***Mix it Up & Squeeze***

**Overview:**

You will make a model of the digestive system that demonstrates mechanical and chemical digestion. This lesson can be used to teach health, nutrition, food or life science topics.

**Specific Expectations:**

**Objectives:**

The students will be able to:

* Describe the parts of the digestive system.
* Construct a model of the parts of the digestive system to illustrate how mechanical and chemical digestion takes place.
* Explain how food moves through the digestive system.
* Discuss how food moves through the digestive system.
* Make observations and perform an experiment on the process of digestion.

**Materials:**

1. Sandwich Size Sliding Lock Bag- (1) for each student
2. Crackers or a piece of white bread
3. Orange Juice, Vinegar or Cola
4. Rolled Paper Towel
5. Scissors
6. Lab journal
7. Bowl to catch waste
8. Newspaper to spread out on the desk or lab table
9. Reproducible diagram of the digestive system

**Procedure:**

1. Pour juice, vinegar or cola about 1-2 tablespoons into the sandwich bag.
2. Add pieces of cracker or bread into the sandwich bag and zip close. Don’t let too much air into bag.
3. Observe what is happening to the food inside the stomach. **(Simulates chemical digestion.)** Write down your findings or observations.
4. Place the sandwich bag in your hands and squeeze **(Simulates mechanical digestion- stomach contractions).** Write down your findings or observations.
5. Spread newspaper across desk or lab table. This may get messy.

6. Using your scissors, snip a corner off of the sandwich bag.

7. Take a paper towel and roll it up. Leave an opening large enough to place the corner of the sandwich bag inside of the opening.

8. Squeeze the materials out of the sandwich bag and observe what is happening. **(Simulates movement of food from stomach to the small intestine.)**

\**The liquid is being absorbed by paper towel, just as nutrients would be absorbed by the small intestine. The solid is being passed out through the towel, just as solids are excreted by the digestive system. Note that the large intestine also absorbs some water and vitamins.*

**Reproducible Materials:**

The Process of Digestion

**Assessment:**

Participation in a hands-on inquiry based lesson.

Written observations made in the journal.

**Extensions**:

Students may research various illnesses associated with the digestive system.

Discuss why athletes do not compete on a stomach full of food.

Review your body systems via gross and cool things that your body does (e.g., burps, gas, ear wax, etc.). at http://yucky.discovery.com/flash/body/

**References**:

http://www.innerbody.com/htm/body.html

http://www.tvdsb.on.ca/westmin/science/sbi3a1/digest/digdiag.htm

http://health.discovery.com/centers/digestive/digestion.html

http://mconn.doe.state.la.us/getFile.php?lesson\_id=979&dlfilename=The+Process+of+Digestion.doc

http://yucky.discovery.com/flash/body/

#### **The Process of Digestion**

1. **Mouth, teeth, and tongue.** The teeth crush food and the tongue pushes the food to the back for swallowing.
2. **Salivary glands.** Release the enzyme *ptyalin*, which changes starches into sugars.
3. **Esophagus.** Carries food down into stomach.
4. **Stomach.** Churns and mixes food with gastric juices, which begin to break down food. This process allows nutrients to be absorbed by the small intestine.
5. **Liver.** Processes nutrients into a usable form and produces bile, which breaks down fat.
6. **Gall bladder.** Stores bile.
7. **Pancreas.** Produces pancreatic juices, which break down proteins, starches, and fats.
8. **Small intestine.** Food is broken down into nutrients, which are absorbed by fingerlike projections, called villi, which line the small intestine. The villi carry the absorbed nutrients to the blood stream, which carries them to the liver.
9. **Large intestine.** Carries waste for elimination and absorbs water.

Diagram courtesy of: http://mconn.doe.state.la.us/getFile.php?lesson\_id=979&dlfilename=The+Process+of+Digestion.doc

Submitted by: Denise E. Glenn, July, 2009