**Gibbon Conservation Center**

**Eat a Seed poop a Tree**

**Digestion**

5th Grade

Onsite – Visit Activity

This lesson plan meets the NGSS in the areas indicated below if used as recommended. It is not however limited to these standards and can be modified as the instructor sees fit to include more or adjusted to meet the needs of other grade levels. J

**Next Generation Science Standards (NGSS)**

*Matter and energy in organisms and ecosystems*

 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Emphasis is on the idea that matter that is not food is changed by plants into matter that is food examples of systems could include organisms ecosystems and earth

**Dimension #1 Scientific & Engineering Practices (SEP)**

*Developing & Using Models*

**Dimension #2 Crosscutting Concepts (CC**)

*Energy & Matter*

**Dimension #3 Disciplinary Core Ideas (DCI)**

*Life Sciences*

Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials. As a basis for understanding this concept. c. 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.

**Materials**

Several colors of pencils or crayons

Gibbon Digestion Diagram make for online upload black and white to color

- Use back of page to draw tree structures

Tree to point out structures

**Recommended Reading**

For Instructor

For Students

TOUR

REVIEW

Leaf in Water Review

*Did you notice anything different with the leaf?*

*Why do you think you see the bubbles?*

*What do you think make up the bubbles?*

*Do you remember how the leaf makes O2?*

Recall that trees take in CO2 & H2O along with sunlight to produce O2

*What is this process called?*

*Why is it important to us that the leaves make O2?*

Recall we inhale O2 & exhale CO2 with the use of our lungs

Acronym for CO2 cycle

QUESTIONS

*What is a gibbon?*

*What is the rainforest?*

*What is an ecosystem?*

*What is a habitat?*

*What is a territory?*

*What do you think gibbons eat in the rainforest?*

Young shoots off of a tree, leaves, insects, flowers, fruit, occasionally birds and eggs

**Parts of Tree**

Point out parts of a tree and their role

Roots- H20 uptake, nutrient uptake & storage, anchoring to the ground, and vegetative reproduction and competition with other plants

Trunk – Support the tree and transfer H2O to the leaves

Branches – help leaves reach light help tree have more leaves

Leaves – contain chlorophyll, which convert energy in sunlight into chemical energy that the plant can eat and make it possible to get more food

Flowers – reproduction, pollination leads to fruit and seeds

Fruit & Seeds – edible to animals and help aid in seed dispersal it is therefore another symbiotic relationship between plants and animals

Trees also provide shade, homes and food for other animals

**Gibbon Digestion Diagram**

Hand out the Gibbon Diagram

Label gibbon body

**Toes, feet & legs**

Enable gibbon ability grasp branch so that they can stand upright and walk along a branch

Legs are shorter than arms since they can get in the way while brachiating through the forest

**Ischial calucities**

Pads on the butt that help making sitting on the branch more comfortable

**Arms, joints, hands & fingers**

Help gibbons’ cup branches while moving quickly and comfortably through the trees

**Eyes & nose**

Help spot food and danger

**Mouth -** First part of digestion

Contains

- Tongue enable gibbon to taste

- Teeth enable gibbon to break apart food while chewing

- Salivary Glands produce saliva, which contains an enzyme that begins breaking down food starch. Saliva also helps moisten food so it moves easily through the esophagus.

**Esophagus**

Is a muscular tube that transports food and water down to the stomach

Once food is swallowed the process of digestion becomes involuntary

**Esophageal sphincter**

Is a muscle that opens and closes between the esophagus and the stomach. It regulates food and water entering the stomach the sphincter relaxes and opens up when the food travels down the esophagus. It also prevents stomach juices from traveling back up the digestive tract.

**Stomach**

Contains

- Stomach Glands, which produce stomach acid and an enzyme that digests protein.

- The upper portion of the stomach relaxes to accept the food from the esophagus.

- The lower portion of the stomach helps to mix food, stomach acids and enzymes to produce chime

**Small Intestine –** Last part of digestion

Contains

- Bacteria to help breakdown and digest carbohydrates

Receives

- Chime or food from the stomach

- Enzymes from the pancrease (via ducts) that break down carbohydrates, fats, and proteins

- Bile from the liver (via bile ducts of the gallbladder) that dissolve fat

The small intestine mixes everything together enabling the fat dissolved by the bile to mix with the intestinal and pancreatic enzymes so that they can digest the fat molecules

The nutrients that have been broken down are then absorbed into the bloodstream and carried throughout the body.

**Large Intestine (Colon)**

Receives

- The undigested portion of the food from the small intestine

- Old cells from the GI tract

Absorbs water and any remaining nutrients

Forms Stool

**Rectum**

Stores stool formed by the Large intestine

Absorbs water and any remaining nutrients

Gibbons are important because they do not chew seed while they are eating and the seeds can move through the digestive system undamaged. By the time they have completed digestion they have moved away from the place they consumed the fruit and poop out the seed in a new area aiding in the trees seed dispersal.

Once the students are comfortable with this process and have asked any questions they might have proceed to have a discussion about deforestation and the following concepts.

*What is deforestation?*

*What are the causes of deforestation?*

*What does urbanization mean?*

*What are the farmers producing?*

*What is it used for?*

*What are the factories?*

Who is consuming (or using) the products of the factories and farming?

*Do you know what sustainable means?* You can break it down to sustain