



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!**

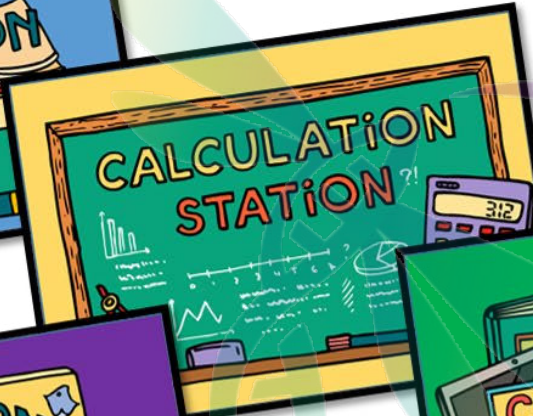
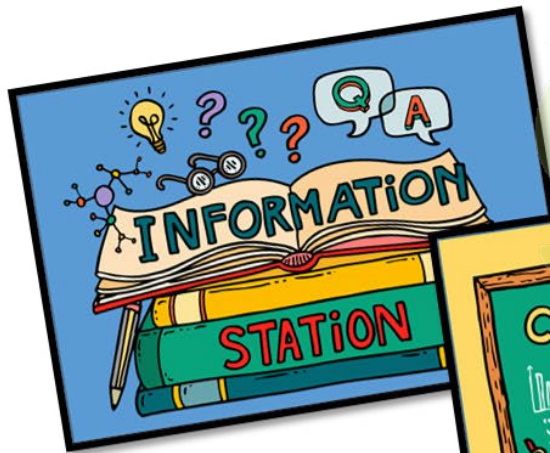
**INQUIRY
SKILLS &
PROCESSES!**

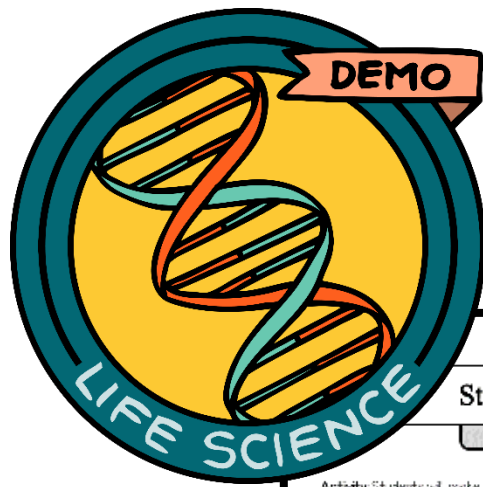
**HANDS-ON
INVESTIGATIONS!**

STEM CHALLENGES!

ALL Station Signage Included!!

Color & Black and White





Teacher guide and answer key
offered for every lab!

Easy-to-get materials!



Structure and Support

ANTHONY DIVERSITY VETERINARIAN

Activity Students will make an analogy of an umbrella structure to that of a skeletal support system.

Materials:

- umbrellas
- umbrellas with "bones" removed
- box fan
- paper confetti/whole bunches (optional - only use if you don't mind finding these for weeks)

Procedures:

Before Class

1. Remove support bones from an umbrella but leave just enough on so it opens up.

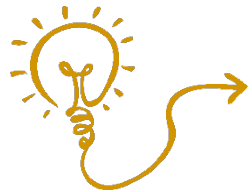
During Class

2. Ask for two volunteers to hold your open umbrellas.
3. Have volunteers stand in front of the box fan with their umbrellas facing the fan.
4. Turn fan on high (add paper confetti if you wish) and point fan back and forth on each umbrella. Have students make observations.

What's Happening?

The umbrella is made with a special structure to provide support to the umbrella and give it shape, just as human bones support and give shape to the body. While the "bones" of the umbrellas and not the surfaces, only serve as bones and close to the surface, but others covered by a soft tissue. The umbrella with missing "bones" completely loses shape and is unable to protect the student holding it.

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Discussion questions and
teacher set-up included!

Egg Anatomy

ANTHONY DIVERSITY VETERINARIAN

Study the diagram of the egg below while reading the following descriptions. Please note that this investigation will use a real animal egg, such as the yolk sac, allantois, and amnion mentioned, since they only develop in fertilized eggs.

EGGSHELL

The shell is made up of proteins and is made of calcium carbonate, which helps prevent water loss from the developing embryo. In addition, the shell is permeable allowing oxygen to enter and carbon dioxide to leave.

MEMBRANES

Eggs have two shell membranes that fill the inside of the egg completely when laid. As the egg sits outside of the bird's body, the inner layer contracts separating from one end of the outer layer forming an air sac. These two layers allow for gas exchange and help protect the embryo that is growing inside the egg from passing the embryo.

ALBUMEN

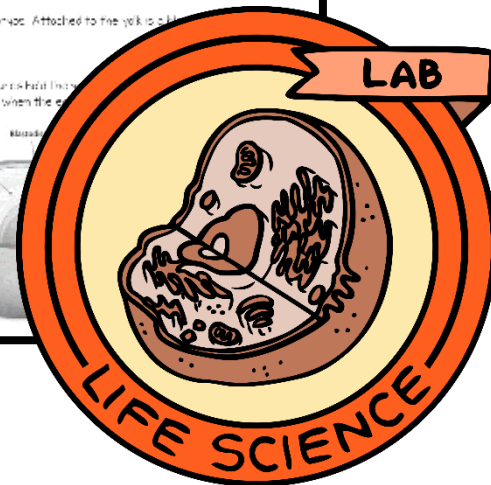
Known as egg white, the albumen is made of proteins and water. The outer layer and albumen water from the protein-rich inner layer. However, both provide nutrients to the embryo and can function as shock absorbers. The thick part of the albumen is called the chalazae, which is the part of the egg.

YOLK

The main supply of nutrients for developing embryo. Attached to the yolk is a small fertilized egg development on embryo.

CHALAZAE

Responsible for anchoring the embryo. The chalazae is a part of the egg that is attached to the yolk and keeps a developing embryo on top when the egg is laid.





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

Mermaid's Purse

The ocean habitat is immense. There are millions of known species living there, and maybe millions more that have yet to be discovered. One of the oldest species known to scientists is the shark. The oldest recorded fossil of a shark is from over 400 million years ago. That is almost 300 million years before dinosaurs existed. Here is it possible for a species to have lived for so many years? Much of the reason has to do with reproduction. One of the reasons it is the next generation. Sharks have been a wide range of reproductive adaptations over millions of years.

Sharks and their close relatives, rays and their skeletons are made of light cartilage, which is not as hard as bone. They have a dorsal fin and gills for breathing. The other fins are used for movement. The other fins are used for movement. The other fins are used for movement.

Most sharks and rays are viviparous. This means that the young develop inside the mother until they are born. Some sharks and rays are oviparous. This means that the young develop outside the mother. This gives them just shed the unprotected eggs into the ocean.

About 30% of the world's sharks and rays are oviparous. This is known as being oviparous. Oviparous sharks and rays lay eggs. These eggs are called mermaid's purses. These eggs are called mermaid's purses. These eggs are called mermaid's purses.

A mermaid's purse is made of cartilage. It would feel like a small, soft, strong, and tough. The cartilage is made of cartilage. The cartilage is made of cartilage. The cartilage is made of cartilage.

These eggs are called mermaid's purses. These eggs are called mermaid's purses. These eggs are called mermaid's purses.

You can catch mermaid's purses. The mermaid's purses are called mermaid's purses. The mermaid's purses are called mermaid's purses. The mermaid's purses are called mermaid's purses.

Identifying mermaid's purses. Many of the mermaid's purses are called mermaid's purses. Many of the mermaid's purses are called mermaid's purses. Many of the mermaid's purses are called mermaid's purses.

A

Explain what it means to be a

B

Compare the terms viviparous and oviparous.

C

It is important for

D

biologists to identify different egg cases?

A

B

C

D

Name _____ Date _____

A1. _____

A2. _____

B1. _____

B2. _____

C1. _____

C2. _____

1. Why are most young born after they are born?

2. Cats are placental mammals. What does this mean?

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



Group members will work with one another to explore the concept through hands-on activities, so they may practice specific inquiry process skills as they learn.





Feather Comparison

Problem: How do structures of feathers relate to their function?

Name _____ Date _____

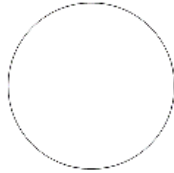
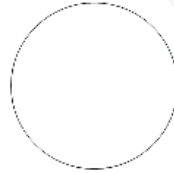
Materials:

- microscope
- microscope slides
- feather samples
- eye dropper
- cover slips
- water
- cover slips
- tweezers

Procedure:

1. Identify the leading edge feather. This is the edge that is the most flexible.
2. Pin about four barbs from the feather and pull them apart carefully to keep them from breaking.
3. Make a wet mount of the barbs. Observe under the microscope. Draw your observations.
4. Repeat steps 2 & 3 with a different part of the feather.
5. Answer the questions on the back.

Directions: Sketch and label feathers below.

Analyze and Conclude:

1. Compare the two feathers and explain which feather would be better for a light and which would be better for insulation?
2. The barbs are held together by hooklets. Why would this be a better advantage than being fused together as a solid structure?
3. Barbs have an oil gland that produces oil and releases it to spread it throughout their feathers. What do you think is the function of this oil?



A



B

Describe how monotremes, marsupials, and placental mammals differ.



C



D

Describe the characteristics of chordates.



A



B

A: Monotremes lay eggs; marsupials are very immature when born and develop in a pouch.

B: A dry, scaly skin, amniotic egg, kidneys that concentrate urine.



E



F

Describe the characteristics of chordates.



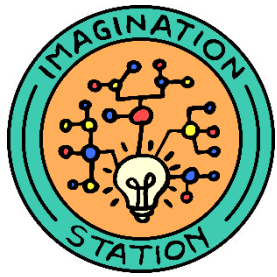
G



H

Describe the characteristics of chordates.

There are three different options for this station: interviews, videos, or group essay. Depending on the option you choose, group members will communicate what they know by answering questions in creative ways.



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:

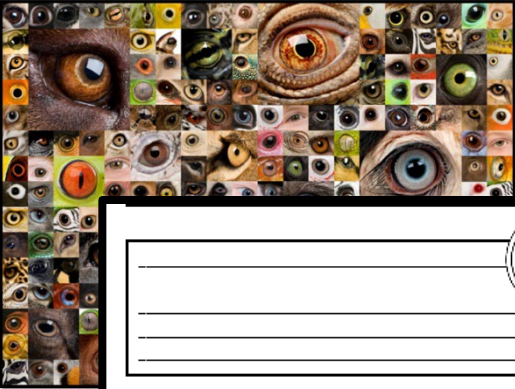
Students easily recognize which answer sheet to use at each station by matching station icons located on each page!



What would you choose?

Directions: Use your imagination to answer the statement below.

IMAGINE you could be any vertebrate for a day.





Describe what vertebrate you would be and why.

© Henry Getty Science



I'm "Lichen" This Relationship

Problem: What is the symbiotic relationship 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 microscopic, invisible, of the symbiotic relationship between two organisms that make up lichen – fungus and cyanobacteria (or algae). The blue or cyanobacteria cells are green or blue-green and some photosynthesize, providing the fungus with nutrients. The long, branching fungus provides the algae with water and minerals.

Materials:

- lichen
- Petri dishes (Petri dishes)
- microscope
- slide
- cover slip
- water
- colored pencils

Procedures:

1. Tear a small piece of lichen off from the sample provided.
2. Tear the lichen piece apart using the Petri dishes.
3. Prepare wet mount slide of 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 grid provided. Make sure to label the diagram and make clear magnification.
6. Answer the questions below on your answer sheet.

Analyze and Conclude:

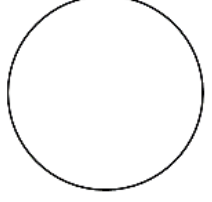
1. Identify the symbiotic relationship that exists in lichen. Give evidence to support.
2. Lichens are pioneer species. What does this mean, and how do they contribute?



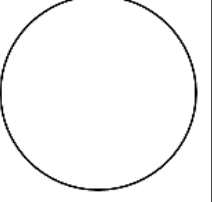
Name _____ Date _____

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: Vertebrates	Classifying	Communicating	Compare & Contrast	Creating Models	Gather/Organize Data	Generalizing	Identifying Variables	Inferring	Interpreting Data/Diagrams	Making Decisions	Manipulating Materials	Measuring	Observing	Predicting
Structure and Support		X	X			X							X	X
Egg Anatomy	X	X	X	X	X			X	X		X	X	X	
Information Station: Mermaid's Purse	X				X	X			X					
Observation Station: Images & Questions	X	X	X			X		X	X	X			X	
Investigation Station: Feather Comparison	X	X	X		X		X			X	X		X	
Calculation Station: Gestation Period	X		X		X		X		X					
Communication Station: Questions		X	X			X		X		X				
Creation Station: Build a Bird's Nest		X		X	X		X			X	X	X	X	X
Imagination Station: What would you...		X				X				X				

NGS Magnified promotes scientific inquiry throughout the curriculum. Students become more confident and effective learners while developing problem-solving and critical thinking skills.

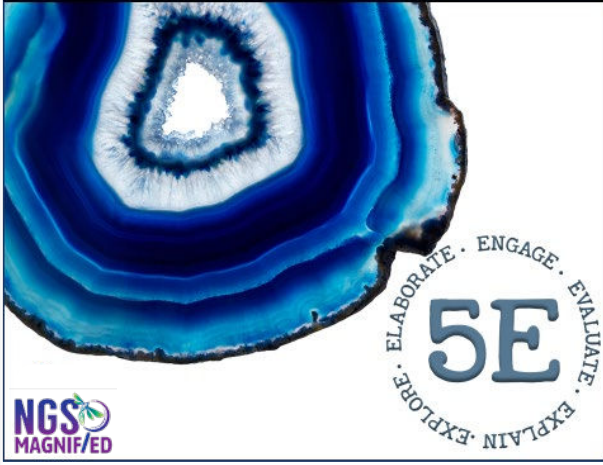
Process skills, such as planning, organizing, and evaluating, help students to complete projects and assignments. These skills allow students to independently gather information, analyze it, and draw their own conclusions.

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