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# Art Integration Paper

The lesson plan that I am trying to modify is from the Digestive system focusing on how a capsule is carefully made to reach the stomach to release its contents. The art form I plan to use will be music because I believe students can create a song/rhyme over the process of digestion. Also, because the body itself makes noises while disgusting from chewing to swallowing. I see this as a connection to writing class because students would have to pick out words that rhyme together and then create a beat/song for the music about the digestive system to flow smoothly. I would use this as an activity in the class as a competition to see which group can make the best song and the most accurate information about the six steps of digestion.

Standard Target: Music (MU: Cr1.1.7)

- Generate rhythmic,  melodic, and harmonic phrases and variations over harmonic accompaniments within AB, ABA, or theme and variation forms that convey expressive intent.

## Lesson Plan

### Lesson 1: “Digestion Process”

### Grade level

$7^{th}$ – $12^{th}$

### Time Allotted

1hr and 30 mins

### Learning Objectives

The learners will describe how simulation is used test the human body’s reaction to medication. Learner will explain how engineers can directly and indirectly help people who are suffering from medical issues related to the digestive system. The learners will describe the function of the stomach in the human digestion process.

### Next Generation Science Standards

HS-LS1-2 Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system.

HS-LS1-1 Systems of specialized cells within organisms help them perform the essential functions of life

HS-ETS1-1 Analyze complex real-world problems by specifying criteria and constraints for successful solutions

**Texas Standards: Texas Essential Knowledge and Skills (TEKS)**

(5) The student evaluates the energy needs of the human body and the processes through which these needs are fulfilled. The student is expected to:

(B) evaluate the modes, including the structure and function of the digestive system, by which energy is processed and stored within the body;

(11) The student investigates the structure and function of the human body. The student is expected to:

(A) analyze the relationships between the anatomical structures and physiological functions of systems, including the integumentary, nervous, skeletal, muscular, cardiovascular, respiratory, digestive, urinary, immune, endocrine, and reproductive systems;

**Lesson Assessment**

**Formative Assessment:**

Students will answer the following questions below:

1) How are you going to design your pill?

2) What helped you decided what materials would be best to use?

3) What can you infer about stomach acid?

4) How long do you think stomach acid would take to open the contents of the pill?

5) What is the name of the process you see occurring?

**Summative Assessment:** An open-ended quiz will be given to students to explain what occurred, the importance of determining capsule protection, and the importance of stomach acid in the digestive system process.

**Engage:** The lesson will start by have the teacher show students different colored pills on the board. Next the teacher will ask, “What do you think is inside of a pill?”. Ideas can range from the pill’s content being powder, liquid, or empty. The teacher will write down all answers on the board and start a group discussion about the purpose of a capsule covering on the pill.

**Watch the video link:** Explain to the students that they will be competing in groups against each other to create the best capsule covering for a pill to survive the stomach acid.

https://www.youtube.com/watch?v=wzitxKO1IEE

**Explore:** The students will design the best combination of coating and place it around the skittles. Students will then complete to see whose coating best survives in the soda as seen in the video.

Engage feature of the lesson.

1) First pass out the recipe and fraction worksheet located in Appendix A.

2) Have students paired in groups of three

3) Place all materials on the desk and have the groups start testing out their plan and write down what they have done on their worksheets

4) Have student test out their creations and time them as seen in the video

**Explain:** The teacher should ask all the students to take a seat and for each group to share their results over the experiment, what they observed, and the time it took for the skittles to be exposed in the soda. Afterwards, explain to the students the importance of why pill coatings are important, how some are easier to swallow, why some coatings have flavor, and absorption rate. Teachers can use this background sheet for more insight: https://www.teachengineering.org/content/cub_/activities/cub_biomed/cub_biomed_lesson05_activity1_background.pdf

**Elaborate:** The teacher should then continue to ask students what are other methods of taking medicicen such as liquids, nasals spryas, and injections and ask why these methods are needed. The teacher can show think video link:  which shows different ways to take medicience besides taking a pill.

**Evaluate:** The teacher will give out the summative assessment mentioned above with the same questions.

**Accommodations/Modifications:** The teacher can modify groups, extend time, shorten the quiz or anything else based on the student's limitations or listing from the Individualized Education Program (IEP).

**Resources and Materials Needed**

Each group needs:

- 60 ml (¼ cup) flour
- 30 ml (1/8 cup) cornstarch

- 60 ml (¼ cup) sugar
- 30 ml (1/8 cup) vegetable oil
- 1 paper plate
- 4 small paper or plastic bowls or cups
- 1 clear plastic cup
- 1 cup clear diet (to avoid stickiness) soda
- 1 small plastic spoon
- 2 pieces of color-coated skittles per group
- Recipe and Fraction Worksheet, one per person

For the entire class to share:

- marker, to write team names on plastic cups
- 1 cup clear diet soda in a plastic cup (for experiment control)
- timer

**Links/References**

https://www.teachengineering.org/activities/view/cub_biomed_lesson05_activity1

**Appendix A**

Name: _____ Date: _____

# Recipe and Fraction Worksheet

| Recipe #1 | | |
|---|---|---|
| | Number of Spoonfuls | Fraction |
| oil | | |
| sugar | | |
| flour | | |
| corn starch | | |
| Total | | |

| Recipe #2 | | |
|---|---|---|
| | Number of Spoonfuls | Fraction |
| oil | | |
| sugar | | |
| flour | | |
| corn starch | | |
| Total | | |

$$\text{Fraction} = \frac{\text{Number of spoonfuls of ingredient}}{\text{Total number of spoonfuls}}$$