**Gibbon Conservation Center**

**Oxygen Cycle – O2**

5th Grade

Pre– 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: a. Students know many multicellular organisms have specialized structures to support the transport of materials. b. Students know how blood circulates through the heart chambers, lungs, and body and how carbon dioxide (CO2) and oxygen (O2) are exchanged in the lungs and tissues. 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. d. Students know the role of the kidney in removing cellular waste from blood and converting it into urine, which is stored in the bladder. e. Students know how sugar, water, and minerals are transported in a vascular plant. f. Students know plants use carbon dioxide (CO2) and energy from sunlight to build molecules of sugar and release oxygen. g. Students know plant and animal cells break down sugar to obtain energy, a process resulting in carbon dioxide (CO2) and water (respiration).

**Materials**

Gibbon/Tree Diagrams

Leaf

Bowl

Water

**Recommended Reading**

For Instructor

For Students

**Before Beginning**

Play gibbon calls

*What do you think is making this sound?*

*Where do you think this animal lives?*

*Why do you think there are different sounds?*

Point out that they create the sound with inhaled and exhaled breaths

Most species sing their territorial call as a duet.

*What is a territory?*

*What is a duet?*

Give general info on gibbons & Graze over external qualities

Gibbons belong in the ape family.

Show “family” tree.

Gibbons are small apes from Southeast Asia.

There are 19 different species of gibbons.

Each species inhabits a different territory.

There are 4 different genus.

The gibbon center houses 5 of the 19 species including:

Scientific names- Nomascus lucogeneys, Hoolock luekenoydes, Syomphalangus syndactelus, Hylobates pileatus, Hylobates molooch

The most endangered gibbon is the Hainan gibbon with only 25 individual left

(Last study was published May 2015.)

Gibbons have fur, long arms, and toes that grasp.

Like humans gibbons walk completely upright.

Gibbons live as small families. (mom dad and at most 4 offspring)

Gibbons live in the rainforest canopy 200 ft above the ground and travel up to 35 mil/hr leaping distances of up to 50 ft.

Some species of gibbons change colors as they age indicating different life stage. This can help scientist identify males from females at a distance. This also helps offspring blend in with mom.

**Hand out Gibbon Diagram**

*What is oxygen?*

Discuss O2 transport through the lungs->heart->body

Use an enlarged photo

Using the vocab words label the gibbon diagram

Name specialty body parts point out some similarities and differences with humans

(Focus on hands, fingers, feet, toes, teeth, mouth, joints)

Draw the pathway of oxygen through the body and heart

Gibbons breathe in oxygen through their nose and mouth from the environment.

The oxygen travels past the pharynx and down the trachea.

Into the bronchi

Into the bronchioles of the **lungs**

Diffusing in the alveoli (Henry’s law)

Into the pulmonary capillaries where the oxygen binds to hemoglobin in the red blood cells.

This oxygenated blood is now sent back to the **heart** via the pulmonary veins

Into the left atrium

Passing the mitral valve

Into the left ventricle

Passing the aortic valve

Into the aorta

It is then circulated throughout the body

Into the arteries

Into the arterioles

Into the capillaries

Where it oxygenates the organs and tissue

Carbon dioxide and waste is then transferred into the blood

Veins carry the deoxygenated blood

From the body to the superior vena cava

Into the right atrium

Passing the tricuspid valve

Into the right ventricle

Passing the pulmonary valve

Into the pulmonary artery

Into the lungs

At the lungs the carbon dioxide is diffused into the alveoli

Into the bronchioles

Into the bronchi

Back up through the pharynx and up the trachea.

Gibbons exhale the carbon dioxide through their nose and mouth into the environment.

**Hand out Tree Diagram**

Conversion of CO2 to O2

Use an enlarged photo

Using the vocab words label the tree diagram

Draw the pathway of oxygen, carbon dioxide, water and sunlight.

Photosynthesis is the conversion of

Sunlight + 6H2O + 6CO2  C6H12O6 + 6O2

Trees & other plants combine sunlight, CO2 (carbon dioxide) from the atmosphere and H (hydrogen molecules) from water to make food & matter.

During this process O2 (oxygen) is released into the atmosphere

ATP (adenosine triphosphate) is stored chemical energy from the sunlight

It consists of a nucleotide (with ribose sugar) with 3 phosphate groups and

It is used to make C6H12O6 (glucose) from CO2 (carbon dioxide)

Glucose is used to make larger chains of cellulose and starch.

This makes up the matter of the plant

Once the gibbon eats the plant the gut breaks down the stored nutrients and carbon.

**Habitat Diagram**

Bring out larger diagram (online black and white diagram for teacher to reference)

Draw arrows in color for cycle

CO2 Cycle (environment) Orange

O2 Cycle (environment) Green

H2O Cycle (environment) Blue Add detail of cycle later

Sun  yellow

Have students draw a large system including:

Trees, Gibbons, Sun, Clouds… (we will come back to the drawing & add to it in post-visit)

Discuss with the class the O2 – CO2 cycle in animals & have students help draw arrows

Discuss with the class the O2 – CO2 cycle in plants & have students help draw arrows

Ask what else the tree needs from the environment (sun & water) draw arrows

**Leaf in Water Activity**

Materials

Leaf - freshly picked

Water

Bowl

Rock or other weight

* Place the leaf in the water and make sure it is fully submerged.
* Check back in 30min to an hour.
* *Does the leaf look different?*
* *What do you see?*
* *Why do you think you see it?*

This activity can be done at the end of the lesson and discussed during the next lesson. Allow all the students to take a look. You can put multiple leafs around the room or have the student do the activity at home. Make sure all students can see an example at school before the lesson. Optional have the students write on a piece of paper anonymously what they saw. If they were sent home the activity have them write down N/A on the paper.