

# RET: Molecular Biology



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# Our Goal



- **To evaluate pre-packaged kits we might want to use in the classroom**
  - Are they cost effective?
  - Are they engaging?
  - Do they work?
  - How can they be modified?

# Our Strategy



- To work through the kits as a group
- To evaluate each kit
- To determine if it would fit into the curriculum
- To create modifications as needed

# Food Chemistry

**WARD'S**  
**\$129.95**



# Food Chemistry



- **Purpose:** To show what macromolecules are in any given food.
- Each macromolecule test is completed for each food given using multiple test tubes.
- Student test it, and graph the results to then distinguish what food they were given.

# Evaluation



- **Potassium Iodine did not work.**
  - Seems that the concentration of iodine needs to be increased.
- **Can label the test tubes to keep the contents a mystery.**
- **Can give unknowns for more inquiry based.**
  - Even add in computer lab time, and presentation opportunities.

# Microbiology



**FREY**  
**\$105.95**



# Microbiology



- **Purpose:** For the students to easily view common micro-organisms that live all around us.
- **Looking at micro-organisms in many different forms and mediums to see the growth pattern and why they are important to the environment.**



# Evaluation



- Tomato fungi was a great visual.
- Yeast was less than desired.
- Soil sample was a great use of dye in the lab.
  - Would have them view without the dye then with the dye to see how it changes was you see.
- Pond water was a great visual on living organisms in traditional pond water.
- Petri dish with agar is a great way to introduce traditional bacteria growth in the lab.

# Edvotek Kits



- **What is an Epidemic and How Does an Infection Spread?**
- **\$49**
- **AIDS: Clinical Screening for the Detection of HIV by ELISA**
- **\$99**



# Purpose



**To understand how one individual may spread an infection to many others**

- **To introduce students to the experimental concepts and methodology used in the ELISA screening process**
- **To reinforce the concept of antigen/antibody reactions**

# Evaluation



- **Infection Kit – great activity to introduce the immune system**
  - Simple and easily reproducible with other materials
  - Modification – students need to discern “patient zero”
  - Appropriate to use with any class – Health, Biology or Anatomy
- **ELISA Kit – background information is a good review for genetics**
  - Lab is somewhat complicated and there are several 15 minute incubation times
  - I would use this with an advanced class such as Anatomy or AP Biology

# Inquiries in Science: Synthesizing Macromolecules



- \$ 99.95
- Refill - \$10.95
- Materials for ten groups



# Purpose



- **To introduce students to the four types of macromolecules essential for life**
  - Carbohydrates
  - Lipids
  - Nucleic acids
  - proteins
- **To explore the activity of the enzyme catalase**
- **To allow students to create their own experiment to test what affects the efficiency of catalase**

# Evaluation



- Kit is reusable but the parts are very small
- Kit includes student pages for seven different activities
- Activities may be clustered or used individually
- Some instructions are confusing – may need to rewrite



# What Influences Enzyme Activity?

## Ward's Natural Science

- Students will investigate the activity of the enzyme diastase, and examine the effects of enzyme concentration, temperature, and pH on the ability of diastase to digest starch.
- Lab involves a series of four activities.

• \$56.95





# Lab activities and evaluations



- **Activity 1- Involved testing enzyme activity based on concentration**
  - Worked well once we diluted the iodine solution. Showed that the higher the concentration of enzyme present, the quicker the reaction occurs.
- **Activity 2- Involved testing enzyme activity based on pH**
  - Worked well showing that a pH closer to living organisms is the best for enzyme activity.

# Evaluation Continued



- **Activity 3 – The effects of temperature on enzyme activity**
  - This one worked very well comparing various temperatures and showing that a temperature close to body temperature worked the best with enzyme activity.
- **Activity 4 – Tests for glucose and starch**
  - This activity should have been done first rather than last. The glucose test strips sent with the test did not work, but having fresh glucose strips would have made this one a good introductory activity to show how the enzyme works in converting starch into glucose.

# Organelles Lab Activity



- **Ward's Natural Science**
- **\$67.00**



# Purpose



- To observe organelles in plant cells
- To simulate the function of an organelle and the selective permeability of an organelle membrane
- With the help of Janus Green B stain, to observe an organelle (mitochondrion) in action

# The Only Impressive Activity- dialysis/potato




- Dialysis tubing was filled with a potato 'slushie' and placed in hydrogen peroxide.
- Two enzymatic reactions occurred causing the release of oxygen into the tubing (expanding it) while at the same time causing a secondary reaction that will change the color of the melanin dark brown.



- This worked great. Not only did the dialysis tubing expand when oxygen was generated, but it also changed color showing the secondary reaction.

# Molecules and Cells Themed Kits



 Food Chemistry - modify lab handout

 Microbiology- can complete without the kit

 How Does Infection Spread - with simple modification 

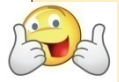
 Screening for HIV Using ELISA – too expensive

 Synthesizing Macromolecules

 Organelles

 What Influences Enzyme Activity

# Other Kits/ Demos



**Glowing Firefly –a darker classroom will help**

- **Dancing Gummy Bear – not a kit but very cool**



**Mitosis**