Can you tie a knot in a bone?

Time Frame: 2 sessions 45 minutes each

Learning Standards:
Physical Science

- Sort objects by observable properties such as size, shape, color, weight, and texture.

Skills of Inquiry:

- Ask questions about objects, organisms, and events in the environment.
- Tell about *why and what would happen if*?
- Make predictions based on observed patterns.
- Record observations and data with pictures, numbers, or written statements.
- Discuss observations with others.

Student will be able to:

- Make predictions about how their chosen solutions will affect the chicken bone.
- Observe the effect and compare this to their original prediction.

Activity #1: Bones in Chemicals

Materials:

- Plastic Dixie cups
- Saran wrap
- Two clean chicken bones for each student
- Vinegar
- Coca-cola
- Worksheet
- Pencils
- Soda water.

Vocabulary: calcium, bone marrow, chemical, solution

Anticipatory set (at rug):

Talk a little about bones: what is their purpose? Bones not only support you but they hold minerals and produce red and white blood cells (which help to keep you healthy). Has anyone in the class ever broken a bone? Do you know what the most common bone to break is? (it is the collar bone). How do you make sure your bones are strong—you need lots of calcium. Talk about some good ways to get calcium; milk.

For this activity you can either have students work individually or in pairs (which would decrease the amount of bones needed).

Activity:

1. First the children should write their name on two cups.
2. At each table set out labeled cups of vinegar, soda water and coca-cola. Tell the students that they will soak one bone in vinegar and another bone in the chemical of their choice. Give the students a little time to observe the different chemicals.
3. Once they have chosen their second chemical, the students should put vinegar in one cup and their chosen chemical in the other cup.
4. The students should then put their chicken bones in the two cups and put saran wrap over the cups.

5. Let the bones sit in the liquid for at least three days.

Closure: discuss what the students think will happen to their bones.

Assessment: Participation in class discussion and activity.

Activity #2: Observing Bones

Materials:

- Worksheet
- Chicken bones from last class
- Paper towels (or other type of place mat)

Anticipatory set:

This part of the lesson can be done outside of the science lab.

Activity:

1. Have the students remove their chicken bone from the cup and place on a paper towel on their desk.
2. Allow the students to examine the bone. Discuss any differences between the bones at each table.
3. Students should be discussing at the table what solutions worked to make their bones softer or hard. They should try to come up with a conclusion about which solution worked best to soften the bones, which didn't. Teachers should be discussing this in small groups before they share with everyone. Can anyone tie a knot with his or her bone?
4. Allow the students to record their findings on the attached worksheet.

Closure: With the class discuss the different results among the different chemicals. Who was able to tie their bone in a knot? Did the students predict the right results?

Assessment: Participation in class discussion, worksheet and activities.

Study of Owls: Anatomy

Time Frame: 1 session 45 minutes

Materials:

- Worksheet
- Stuffed Owl—If possible have all parts of owl that you will be discussing, talons, beak, etc...
- Computer
- Pencils
- Markers
- Booklet: anatomy of an owl

Learning Standards:

Life Science

- Recognize that people and other animals interact with the environment through their senses of sight, hearing, touch, smell, and taste.

Skills of Inquiry:

- Ask questions about objects, organisms, and events in the environment.
- Record observations and data with pictures, numbers, or written statements.
- Discuss observations with others.

Student will be able to:

- Name important features of Owls.
- Present their findings in front of the class.

Vocabulary: anatomy, talons

Anticipatory set:

Tell the students that they will be studying the anatomy of an owl today. Anatomy is the study of the different parts of

living things. Open the class by discussing the some facts about the wings of an Owl. Some interesting facts include:

1. Owls have large light wings that allow them to glide easily. Their wings let them glide slowly and silently over the ground, which helps them hunt.
2. Owls have tiny hair-like feathers on their feet called filoplumes, these feathers sometimes act as sensors and help the Owl react to things it touches—like prey.
3. Owls have unique feathers on the front of their wings that allow them to fly silently. For other birds, air rushes past their wings and makes a wooshing sound. However, for owls these special feathers in the front of their wings redirect the wind and prevent this wooshing sound allowing the owls to sneak up on their prey.

Tell the students that they will be learning about owl anatomy today. There will be different stations set up at the four tables and the students will rotate around to all the tables.

Here is a link to a good website that has both pictures and facts"
http://www.owlpages.com/articles.php?section=Owl+Physiology&title=Feathers
It also might be a good idea to show one of the videos listed.
http://www.youtube.com/watch?v=yps7pgq1TAk
is a particularly informative video on owls.

Activity:

1. Have four teachers stationed at the four tables around the room. Each teacher will be explaining a different key part of owl anatomy. The four most important parts include: talons, beaks, eyes and ears.
2. Break the students into four groups. They should rotate tables every ten minutes.
3. As they learn about the different parts of the owl the teachers should help the students to fill in the attached booklet.

4. Each student should spend about 10 minutes at each station; if they finish writing before their time is up have them draw pictures of the part they just learned about.

Closure: The students should each share a fact about the station they ended at. Encourage the students to share a new fact. Present in the form "did you know..."

Assessment: Participation in class discussion, worksheet and activities.

Dissecting Owl Pellets

Time Frame: 1 session 45 minutes

Materials:

- Rubber gloves
- Tweezers
- Owl pellets (one for every two kids)
- Attached worksheet taped to a paper plate (one for each student)
- Black construction paper
- Bone charts
- **CLEAR TAPE**

Learning Standards:

Life Science

- Recognize that animals (including humans) and plants are living things that grow, reproduce, and need food, air, and water.
- Identify the ways in which an organism's habitat provides for its basic needs (plants require air, water, nutrients, and light; animals require food, water, air, and shelter).

Skills of Inquiry:

- Ask questions about objects, organisms, and events in the environment.
- Name and use simple equipment and tools (e.g., rulers, meter sticks, thermometers, hand lenses, and balances) to gather data and extend the senses.
- Record observations and data with pictures, numbers, or written statements.
- Discuss observations with others.

Student will be able to:

- Understand what owl pellets are and why owls must create them.
- Use the appropriate tools to dissect their pellet and then reassemble a skeleton of a mouse.

Vocabulary: proventriculus, regurgitation

Anticipatory set:

Talk about what parts of animals we don't eat—bones, fur, etc. We don't eat these parts not only because they wouldn't taste very good but because they have no nutrients and our body can't digest them. Owls eat the entire animal but they too are not able to digest everything. This is why owls produce owl pellets. Introduce vocabulary words while showing a diagram of the owl's digestive system (proventriculus, regurgitation). Also go over how to use the bone sorting charts to identify bones and where they are on the body.

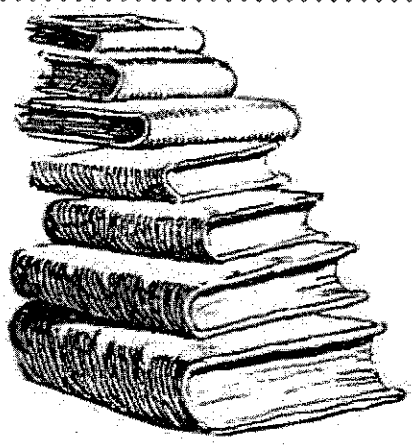
Activity:

1. At every desk there should be tweezers, gloves, a black placemat, and the attached worksheet (the worksheet should be taped to a paper plate). Pellets should then be handed out to each pair of students. The students will be sharing the owl pellets but they will each have their own worksheet.
2. Using tweezers the students should begin to dissect their owl pellet, carefully separating the fur from the bones. As bones are discovered, they should compare and contrast bone shapes with the bone sorting charts.
3. After ten minutes hand out more owl pellets so that each student has a pellet. Allow them to continue dissecting.
4. They are looking for bones, which they can match to the picture of the mouse skeleton.
5. Once the students have found bones that match the pictures they should use clear tape to attach them on top of the matching bone on their picture. Children should know that the bones are fragile and may not match the exact shape.

Closure: The owl pellets will take the entire class so you should talk about their experience after lab. Ask the students what they found inside of the owl pellets. Were they surprised? Did they understand why they found what they did?

Assessment: Participation in class discussion and activities.

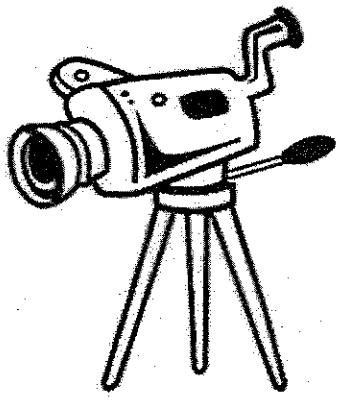
Owl Reading!



List of suggested reading for Owl unit:

- All about Owls by Jim Arnosky ISBN 0-439-05852-x
- Animal predators OWLS by Sandra Markle ISBN 1-57505-816-2
- Owls for kids by Neal Niemuth ISBN 1-55971-475-1
- Owls by Gail Bibbons (talks about anatomy in different ways) ISBN0-439-89525-*1*
- Owls whoo are they? By Kila Jarvis and Denver W. holt ISBN 0-87842-336-2
- Curious Creatures: Owls (reading Success Series) by James Robert. ISMB 076090118
- Bones Steve Jenkins ISBN 978-0-545-04651-0
- A new true book; birds of prey ISBN 0-516-01676-8
- Raptor a kid's guide to birds of prey by Christyna and Rene Laubach ISBN 1-58017-445-0
- Birds of the Night by Jean de Sart ISBN 0-88106-671-0
- Beaks by sneed B. Collard III ISBN 1-57091-387-0

Owl Videos!



List of online videos:

- http://www.youtube.com/watch?v=yps7pgq1TAk great BBC video showing an owl hunting and explaining some of it unique features.

- http://www.youtube.com/watch?v=jN2Hpd_W9g8 national geographic video on Snowy Owls.

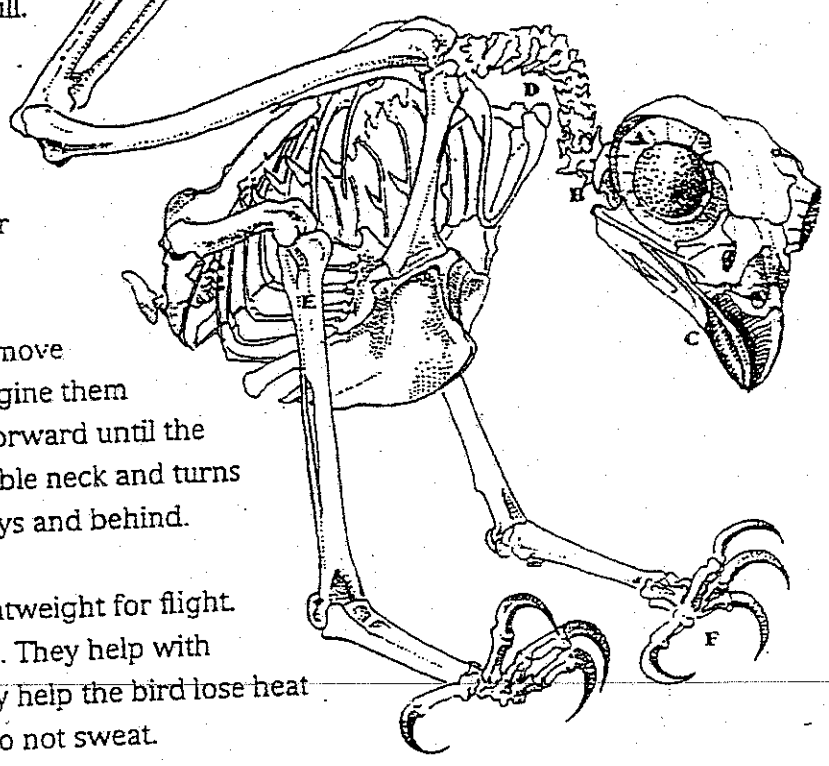
- http://www.youtube.com/watch?v=SAz1L8DlvBM cool slow motion clip of owl swooping down on prey.


2.
Paste back of tab – position on top of muscle layer tab (1) on page 18.
1.
Paste back of tab – position within the rectangle above skeleton on page 18.

name

Paste (1) muscle layer tab and (2) whole owl tab here

Skeleton Layer



A. Bony rings protect huge eyes. Owl eyes are as large as human eyes! If your eyes were as large, proportional to your head size, they would be as large as grapefruits.

B. Large, crescent-shaped ear holes lie at each side of the skull.

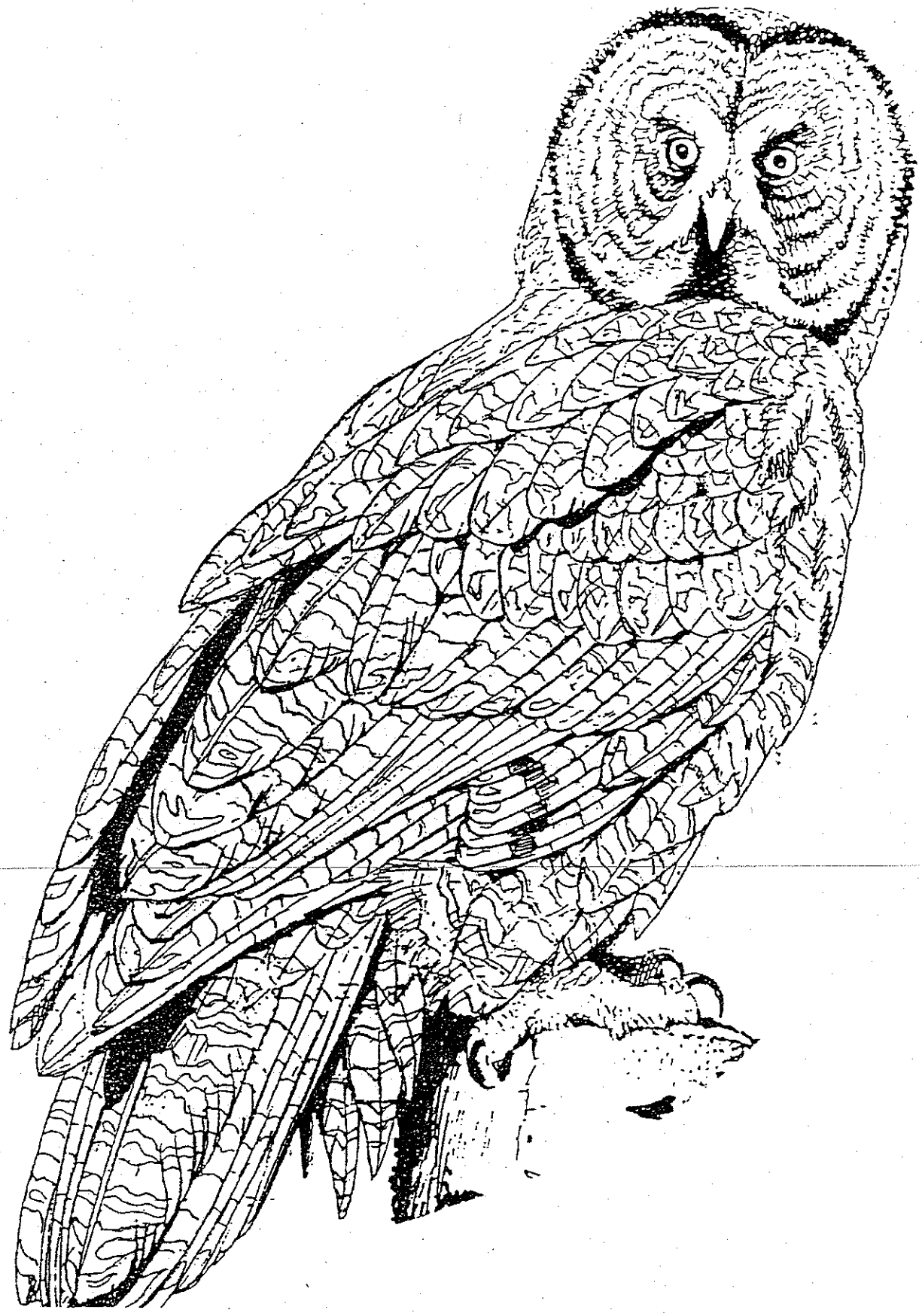
C. An owl's curved beak is used for shredding large prey. An owl swallows small prey whole. It has no teeth for chewing (see page 29).

D. An owl's big eyes cannot move much in the eye sockets. Imagine them like car headlights, shining forward until the car turns. The owl has a flexible neck and turns its whole head to see sideways and behind.

E. Bones are hollow and lightweight for flight. Some bones contain air sacs. They help with breathing during flight. They help the bird lose heat when it gets too hot. Owls do not sweat.

F. Four toes with long, pointed talons spread wide to catch prey.

_____'s Owl Book



Other facts that I know about owls...

1. _____

_____

2. _____

_____

3. _____

_____

Draw a picture of your favorite owl below.

An owl's ears are special because:

An owl's facial disc is special because:

An owl's neck is special because:

An owl's talons are special because:

An owl's eyes are special because:

An owl's feathers are special because: