit

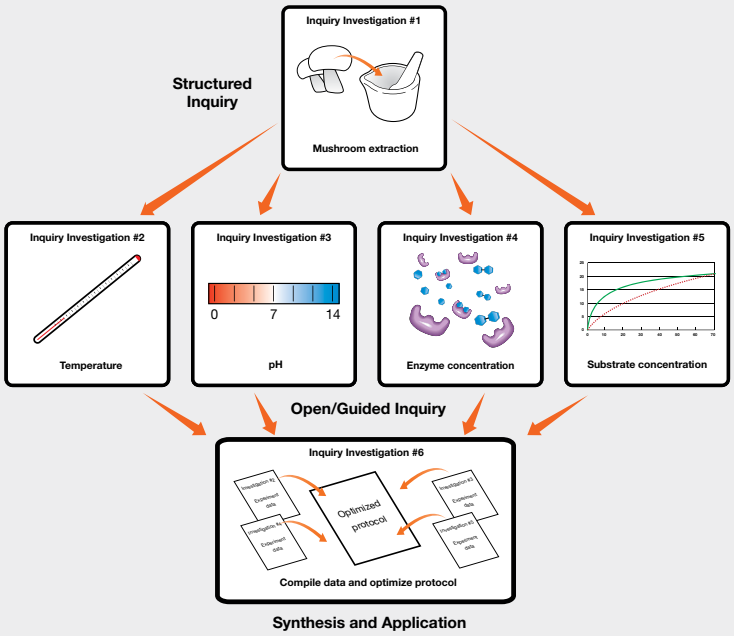
Meet AP Biology Learning Objectives with Our ThINQ! Investigations

The ThINQ! Biofuel Enzyme Reactions Kit (17001235EDU) includes pre-lab questions, six inquiry investigations, post-lab questions, and a science case study that align with AP Biology Big Ideas 2 and 4. The Instructor's Guide provides support for different levels of inquiry (structured, guided, and open) for each of the investigations.

The table on the reverse side lists the AP Biology Learning Objectives (LOs), Essential Knowledge (EK), and Science Practices (SP) that are met by activities in the ThINQ! Biofuel Enzyme Reactions Kit and provides specific details on how these activities align with the AP LOs. Visit **bio-rad.com/docs/biofuelAP** for more information.

The ThINQ! Biofuel Enzyme Reactions Kit includes the content and materials for eight workstations to complete the following activities:

- **Pre-Lab Activity:** Modeling Enzymatic Reactions
- **Investigation 1:** Compare Cellobiase Activity of Mushroom Extracts
- **Investigation 2:** Determine the Effect of Temperature on the Reaction Rate
- **Investigation 3:** Determine the Effect of pH on the Reaction Rate
- **Investigation 4:** Determine the Effect of Enzyme Concentration on the Reaction Rate
- **Investigation 5:** Determine the Effect of Substrate Concentration on the Reaction Rate
- **Investigation 6:** Combine Results and Test an Optimized Protocol
- **Science Case Study:** Could Washing Your Pills Down with Juice Be Bad Medicine?



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AP Curriculum	ThINQ! Biofuel Kit Alignment with AP LOs	Pre-Lab Q's	Investigations 1	2	3	4	5	6	Post-Lab Q's	Science Case Study
Big Idea 2: *Biological systems utilize free energy and molecular building blocks to grow, to reproduce, and to maintain dynamic homeostasis.*		✓	✓	✓	✓	✓	✓	✓	✓	✓
LO 2.4 The student is able to use representations to pose scientific questions about what mechanisms and structural features allow organisms to capture, store, and use free energy. **[EK 2.A.2 & SP 1.4, 3.1]**	*Students generate models to explore how enzymes reduce the activation energy required to generate product(s) from a substrate.*	✓	✓	✓	✓	✓	✓	✓		
LO 2.22 The student is able to refine scientific models and questions about the effect of complex biotic and abiotic interactions on all biological systems, from cells and organisms to populations, communities, and ecosystems. **[EK 2.D.1 & SP 1.3, 3.2]**	*Students refine their models of enzyme activity based on the results of their experiments.*		✓	✓	✓	✓	✓	✓		
LO 2.23 The student is able to design a plan for collecting data to show that all biological systems (cells, organisms, populations, communities, and ecosystems) are affected by complex biotic and abiotic interactions. **[EK 2.D.1 & SP 4.2, 7.2]**	*Students generate protocols for investigating enzyme function.*		✓	✓	✓	✓	✓	✓	✓	✓
Big Idea 4: *Biological systems interact, and these systems and their interactions possess complex properties.*		✓	✓	✓	✓	✓	✓	✓	✓	✓
LO 4.3 The student is able to use models to predict and justify that changes in the subcomponents of a biological polymer affect the functionality of the molecule. **[EK 4.A.1 & SP 6.1, 6.4]**	*Students analyze data and generate models that explain the relationship between enzyme structure and function.*	✓	✓	✓	✓	✓	✓	✓	✓	✓
LO 4.5 The student is able to construct explanations based on scientific evidence as to how interactions of subcellular structures provide essential functions. **[EK 4.A.2 & SP 6.2]**	*Students generate explanations about enzyme function based on data collected during investigations.*	✓	✓	✓	✓	✓	✓	✓	✓	✓
LO 4.14 The student is able to apply mathematical routines to quantities that describe interactions among living systems and their environment, which result in the movement of matter and energy. **[EK 4.A.6 & SP 2.2]**	*Students calculate the rate of enzyme reactions during each investigation and relate rate to functionality.*		✓	✓	✓	✓	✓	✓		
LO 4.17 The student is able to analyze data to identify how molecular interactions affect structure and function. **[EK 4.B.1 & SP 5.1]**	*Students analyze data to explain the interaction between enzyme molecules and substrate to produce product.*		✓	✓	✓	✓	✓	✓	✓	✓