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Blended Learning for AP* Biology

National NSTA Convention
Los Angeles

Presented by
Meg Griffith

What is Blended Learning?

Content via technology and feedback via instructor.

"Of mixed method courses that *added instruction* during application of content to traditional courses, 77% reported improved learning outcomes."

–Margulieux et al, 2015

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Why Blend?

Higher level of student engagement in the classroom.

"Successful blended courses have higher rates of student-to-student and instructor-to-student interactions."

– Aycock et al, 2002

How?

Prepare students with relevant background knowledge

FLINN PREP™

Provide feedb tive learning

POGIL™

FLINNPREP™

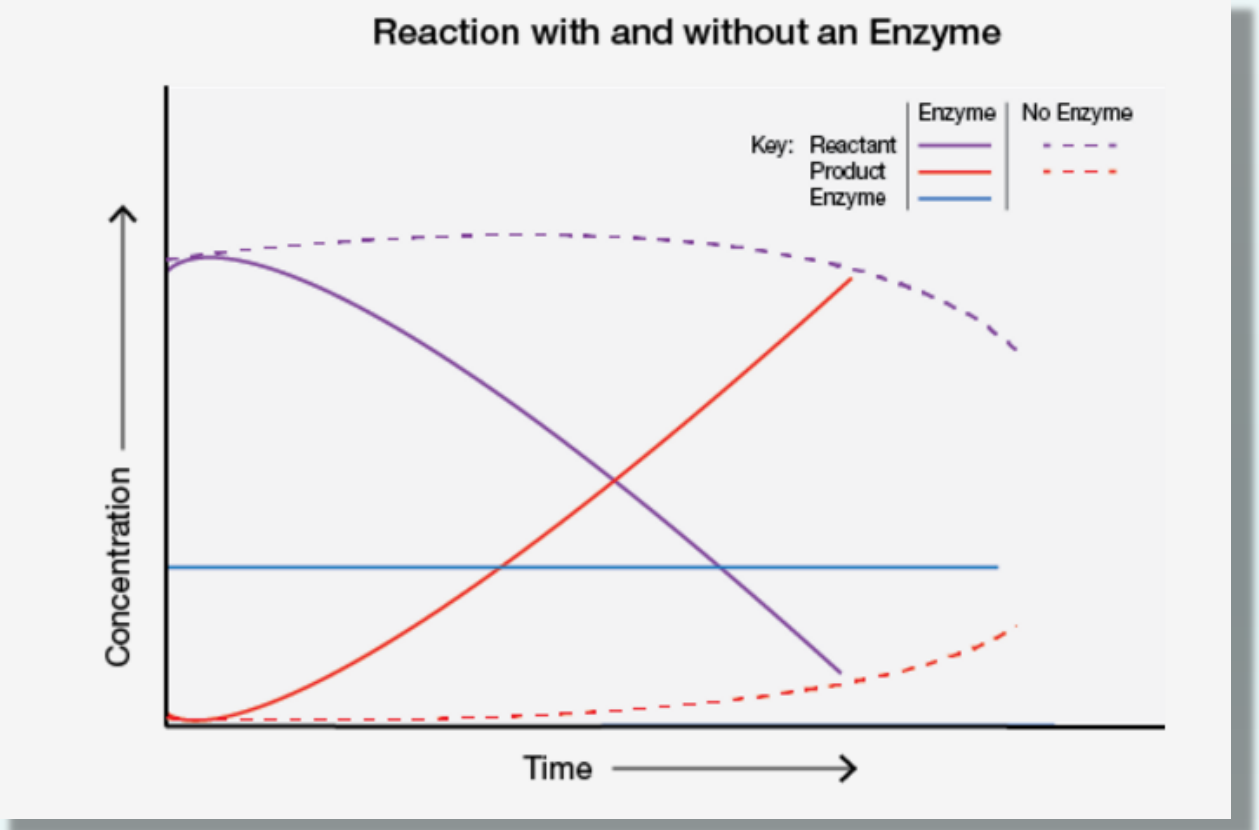
Interactive web-based content to engage students in review and practice, freeing up valuable classroom time.

Assign before lab to build background

FLINNPREP™

Enzyme Structure and Function

Enzymes are proteins that are important to the survival of all organisms. They are biological catalysts that decrease the energy required for a spontaneous reaction to occur. Enzymes are necessary for both breaking down polymers into monomers and assembling polymers from monomers. Watch the video to see how enzymes work.



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After reviewing content, introduce an inquiry-based lab activity or demonstration activity.

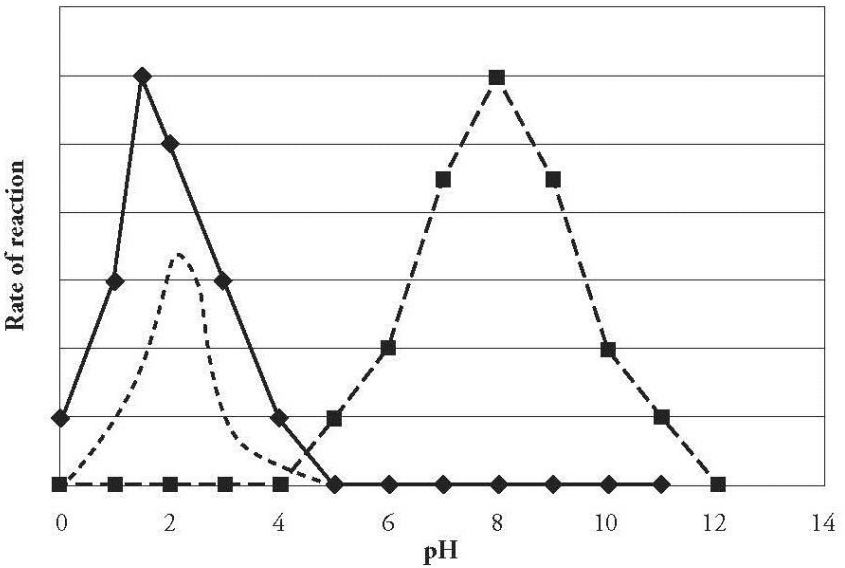
Lactose Intolerance Lab Activity

Materials: 1 sucrose packet, 3 cups, lactose powder added to 2 of the cups, ½ lactase tablet, 1 packet of yeast, 3 tests tubes with caps, very warm water

- Smash ½ lactase tablet inside the bag then add to one cup with lactose.
- Empty sucrose packet into the empty cup.
- Add yeast – about ½ tsp – to each cup and mix.
- Fill three test tubes, 2/3 full with warm water.
- Add contents of each cup to each test tube.
- Screw on each cap and shake each test tube to dissolve yeast and sugar.
- Remove the caps.
- Place balloon over each test tube.

While the lab proceeds, let's look at using POGIL to build understanding

- Process Oriented Guided-Inquiry Learning
- Uses models to build understanding
- POGIL Enzymes and Cellular Regulation



1. Name the two enzymes illustrated in Model 1.

   Pepsin and lipase.

2. Consider the information provided in the *Why?* box and in Model 1 about these proteins.

   a. In which body organ is pepsin active?

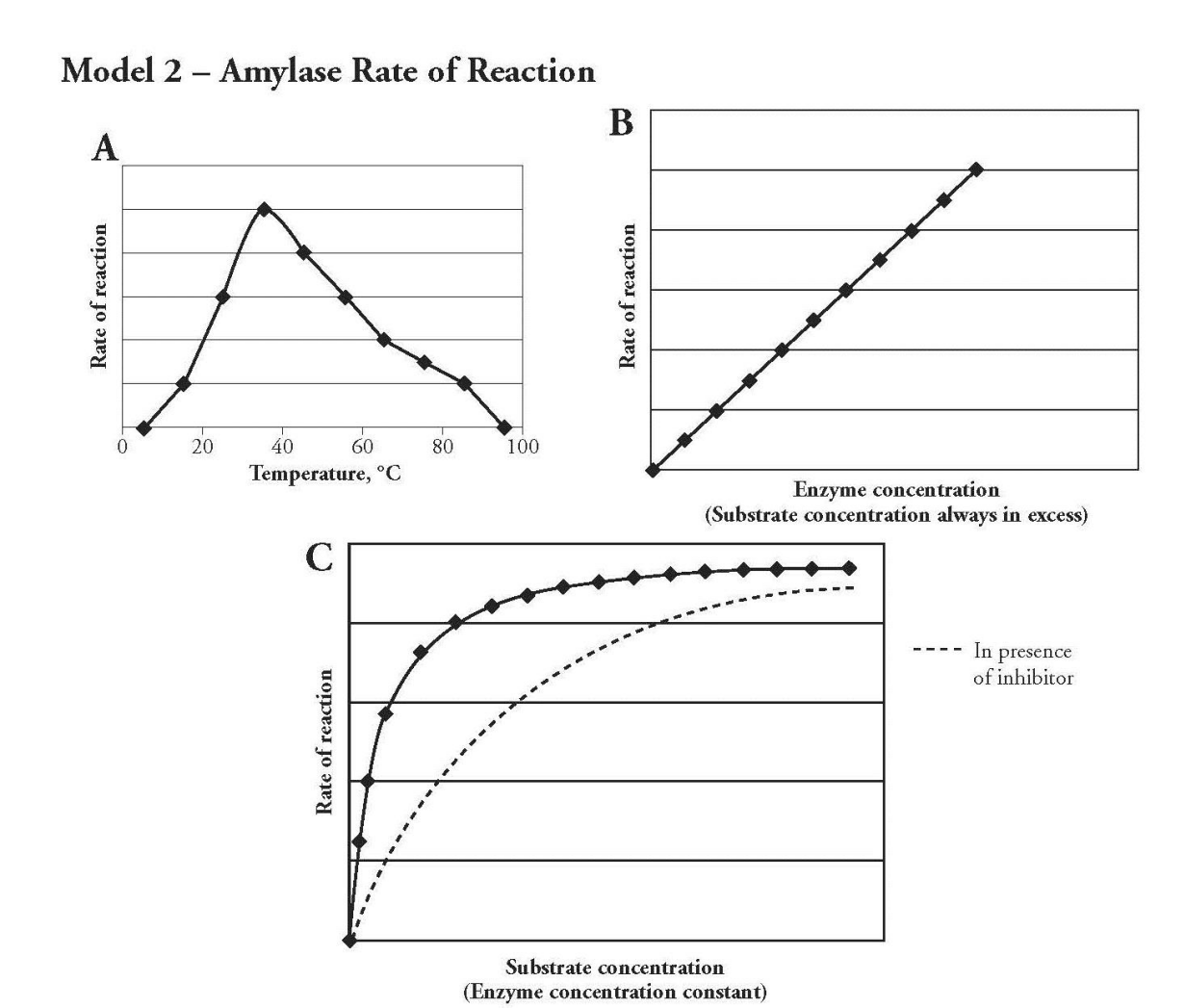
   The stomach.

   b. In which body organ is pancreatic lipase active?

   The small intestine.

Apply content from FlinnPREP and engage in active student-to-student learning

POGIL™



Apply POGIL concepts to Inquiry Labs

Why Choose FLINNPREP™?

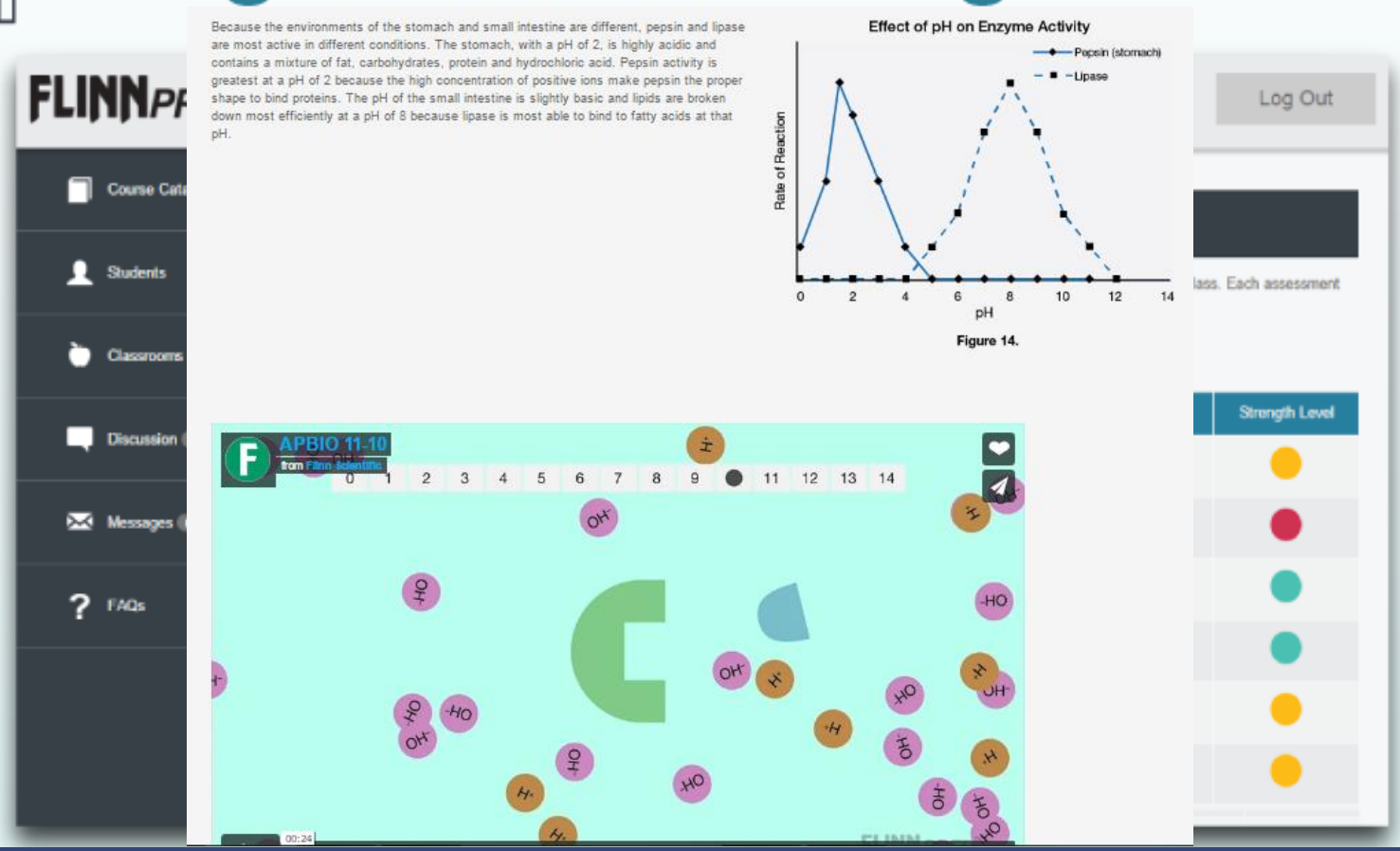
FLINNPREP™ helps teachers personalize learning and empowers students with anytime, anywhere access to...

Full Length Practice Exams

Interactive Learning

Reteach Videos

Progress Monitoring



Free teacher account to access all the content.

Year-Round Learning

- Review foundational topics during summer or before unit content.
- Supplemental AP* level content optimized for blended classrooms.

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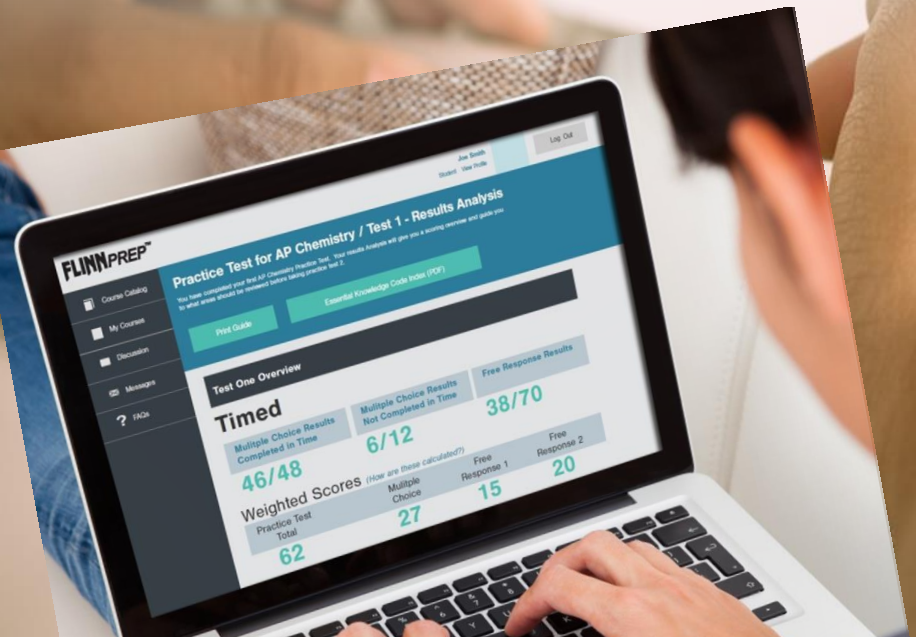
Students need more practice with the types of questions on the AP level tests

We designed 2 full-length practice tests that replicate the AP Exam



Drag and Drop

Chromosomes line up by homologous pairs	
Each pair of homologous chromosomes separates towards its respective pole	
Homologous chromosomes pair and exchange segments of DNA	

Prophase I

Metaphase I

Anaphase I

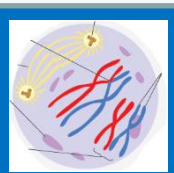
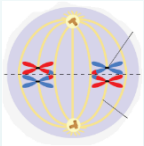
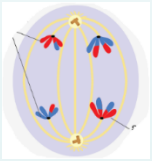
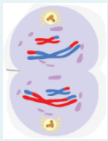
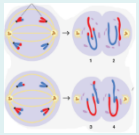
Cytokinesis I

Drag and Drop

Chromosomes line up by homologous pairs	→	Cytokinesis I ✗
Each pair of homologous chromosomes separates towards its respective pole	→	Anaphase I ✓
Homologous chromosomes pair and exchange segments of DNA	→	Prophase I ✓

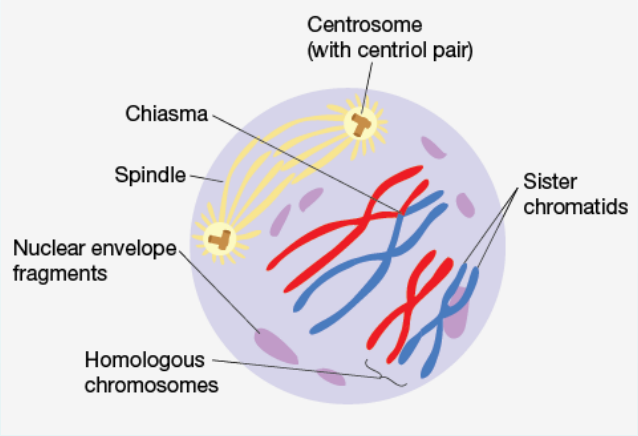
Metaphase I

Click-through explanation

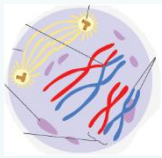
Click each thumbnail to know the stages of Meiosis.

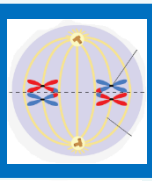
Prophase I

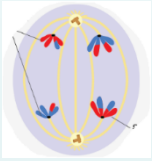


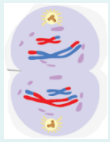
Homologous chromosomes pair and exchange segments of DNA. Paired homologs become physically attached to each other by a protein structure called the synaptonemal complex. This state is known as synapsis. Crossing over is the exchange of corresponding segments of DNA between nonsister chromatids. The site of the crossover is known as the chiasma.

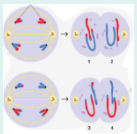
Click-through explanation





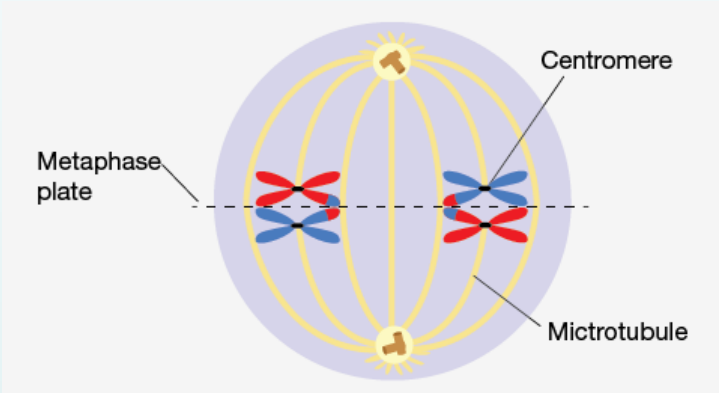






Click each thumbnail to know the stages of Meiosis.

Metaphase I



Chromosomes line up by homologous pairs on the metaphase plate.

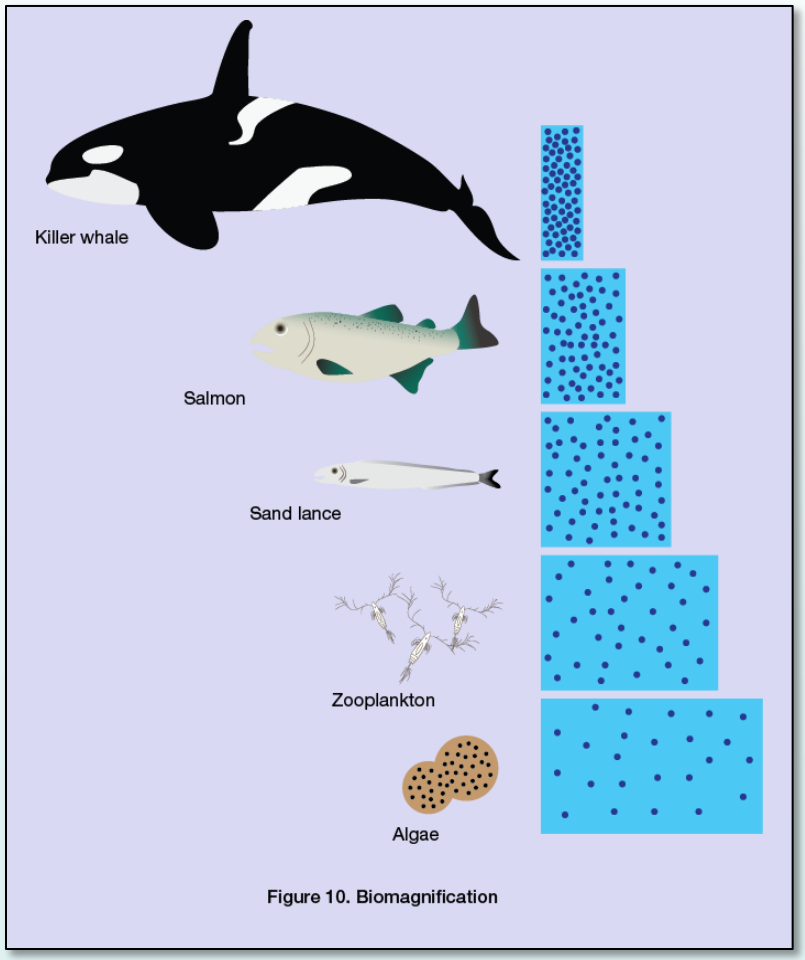


Figure 10. Biomagnification

Foundational Content

- Fundamentals of Biology
- Cell Structure and Function
- Genetics
- Evolution
- Ecology

Advanced Content

- Biochemistry
- Energy and Metabolism
- Organismal Regulation
- Gene Reg and Cell Communication
- Immune Response

Lactose Intolerance Lab Activity

- Model organism (SP 1)
  - Yeast
- Connecting Big Ideas
  - Enzymes (BI 4)
  - Respiration (BI 2)
- Introduction to inquiry
  - Sugar metabolism
  - Yeast evolution

Lactose Intolerance Lab Activity

- Interactions between molecules affect structure and Function (EK 4.B.1)
- Change in function of an enzyme can be interpreted from data. (EK 4.B.1.d, LO 4.17)
- Growth, reproduction, and maintenance of the organization of living systems requires free energy and *matter*. (EU 2.A.)
  - The type of matter matters!

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Questions? Call, chat or email! We would love to hear from you!

800-452-1261

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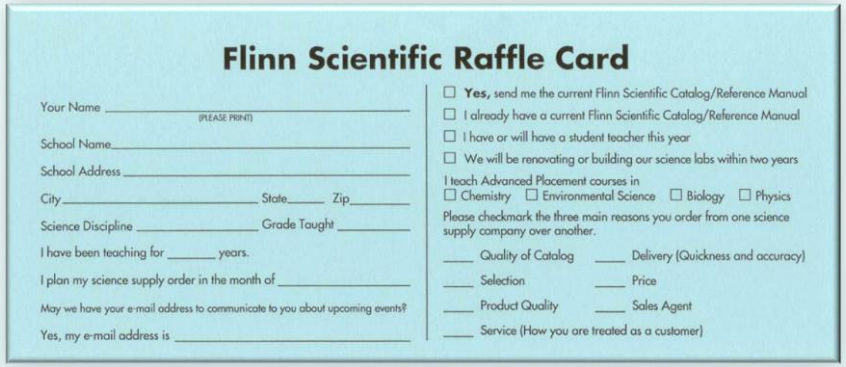

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