



Demos, Labs, & Science Stations Feature:

- Hands-on Investigations
- STEM Challenge
- Scientific Literacy
- Inquiry Process Skills

LIFE SCIENCE - 5E

NGSS • TEKS

DEMOS, LABS, & SCIENCE STATIONS

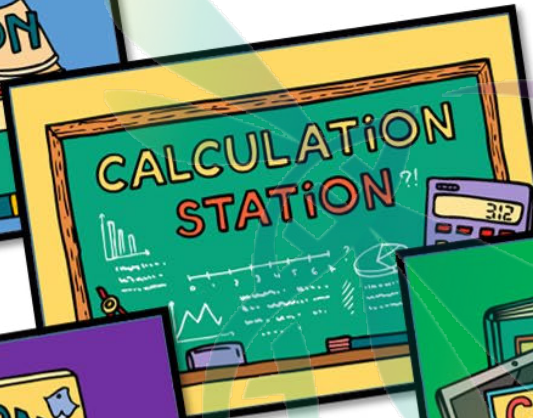
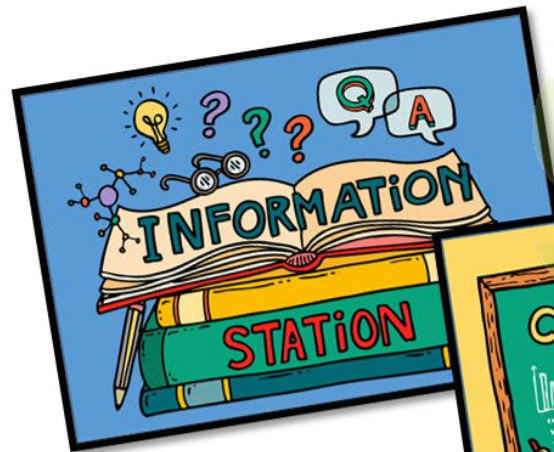
HANDS-ON • STEM • CRITICAL THINKING

**ENGAGING
READING!**

**GRAPHING,
WORD
PROBLEMS &
MEASUREMENT!**

**INQUIRY
SKILLS &
PROCESSES!**

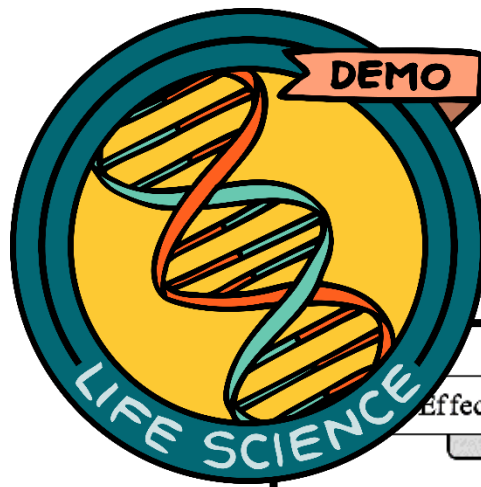
**HANDS-ON
INVESTIGATIONS!**



STEM CHALLENGES!

ALL Station Signage Included!!

Color & Black and White



Teacher guide and answer key
offered for every lab!

Easy-to-get materials!





Effects of Physical Activity

HUMAN BODY

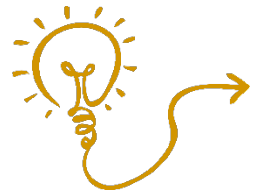
Materials:

- large plastic sandwich bag
- masking tape
- heart rate monitor (optional)
- stopwatch

Procedure:

1. With help from a partner, have students tape a plastic bag around the neck, you will be using to feel your pulse rate on.
2. Have students find their pulse by placing their index and middle finger together on their wrist below the base of the thumb.
3. Have students determine their resting heart rate by counting the number of beats they feel for one minute. Have them make observations.
4. Have students walk in place for one minute. Without delay, take their pulse for one minute.
5. Have students run in place for one minute. Without delay, take their pulse for one minute. Make observations.
6. Have students determine their recovery heart rate by having them sit down and rest for one minute. Check your pulse rate again for 1 minute and make observations.
7. Have students do a final rest for an additional 3 minutes and then check their pulse rate for one minute. Record results.
8. Finally, have students look at bag on their hands. What do they notice? Why is this happening?

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Discussion questions and
teacher set-up included!



Tidal Volume

HUMAN BODY

The amount of air you move in and out of your lungs during a normal breath is called the tidal volume. In this lab you will measure your tidal volume by inhaling into a balloon.

Materials:

- balloons
- string
- meter stick
- stopwatch
- calculator

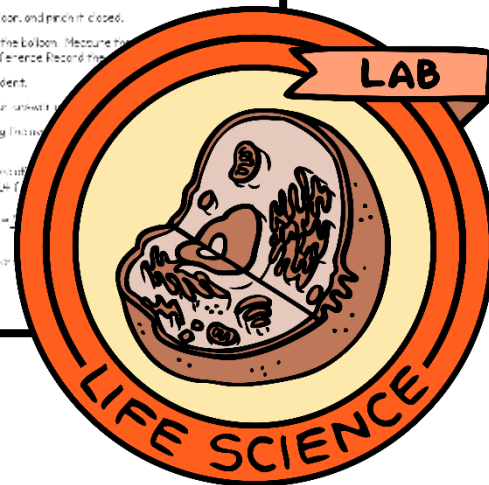
Procedure:

Part A: Respiratory Rate

1. Student 1 will stand how many breaths student 2 breathes in 30 seconds. Repeat two more times and record your data on Table 1.
2. Repeat step 1 for each student in the group, with each student taking their own data.
3. Calculate the average number of breaths and count your answer on Data Table 1.
4. Calculate the average resting breathing rate in breaths per minute by multiplying the average number of breaths by 2. Record your answer on Data Table 1.

Part B: Tidal Volume Estimation

1. Student 1 take a normal breath, exhale into the balloon, and pinch it closed.
2. Student 2 wrap a string around the widest part of the balloon. Measure the string around the balloon in centimeters to get the circumference. Record the
3. Repeat steps 1 and 2 two more times for each student.
4. Calculate the average circumference and count your answer on Table 2.
5. Calculate the average radius of the balloons by dividing the circumference by 2.
6. Use the following formula for finding the surface area of a sphere. Use the average balloon radius for r and 3.14 for pi.
7. Count your answer, which will be in square centimeters.





Group members will read a passage and then complete a task to help increase science literacy and deepen their understanding of the science concept.

Effects of Space Travel on the Human Body

Many people look up into the night sky and wonder what it would be like to be an astronaut and travel to outer space. However, not just anyone can journey into outer space. Astronauts must undergo extensive training and preparation before leaving Earth, have regular health checks in flight, and endure an extensive rehabilitation process when returning. In addition, traveling to an environment with low gravity, known as microgravity, can have several adverse effects on the human body.

Before sending humans into space, experiments need to be done to determine how microgravity would affect everyday bodily functions that we take for granted, such as eating and swallowing. In 1962, John Glenn was the first American to orbit the Earth. He was sent with toothpaste tube full of applesauce and instructed only to take little sips at a time. He was nervous if the food could be swallowed and if it would move down to his stomach. His trip lasted under five hours.

Since 1962, many astronauts have traveled, and research is now looking into problems that can arise when they return to Earth. If space travel is more common, the inner ear falls out of sync, and astronauts can get motion sickness.

Loss of muscle and bone mass is also a problem. In microgravity, the body has to work less because there is no gravitational pull. Astronauts are required to exercise vigorously to maintain muscle mass.

Earth's atmosphere doesn't have this protection, and other diseases of radiation exist. Radiation they have to deal with.

With this study, the effects of space travel on the human body must be done to send on astronauts. It is too harmful to send on astronauts.

A

What is microgravity?

B

Describe at least two problems that astronauts face when returning from space.

A. _____

B. _____

C. _____

D. _____

C

What are the problems that astronauts face when returning from space?

D

Would you rather be an astronaut, or an engineer who designed solutions for astronauts? Explain your answer.

A

Human Body Systems

B

C

Name _____ Date _____

A1. _____

A2. _____

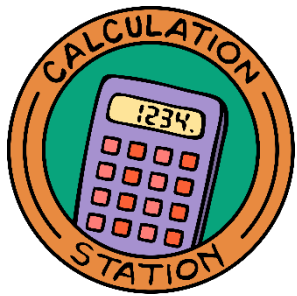
B1. _____

B2. _____

C1. _____

C2. _____

Group members will have images, illustrations, or actual samples at this station that show applications or processes of the science topic.



Group members use their math skills to complete the station challenge. Skills may include graphing, analyzing data, using models, measurement, and calculating formulas or word problems.

Fetal Growth

A fetus (fetal stage) grows and gains weight that results in the fetus term at birth through the eighth week of development. The development of the fetus is monitored by doctors from conception to monitor a fetus's growth.

Materials:

- ruler
- colored pencils

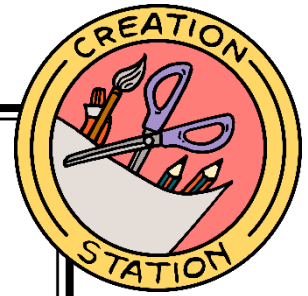
Procedure:

1. Draw a fetal growth graph on the grid. Remember to label the axes.
2. Draw a fetal growth graph on the grid. Remember to label the axes.
3. Answer the following questions:

Week	Weight (lb)	Length (in)
1	1.5	5.0
2	2.0	6.0
3	2.5	7.0
4	3.0	8.0
5	3.5	9.0
6	4.0	10.0
7	4.5	11.0
8	5.0	12.0
9	5.5	13.0
10	6.0	14.0
11	6.5	15.0
12	7.0	16.0
13	7.5	17.0
14	8.0	18.0
15	8.5	19.0
16	9.0	20.0

Analysis and Conclusion:

1. During which months do you see the fastest growth occur?
2. Using your knowledge of fetal development, when is developing during the time of rapid growth?



Breathing

Challenge: Build a model of lungs and diaphragm.

Materials:

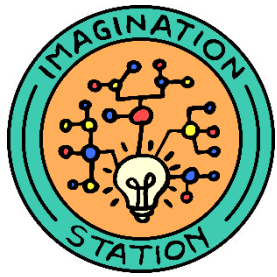
- plastic soda/water bottle with lid
- 2-meter drinking straw - with 2 inches trimmed off straight end
- 3 rubber balloons
- tape
- clay
- scissors

Procedure:

1. As a group, work together.
2. Use scissors to cut the straw smooth as possible, so it fits into the bottle.
3. Take one straw and tape it securely (fastened). Tape the balloon opening below it.
4. With balloons hanging up.
5. After the teacher runs the class.
6. From the inside of the bottle, push the balloons and straw in.
7. Use clay on the outside of the bottle to create the diaphragm.
8. Cut off the edge of the soda bottle.
9. Pull down on the center of the diaphragm.
10. Explain how the diaphragm contracts, lung volume and enables breathing.

Explain how the diaphragm contracts, lung volume and enables breathing.

Group members will work together to solve a STEM (Science, Technology, Engineering, Math) challenge by creating models or designs that demonstrate their understanding of the science topic being taught.



This station makes science concepts relevant for students by asking them to imagine scenarios that will bring about discussion and critical thinking.

USER-FRIENDLY PAGES:

Students easily recognize which answer sheet to use at each station by matching station icons located on each page!



Make Healthy Choices

Directions: Use your imagination to answer the statement below.

IMAGINE you're in charge of designing a Get Healthy campaign for students.





Describe how you will encourage students to get healthy.

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I'm "Lichen" This Relationship

Problems with symbiotic relationships as found in a lichen?

Lichens grow in places where few organisms can survive – usually on top of mountains. They are a mixture of the symbiotic relationship of two organisms that make up lichen – fungus and cyanobacteria (or algae). The algae or cyanobacteria cells are green or blue-green and carry out photosynthesis, providing the fungus with food. The fungus, in turn, provides the algae with water and minerals.

Materials:

- lichen
- Petri dishes (Petri dishes)
- microscope
- slide
- coverslip
- water
- colored pencils

Procedures:

1. Tear a small piece of lichen off from the sample provided.
2. Tease the lichen piece apart using the forceps.
3. Prepare wet mount slide of the lichen.
4. Observe the lichen under the microscope at low power.
5. Observe the lichen at high power and draw what you see in the space provided. Make sure to label the diagram and make down imagination.
6. Answer the questions below on your answer sheet.

Analyze and Conclude:

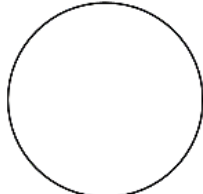
1. Identify the symbiotic relationship that exists in lichen. Give evidence to support.
2. Lichens are pioneer species. What does this mean, and how do they affect the environment?

Name _____ Date _____

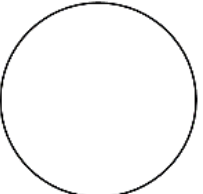


Data and Observations

Low



High _____



Analyze and Conclude:

1. _____
2. _____

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TEACHERS SAVE TIME:

Laminate station pages and reuse for each class and for years to follow!

Inquiry and Process Skills

©NGS

Demo

Guided Inquiry Lab

Science Stations

Inquiry-Based Science Unit: Human Body Part 2	Classifying	Communicating	Compare & Contrast	Creating Models	Gather/Organize Data	Generalizing	Identifying Variables	Inferring	Interpreting Data/Diagrams	Making Decisions	Manipulating Materials	Measuring	Observing	Predicting
Effects of Physical Activity		X	X			X							X	X
Tidal Volume	X	X	X	X	X			X	X		X	X	X	
Information Station: Effects of Space Travel	X				X	X			X					
Observation Station: Images & Questions	X	X	X			X		X	X	X			X	
Investigation Station: Heart-ly Working	X	X	X		X		X		X	X	X		X	
Calculation Station: Fetal Growth	X		X		X		X		X			X		
Communication Station: Questions		X	X			X		X		X				
Creation Station: Breathing		X		X	X		X			X	X	X	X	X
Imagination Station: Healthy Choices		X				X				X				

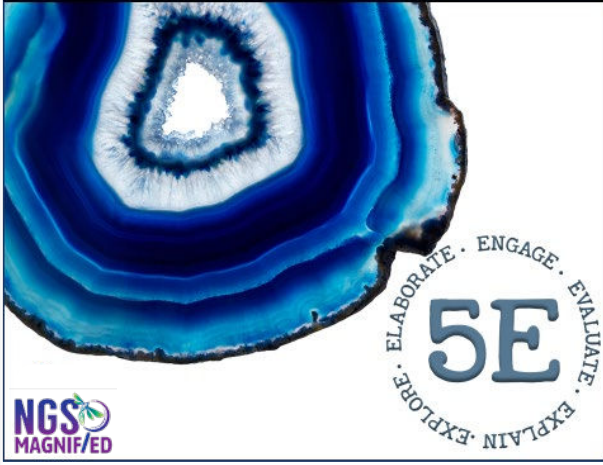
NGS promotes scientific inquiry throughout the curriculum. Students become more confident and effective learners while developing problem-solving and critical thinking skills. Process skills, such as planning, organizing and evaluating, help students to complete projects and assignments. These skills allow students to independently gather information, analyze it, and draw their own conclusions.

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