Lesson 6: Digestive System
Feeding Adaptations
Guided Inquiry

**Grade Level:** This lesson is designed for a 5th grade science classroom. Grade 5 students should have already learned that animals have developed adaptations in physical structures, which serve different functions in growth and survival.

**Science Concept:** This lesson is focused on helping students understand how adaptations in the skin, teeth, jaws, and windpipe enable snakes to swallow and eat animals that are larger than its size.

**Relationship to California Science Content Standards:**
2c. Students know the sequential steps of digestion and the roles of teeth and the mouth, esophagus, stomach, small intestine, large intestine, and colon in the function of the digestive system.

**Learning Objectives:**
1. Students will identify and explain one of a snake's adaptations that allow it to eat animals that are larger than its size.

**Evaluation Ideas:**

a. formative: Teacher will observe and guide students as they explore centers and continue independently researching.

b. summative: Teacher will evaluate student’s final presentation and student’s notes on other groups’ presentations.

**Conceptual Background:**
A snake’s physical structures are adapted to allow it to feed on prey that is up to five times the size of its head. To visualize the magnitude of that feat, imagine eating an entire watermelon in one bite! A number of factors help snake swallow their prey whole.

First, the skin around the snake’s mouth is so elastic that it can stretch around a large prey item. Furthermore, a snake’s jaws has numerous adaptations that allow a snake to stretch its jaws more than 180 degrees wide. For example, the upper and lower jawbones are joined very far back and are held together by elastic ligaments, allowing a lot of stretch. Not only that, the two sides of a snake’s lower jawbone are not rigidly connected, but are held loosely together by muscles, so a snake can move the two sides of his
lower jaw independently. In addition, snakes have backward facing teeth that are angled towards the throat, which prevent a snake’s prey from prying loose. Lastly, a snake’s throat can be blocked for more than an hour while it is feeding, so in order to sustain breathing, a snake will push the opening of its windpipe forward for respiration.

**Materials:**
1. Watermelon
2. Models of snake jaw and human jaw (can be borrowed from SERC)
3. Models of snake teeth and human teeth
4. Books about snakes feeding
5. Pictures showing snakes feeding
6. Video of snakes feeding

**Lesson Implementation Plan:**

Engage – I will ask students if they have ever seen a snake feeding. I will then prompt them to predict what types of food snakes eat. I will then tell them that snakes feed on animals that can be up to five times the size of its head! I will show the students a watermelon that I have brought to class, and I will ask students to come up and compare their opened mouths to the watermelon.

Explore – Students will work in partners on this assignment. There will be 4 centers, each with a focused question, for students to explore feeding adaptations. I will assign specific groups to specific stations, so that each group will be experts on one adaptation, and groups can share their findings with each other, similar to a jigsaw reading, or in this case, a jigsaw investigation:

**Center 1:** How is a snake’s jaw adapted for eating large animals?
Center 2: How are a snake’s teeth adapted for eating large animals?
I will provide a table full of books that depict different snake’s teeths, including the book *Outside and Inside* by Sandra Markle.

Center 3: How is a snake’s skin adapted for eating large animals?
Let students observe the live SERC snake feeding on an animal. If that is not an option, show a video of a snake feeding on its prey.

Center 4: How does a snake breathe when a large prey is blocking its throat?

Explain – After students record their observations, they will use their own preferred method to further research their assigned question.
Elaborate – Students will document what they discovered about their adaptation in a creative format of their choice. Suggestions include: a powerpoint presentation, a poster, or a brochure. Each group will present their discoveries to the class and all the groups who did not explore the same questions as the presenting group will take notes on presentation.

Evaluate –

c. summative – Teacher will evaluate student’s final presentation and student’s notes on other groups’ presentations.

d. formative - Teacher will observe and guide students as they explore centers and continue independently researching.

Differentiation:

Behavioral for Student A
If a student is too active, I will provide clear benchmarks for him to meet at certain times throughout the day so that he has focused goals.

Cognitive for Student B
If a student has a hard time keeping up, I will pair him with a student who is at a higher level to help model the research procedure.

Cognitive for Student C
If a student is ahead, I will ask him to explore another feeding adaptation on his own.

Affective for Student D
If a student doesn’t want to participate because he thinks that snakes are disgusting, have another student describe to them how the snake feels to dispel false notions. Also, try to alleviate fears that student may have about safety.

Language Demands for Students E, F, G

Beginner: Provide examples of powerpoint, posters, or brochures for visual scaffolding. Allow students to complete final project in native language and have it translated.

Intermediate: Provide sentence frames for student to describe the adaptation. “I noticed that the snake’s _______ is _______. I
think that the snake developed this adaptation so that it could __________________.

Advanced: Use cause and effect relationship to explain why the snake would have developed the specific adaptation.