3. Lesson Plans

Below there are eight days worth of lessons on the Digestive System starting with a pre-assessment and ending with a post-assessment. The highlighted information indicates points that needed to be stressed and assessed based on my pre-assessment analysis. These highlighted responses generally refer to questions that many students got consistently wrong on the pre-assessment and thus I decided to make changes to my lessons. Overall, I feel that my lessons are engaging and hold students accountable for learning the material.

I tried to provide a few activities and demonstrations to keep the lessons interesting and to give students visuals to guide their learning. Based on the time constraints of the lessons due to State Testing, I feel that the students were able to still get a lot out of the unit. I could have done so much with the digestive system; however, it was important to pick and choose the most important activities and points to address, based on my unique classes.

Day One
Wednesday, April 11, 2012

Introduction and Pre-Assessment for Digestive System Unit

Pre-requisites:

- 6 Essential Nutrients (Carbohydrates, Proteins, Fats, Water, Vitamins, Minerals) and their roles in the body
  - These nutrients play a key role in digestion and thus we have spent three days on the nutrition portion of the unit prior to today.

Instructional Objectives:

- Students will be able to define “digestion” using their own words.
- Students will be able to outline the six essential nutrients and begin to understand why they need to be broken down into smaller molecules to be used for cell processes.

Learning Styles: Visual-Spatial, Intrapersonal, Logical

Materials:

- Human Body Unit Organizer
- How Much Do You Know About the Human Digestive System? Pre-Assessment Quiz
Anticipatory Set: Students enter the room and are expected to write the Word of the Day in their Word of the Day journals after the bell rings. The word, “depleted”, corresponds with the unit because it means to decrease in quantity. I will stress in this lesson the fact that our diets must be rich in all nutrients because when our body does not have the essential nutrients; our stores will become depleted disrupting the homeostatic balance.

Procedure:
1. Students will write down the Word of the Day, “Depleted”: to diminish, decrease in quantity. They should also record the example sentence: The campers depleted their food supplies quickly.
2. We will briefly discuss the word and the relevance to the nutrition/ digestion unit. I will ask the class; if the campers’ food supply was depleted- do they have a lot or a little bit of food remaining? so that students will be able to better, understand the definition.
3. We will quickly review the six essential nutrients learned before break and why we need to eat a balanced diet of all six. I will ask the class about how this relates to cellular respiration, a unit from earlier in the year.
4. Pre-assessment: I will pass out a short one-page traditional quiz-like assessment to all students to begin this unit. They will be told that this assessment is not graded; however, will be used to determine how much they already know about the human digestive system. They will be given 20 minutes.
5. During the remaining time together as a class, we will go over their unit organizer for the unit. The unit organizer puts the new unit into perspective with the muscular system and circulatory system (past and future) units. We will discuss together, and students will fill in, in graphic organizer form, the purpose of the digestive system, the six nutrients, the two types of digestion (mechanical and chemical) and possible malfunctions. This will give the students a nice foundation to build upon for the lessons to come.
6. At the end of the period, I will advise students to put away their organizers safely into their binders. I will ask the class to tell me at least one new concept they learned and would like to learn more about today.

Evaluation: I will evaluate each student’s pre-assessment for my own record keeping. The students will never be told of their grade on the performance because it will not count for their average. I plan to return the pre-assessment at the end to show the students how much they did learn. I will also formatively assess the students during the class period, especially at times of discussion.

New York State Standards:

Standard 4: Key Idea 1, Performance Indicator 1.2:

1.2b: Tissues, organs, and organ systems help to provide all cells with nutrients, oxygen, and waste removal.
1.2c: The digestive system consists of organs that are responsible for the chemical breakdown of food. The breakdown process results in molecules that can be absorbed and transported to cells.

**Modifications:** Students in my 2nd and 3rd period inclusion class may need more time on their pre-assessments. I may stretch the time to 25 minutes if need be.

Day Two
Thursday, April 12, 2012

**Measuring the Length of the Human Digestive Tract**

**Pre-requisites:** Students should be familiar with some of the names of the digestive system’s organs from their pre-assessments, as well as from their unit organizers from yesterday. They should also know the six nutrients found in foods we eat. Students will be familiar with the metric system and how to use a ruler to measure.

**Instructional Objectives:**
- Students will be able to identify (diagram/label) the organs of the digestive system.
- Students will be able to hypothesize and then measure the length of the human digestive tract.
- Students will begin to evaluate the relationship between length of the digestive organ and the events that occur in each.

**Learning Styles:** Visual-Spatial, Bodily-Kinesthetic, Interpersonal, Linguistic, Logical-Mathematical

**Materials:**
1. The Digestive System Body Diagram
2. Overview Nutrients and Digestion Bubble Map Worksheet
3. Measuring the Human Digestive Tract Worksheet
4. Colored Pencils
5. Smart Board
6. 5 different colored yarns pre-cut
7. Meter sticks
8. Calculators

**Anticipatory Set:** As students enter the class, they should pick up the work sheet for their do now. The do now activity will be reinforcement of the six essential nutrients in a bubble map form.

**Procedure:**
1. Students will work on the do now activity at the start of the period. The worksheet is titled Overview Nutrients and Digestion Bubble Map Worksheet. This should take about 5 minutes. They can work with their seatmates if working efficiently. During this time, I will take attendance.
The bubble map again was review on the importance of nutrients. From the pre-assessment, I found that many students still were confusing what carbohydrates and proteins broke down to. Therefore, when reviewing the material as a class I made sure to incorporate questions that would show the class the differences. Mrs. Kreso also told me a good strategy would be to get the whole class to verbally together what each get broken down to. Therefore, I acted as a director of a chorus and asked the question “What do carbohydrates (proteins) get broken down to by the digestive system?” and the class would tell me “Sugars/Amino Acids.”

2. We will review the sheet as a class. I will call on students randomly after I ask the question to keep everyone on their toes. I want to hear from a good representation of the students. Nutrients are a very important topic and thus all students need to be held accountable for this material. This should take no more than three minutes.

3. Together as a class, we will fill out the human digestive system diagram. I will label the diagram on the Smart Board for all students to see. I will try to get students to tell me what they know and ask relevant questions so that they begin to understand the pathway food travels throughout the body.

- Based on the pre-assessment, I found that many students were confusing the stomach and liver and therefore, I made sure to point out the fact that they are two distinct organs in shape, function, size and placement in the body.
- From the pre-assessment, I was able to find out that most students were familiar with the major organs of the digestive tract and where they are on the diagram. Because of this I spent less time on those organs, and relied more heavily on students to tell me where they were.

4. I would like the students to color and trace the pathway that food travels (mouth, stomach, small intestine, large intestine, anus) with one color. I will trace the pathway on the Smart Board and have students follow along. I will then have the students repeat the pathway.

- From the pre-assessment, I learned that many students were unfamiliar with the fact that food does not pass throughout all of the digestive system organs. Therefore, I wanted the students to color in the accessory organs- or organs that food does not directly enter. These organs are special because they produce chemicals for digestion.

5. Directions for the Digestive Tract activity: I will describe the pathway food travels throughout the body, give students the premise of the activity they will be doing and review the metric system.

6. Students will work in groups of four that I will assign. Together, they will hypothesize what they think the length of the digestive tract is in meters.

- From the pre-assessment, I had learned that students are unfamiliar with the fact that the small intestine is actually the longest in the digestive tract. This is very important to know and therefore, I wanted students to be able to visualize all of this with the string. This is really the main goal of this lesson.

7. They will then measure the length of each colored string provided and based on the data table on the Smart Board of the average length of each organ, they are to determine which colored string represents each organ. When they have finished the measurements, as a group they are to assess their hypotheses and answer some conclusion questions based on what they had learned in the activity.
8. At the end of class, with about seven minutes remaining we will regroup. I will have one student from each group clean up the string. I will collect the rulers. We will review the worksheet and key concepts quickly.

**Evaluation:** I will collect the Measuring the Human Digestive Tract worksheets, and assess what students have completed. I will also formatively assess how students work in small groups. I can walk around to each group to make sure that all students are participating and try to keep students on task. I will offer support where needed.

**New York State Standards:**

**Standard 4: Key Idea 1, Performance Indicator 1.2:**

1.2b: Tissues, organs, and organ systems help to provide all cells with nutrients, oxygen, and waste removal.

Day Three
Friday, April 13, 2012

**Mechanical vs. Chemical Digestion & Enzymes**

**Pre-Requisites:** Students should be familiar with the terms mechanical and chemical prior to this lesson.

**Instructional Objectives:**

- Students will be able to distinguish the differences between mechanical and chemical digestion.
- Students will be able to explain the role enzymes play in digestion.
- Students will be able to outline the products of carbohydrates, proteins, and lipids.

**Learning Styles:** Visual-Spatial, Intrapersonal, Audio

**Materials:**

- Digestive System Notes
- Digestive System PowerPoint
- Digestive System Diagram
- Full length of yarn from digestive tract activity
- Digestion Videos
- Exit Slip

**Anticipatory Set:** Students will take their seats when the bell rings. They will be provided with a word of the day that they must write down on the word of the day sheets. The word produces relates to the day’s lesson in that accessory organs produce chemicals that break down large molecules to smaller molecules.

-I had found from the pre-assessment that students did not know that there were organs in their digestive system that food did not enter. I thought that this vocabulary word would help students
realize that there is a difference. These types of organs produce chemicals! They are not places where digestion occurs.

Procedure:
1. Anticipatory Set: Word of the Day as described above. We will briefly discuss the relationship the day’s lesson.
2. Digestive System Notes: Today, we will begin the notes for the unit. Students will be given a guided note sheet, with spaces for them to fill in the most important terms and definitions. They should follow along. I will be guiding the lesson by showing slides of pictures and words that correspond to what I am talking about. We will discuss: mechanical, chemical digestion and the role enzymes play in digestion. I will begin notes on the upper part of the digestive tract as well.
   - Enzymes was a question that most students answered incorrectly on the pre-assessment. For that reason, I need to check for understanding multiple times throughout the lesson.
3. Exit Slip: Students will be given an exit slip with four questions that ask students to complete using their notes and re-writing what they have learned in their own words. I will collect the slips at the end of the period.

Evaluation: I will evaluate all student exit slips to check for understanding of the major concepts taught in the lesson. Based on the questions students pose in their exit slips, I will design a quick review to use at the start of the next class period. As always, I will formatively assess discussion.

State Standards:
1.2c: The digestive system consists of organs that are responsible for the mechanical and chemical breakdown of food. The breakdown process results in molecules that can be absorbed and transported to cells.

Day Four
Monday, April 16, 2012

**Esophagus, Stomach, and Small Intestine**

Pre-Requisites:
- Mechanical and chemical digestion- definitions and how it relates to digestion

Instructional Objectives:
- Students will be able to outline what occurs in the esophagus, stomach and small intestine.
- Students will be able to differentiate between digestive tract organs and accessory organs.

Materials:
- Digestive System Notes
- Smart Board
- Digestive System Videos
Procedure:

1. Students will enter the room and take their seats. They will write down the word of the day “Feedback” which has to do with the pancreas, insulin, and glycogen production. I want the students to understand that the pancreas is important with this word.

   - Again, I am stressing pancreas because many students were unfamiliar with where it was on the body and what it does for us on the pre-assessment.

2. Digestive System Notes Continued: Today, we will pick up with the esophagus. I will discuss the esophagus’ purpose and remind students of its composition of smooth muscles. I will then discuss peristalsis by showing an animation that shows the esophagus moving in action.

3. Stomach: I will then go into discussing the stomach. I will again discuss mechanical and chemical digestion as examples. I will ask a series of questions about HCl’s role in digesting proteins, alongside, what HCl is capable of doing (digesting/dissolving our stomach). I will ask the class what the role mucous plays. I will show a quick video outlining the events that occur in the stomach.

4. Accessory organs: I will introduce the liver, gall bladder and pancreas and their roles in chemical digestion. I will have students repeat in a chorus like fashion what occurs in each.

5. Small intestine: I will go through the small intestine notes, stressing the two important roles it has in our body. We will discuss new vocabulary- “Villi.” I will show 2 quick videos on the small intestine- one on chemical digestion that occurs there, and the other on absorption of nutrients.

6. Lastly, I will check for understanding, asking students if they have any questions on the material covered?

Evaluation: I will formatively assess student participation in discussion questions, as well as note common questions throughout the class periods.

State Standards:

1.2b: Tissues, organs, and organ systems help to provide all cells with nutrients, oxygen, and waste removal

1.2c: The digestive system consists of organs that are responsible for the mechanical and chemical breakdown of food. The breakdown process results in molecules that can be absorbed and transported to cells.

Day Five and Six (Shortened Periods- due to State Tests)
April 17th, 2012 and April 18th, 2012

Digestion Lab (Two Days):

Prerequisites:

- Digestive System vocabulary (Mechanical, chemical digestion, bile, enzymes)
- Digestion Enzymes & Nutrients
• Digestive system organs and their functions

Instructional Objectives:

• Students will be able to hypothesize and assess the effects of amylase on the digestion of carbohydrates.
• Students will be able observe the effects bile has on fat digestion.

Anticipatory Set: Students will enter the classroom and are expected to quickly take their seats once the bell rings. They are to take their seats and write down the Word of the Day on their sheets. We will then go over the word of the day as a class. I will call upon at least one student to put the word into his or her own words. I will pass out the Digestion Lab worksheet and take attendance.

Instructional Procedure:

1. Anticipatory Set: Word of the Day ~ 3 minutes
2. *Digestion Lab:
   a) How Sweet It Is!: ~5 minutes
      We will discuss mechanical digestion. Students will fill in the definition on their lab sheet. They will then be given a minute to come up with a hypothesis based on whether or not they think food particle size effects rate of digestion.
      Students will place a whole sugar cube in one jar and in another they will place a spoon full of granulated sugar. They should close the jar and shake, timing how long it takes for both jars of sugar to be dissolved into the water. They should observe the granulated sugar because it is initially in smaller pieces dissolves faster.
   b) Changing Colors!: ~10 minutes
      We will discuss chemical digestion and review the effects of enzymes during digestion in the mouth. They will be given a minute to come up with a hypothesis- if amylase is mixed with carbohydrates, the effect will be? This will be a teacher run demo. I will mechanically crush up one cracker and place it in a test tube. I will chew up one cracker, and place it in another test tube. I will add a drop of Benedict’s solution (changes color in the presence of starch) and heat both tubes in a hot water bath.
   c) Bile Action!: ~5 minutes
      We will review the term bile. Students will hypothesize what would happen if bile is added to fats. I will fill 2 jars halfway with water and add vegetable oil. I will then add liquid soap to one jar and shake. The class should observe the changes that occur.
3. If there is time, students will fill out the questions that correspond to the lab. I will ask if there was any major questions associated with the lab demos.
*Because of the shortened periods, it may be difficult to finish the entire lab in 30 minutes. My plan as of now is to spend the class period finishing the demos. The students will be given more time the following class time to finish up the questions.

**Materials:**
- Digestion Lab Student Worksheet
- Smart Board Slides corresponding to the Lab
- Sugar cubes, granulated sugar
- Water
- Stop watches
- Crackers
- Test tubes
- Benedicts solution
- Beaker
- Hot Plate
- Jars/ Clear Plastic Bottles
- Vegetable oil
- Liquid soap
- Pen/Pencil

**Assessment:** Each student is required to complete the Digestion Lab Student worksheet, which will be graded as part of his or her lab grades and added to their lab portfolios. I will assess student participation as well as discussion on the key terms of the unit.

**New York State Standards:**

**Standard 4: Key Idea 1, Performance Indicator 1.2:**

1.2c: The digestive system consists of organs that are responsible for the chemical breakdown of food. The breakdown process results in molecules that can be absorbed and transported to cells.

Day Seven
April 19, 2012 (Shortened period- due to State Testing)

**Large Intestines & Malfunctions**

**Pre-requisites:** Students should have a good working knowledge of all of the digestive system organs thus far. They should know what occurs in each one.

**Instructional Objectives:**
- Students will be able to describe what takes place in the large intestine.
- Students will be able to explain the role that bacteria plays in the large intestine.
- Students will be able to predict what may occur if homeostasis is not maintained in a digestive system organ. They will be able to associate malfunctions with certain digestion organs.
Materials:
- Digestive System Notes- Word Game (Review)
- Digestive System Unit Organizer
- Digestive System Smart Board Slide Show
- Digestive System Videos

Instructional Procedure:
1. Students will enter the classroom. They will take out their unit organizers and begin filling out the vocabulary associated with the entire unit. Because the unit is coming to a close, it is important to begin reviewing. I will give students about 7 minutes to complete this task.
2. Large intestine notes: Students will fill in the large intestine note sheet. We will discuss the events that occur in the large intestine. We will also discuss bacteria’s role.
3. We will then move forth into a discussion on malfunctions. Students are encouraged to ask questions and think critically about what would happen if the organs were not functioning properly.
4. We will then review using a Word Game Sheet located on the back of their notes. I will give the students time in class to work with a partner and use their notes to study.
5. We will go over this worksheet together as a class. I will cold call on students so as to keep everyone prepared and accountable. The sheet again highlights the main points stressed in the pre-assessments and the objectives of the course.

Assessment: Again, I will formatively assess group work and class participation. I can assess how well the students were able to answer the review Word Game worksheet when we go over the questions. Depending on the answers to the review, I can create a list of questions; I want to go over before the quiz.

Standards:
1.2b: Tissues, organs, and organ systems help to provide all cells with nutrients, oxygen, and waste removal

1.2j: Disease breaks down the structures or functions of an organism. Some diseases are the result of failures of the system.

Day 8
April 23, 2012

Post-Assessment Day

Pre-requisites: Students should be prepared to take the quiz. They should be familiar with all key terms described in all of the objectives in the prior lessons.

Materials:
- Digestive System Quiz
- # 2 Pencil
- SCAN-TRON
• Smart Board

**Instructional Procedure:**
1. Students will enter the classroom. They will take out their digestive system notes and unit organizer and review for 5 minutes.
2. I will quickly go over two key questions: What is the difference between mechanical and chemical digestion and what are the six essential nutrients?
3. I will pass out the quizzes and students will be given the rest of the period to finish them.

**Assessment:** I will be grading the quizzes and analyzing them for patterns described below.