Amoeba Sisters Video Recap: *Enzymes*

1. In the box below, please illustrate an enzyme and substrate. Label the following key words in your illustration: **enzyme**, **substrate**, and **active site**.

2. Enzymes are typically which type of **biomolecule**?

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3. Describe the effects that enzymes can have on **substrates**.

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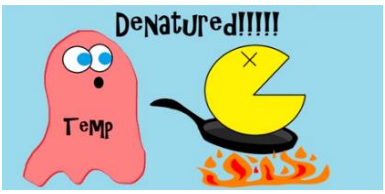
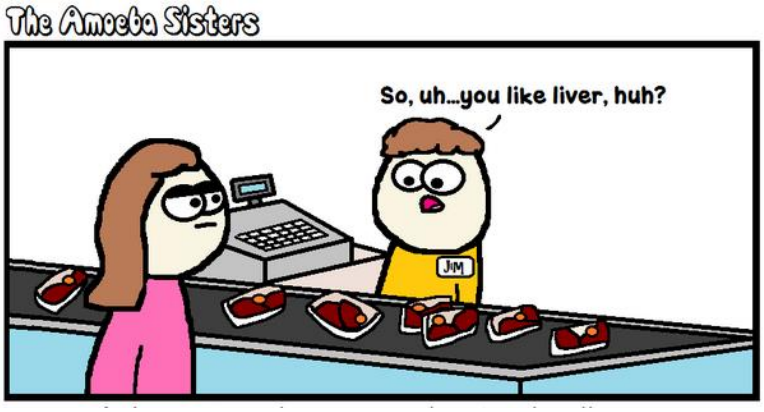
In order to function efficiently, enzymes need to be at an ideal **pH** and **temperature**. Different enzymes have different ideal pH and temperature conditions. If the pH or temperature is extreme for a particular enzyme, it can even **denature** an enzyme, which can prevent it from binding and acting on its substrate. For the following two scenarios, name the variable (temperature or pH) that is affecting the function of the enzyme.



A) ATP is produced by cellular respiration in your human body cells. There are a variety of enzymes that work to produce ATP, but one of those enzymes is called phosphofructokinase-1. This enzyme is sensitive to blood acidity. Blood can become more acidic if a patient is in respiratory distress.

4. **Variable affecting enzyme function:** _____

B) A popular lab that can be performed by students is to test the reaction rate of catalase enzyme when it acts on the substrate hydrogen peroxide. Catalase has the ability to break down hydrogen peroxide. Catalase can be found in beef liver from the grocery store! However, if the beef liver is boiled first, the catalase will not be able to break down hydrogen peroxide.



5. **Variable affecting enzyme function:** _____

Real Life Enzyme Scenarios

Please fill in the chart for every real life scenario listed below. Some boxes have been filled in for you!

Scenario	 **Identify Enzyme:**	 **Identify Substrate:**	**Illustrate the Scenario (label <u>enzyme</u> and <u>substrate</u> in illustration):**	**Describe the relationship between the substrate and enzyme in the scenario.**
Lactase is an enzyme that breaks down a sugar found in dairy products known as lactose. Some people are lactose intolerant, and this can be due to not having enough lactase production. People who are lactose intolerant may not feel well after eating foods containing lactose.	6.	lactose	7.	8.
An enzyme called glucocerebrosidase breaks down a glycolipid in the body known as glucocerebroside. However, in a genetic disease known as Gaucher's disease, the body does not produce enough glucocerebrosidase. Therefore glucocerebroside can build up in the body and this can cause serious side effects such as anemia and swelling of the liver and spleen.	9.	10.	11.	12.
Pancreatitis is an inflammation of the pancreas which can damage pancreatic tissue. The pancreas produces digestive enzymes such as amylase and lipase. These enzymes assist in breaking down certain food biomolecules. In this disorder, enzyme production from pancreatic tissue may be stopped.	13.	14.	15.	Since the pancreatic tissue can be damaged in this disorder, the production of the enzymes in this tissue (amylase and lipase) may be disrupted as well. This would affect the ability to break down certain types of food biomolecules (substrate).