Educational Program Outline

Title: Eggs to legs
Content Area: Science

Lesson Description: Students will use activities, demonstrations, investigations and dramatic play to examine the life cycles of birds and other egg-laying creatures. Animal classification and hands-on experimentation are included in this program, as well as (seasonal) visits from live oviparous animals!

CT Science Framework Standards Addressed:

*K Many different kinds of things inhabit the earth

1.2 - Living things have different structures and behaviors that allow them to meet their basic needs.

1.3 - Organisms change in form and behavior as part of their life cycles.

3.2 - Organisms can survive and reproduce only in environments that meet their basic needs.

4.2 - All organisms depend on the living and non living features of the environment for survival.

5.2 - Perceiving and responding to information about the environment is critical to the survival of organisms.

6.2 - An ecosystem is composed of all the populations that are living in a certain space and the physical factors with which they interact

Theme: Birds and other animals undergo several stages as part of their life cycles. Animals that hatch from eggs have adaptations that help them through the hatching and development processes.

Teacher Preparation: 15-20 minutes
Time to Complete: Pre-site 15-30 minutes
On site 1-2 hours
Post site 10-30 minutes
http://www.nhm.org/birds/guide/pg003.html

Materials, Equipment, Resources Included: Pre site worksheet (appendix) Mounted specimens, eggs, nests, (Seasonal) live specimens (onsite program) Post site worksheets
Materials, Equipment, Resources NOT Included: Materials for optional post site activities

Pre-site Activities:
-Complete pre site worksheets
- Make a Venn diagram of birds, reptile, and insect features.

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On-site Program:

I. Introduction and safety-

A. Topic

-There are many creatures hatch from eggs. **The study of eggs is called oology (O-ology) Oviparous (egg laying) animals can be reptiles, birds, amphibians, fish, insects or spiders.

B. Safety

-Specimens and their eggs are extremely delicate. Be careful when touching any of the items or specimens we have today. Wash your hands thoroughly as soon as we are done with this program.

II. Vertebrates- Animals with bones, skulls and backbones

A. Birds

Brought in live chicks from farm

Every bird wild and domestic lays eggs

Some of Flanders wild birds **migrate** to there nesting ground

Diversity in birds;

1. Beaks/bill

-beaks have an egg tooth when first born to help break from egg (turtles, snakes, alligators also have egg teeth)

-Beaks/bills can be pointy or flat, depending on their uses

-Birds use their beaks to preen (clean themselves), peck at prey, collect nesting materials, and defend territory

2. Feet

-Feet may have very sharp talons for catching prey

-Feet may be designed for scratching up food from dirt (chicken, turkey)

-Feet may be webbed for swimming

-Feet have scales

3. Wings and flight

a. Wings

-All birds have wings

-They are shaped differently depending on what type of movement they are designed to do. Some birds flap, some glide, some do both

-Not all birds fly (penguins and ostriches)

b. Feathers

- Birds have 3 main types of feathers: Contour: flight feathers (remiges for flying) and tail feathers (retrices for balance), and down (insulating).

-There are four other feather types: Semi plumes; Filoplumes; Bristles and Powder feathers

-Brightly colored ones allow males to attract mates while drab colored ones (typically for females) serve as camouflage.

-Feathers evolved from reptilian scales in prehistoric times

Activities:

Nature Rules! (Hand play)**-This concept will be reiterated throughout the program**

Look, Learn and Leave it Alone!

Look with your eyes (hands form binoculars)

Learn from a book (Hands form a book)

Leave it alone (Put up hands up like traffic police)

#1 Chickens Aren't the Only Ones

By Ruth Heller

While reading the story, stop and show **local oviparous** animals each page represents.

#2 Show different types of nests

Show different types of bird eggs

Show Emu egg (fragile)

Show different types of feathers

#3 Show scaly feet with claws, discuss adaptations…later compare to turtle feet.

#4 Have students stand arms lengths apart and demonstrate different types of flight. What wing shapes would work best for each?

#5 Look at different types and colors of feathers from the bin. Discuss the parts of a feather, Shaft, quill, barbs and vane

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On-site Program:

B. Reptiles

-Many reptiles lay leathery eggs in clutches that they bury or deposit in a shallow depression.

1. Snakes- Some snakes (like copperheads, boa constrictors, rattlesnakes, and garter snakes) give birth to live babies. Most snakes hatch from eggs (oviparous). Racers, bull snakes, milk snakes and green snakes are common egg-layers. The eggs are usually white and have an oblong, leathery-like shell. The female deposits her eggs in a location that is moist and relatively warm such as sand, sawdust piles, rotting stumps, or under rocks. She doesn't incubate like bird eggs; the warmth of the soil or covering and rays of the sun control the incubation process. Incubation may last up to 60 days before the young are fully developed and hatch.

2. Turtles-Turtles lay their eggs in holes that they make to incubate them. Connecticut is home to painted, spotted, sliders and other turtles. One that lives on land is the Box turtle. The female box turtle lays from two to seven eggs and then buries them in moist land in the late spring. They take 75-90 days to hatch, which has them emerging from their shells in the early fall. When the turtle hatches it is on its own. It has to find food and protect itself alone. The young often remain in the nest until the following spring

3. Alligators-North America has 1 Crocodilian-alligator mississippiensis (American Alligator) The female builds a conical nest a few feet tall to keep water out of mud and vegetation. Then she makes a depression in the cone and lays between 30 and 50 eggs. Then she covers the eggs and waits 65 days until the babies hatch and cry "nyuck...nyuck" and she digs them out and carries them to the water in her mouth!

4. Dinosaurs are extinct… but they hatched from eggs! (Compare the idea of carnivorous vs. herbivorous dinosaurs)

C. Amphibians (amphibian means two lives; one on water, one on land)

All amphibians start life as an egg in a ball of jelly. The eggs are laid in water. The egg hatches and the young amphibian breaks out of the jelly. The young amphibian has gills to breathe underwater and a tail with a fin so it can swim. When it gets bigger it starts to grow legs. When it is full grown it changes quickly to its adult body shape. It loses its gills and grows lungs to breathe air. Then it leaves the water to live on land. It looks like an adult now, only much smaller. It takes a couple of years for an amphibian to grow to its adult size. In spring the adult will return to the pond, lake or stream where it was born to look for a mate. Then the females lay eggs to start the cycle over again.

Activities:

#6 Reptiles

Show children live Eastern Box turtle in travel bucket

Other local species;

Eastern painted turtle
Spotted turtle
Snapping turtle

I told a story of the snapping turtle laying eggs in the ground. Children pretend to dig, (many eggs were laid) then cover the eggs with dirt. Mothers leave the nest spot and baby turtles have to find the pond alone.

#7 May include a visit from-

Live Spring peepers (x on back, peeping sound in spring)
Live green frog tadpoles
Live Green Frog (female)
Wood Frog eggs from **vernal pool**
Live Red Spotted Newt (salamanders live on land when they are adults…Newts live in water when they are adults. For part of a Red spotted Newts lifecycle, (red efts) they live in the forest.

Examine live or mounted specimens. Discuss life cycles as they pertain to frogs, newts and salamanders.

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On-site Program:

1. Frogs-lay eggs in sheets or groups in jellylike slime in the water-some (like bullfrogs) can lay up to 20,000 eggs at a time. The eggs hatch into tadpoles which have to stay in the water until they develop legs and can breathe air.

2. Toads-may lay groups or strings of eggs in water or damp patches on the ground. Toad eggs are poisonous to fish

3. Newts and salamanders-develop from eggs-jelly in the water, but the young develop their front legs first. The three types totally aquatic, semi-aquatic, and completely terrestrial lay eggs, but the completely terrestrial lay their eggs on land. Semi-aquatic, such as the red-spotted newt spends their middle lives on land as efts.

D. Fish- don't have legs; they have fins, but also hatch from eggs.

III. Invertebrates-

1. Insects-Many insects lay eggs, and winged-insects undergo changes in their life cycles called metamorphosis. Because insects have a tough, non-living outer covering or exoskeleton, they cannot grow steadily, but have to grow in stages by periodically shedding the exoskeleton. This process is called molting or ecdysis. The stages between molts are called instars. Winged-insects develop in stages of either egg-nymph –adult (like dragon and damselflies, Exopterygota) or egg-larva-pupa-adult (like butterflies, Endopterygota).

2. Spiders –lay their eggs inside a silk egg sac. Mother spiders may die after giving birth. Many spiderlings hatch from the sac, and go through a similar exoskeleton shedding and development process to insects.

3. Snails, leeches worms, etc-also lay eggs and develop in stages but, do not develop legs.

V. Conclusion-Many animals begin their lives as eggs and undergo amazing development processes into adulthood. Birds, reptiles, amphibians, and insects use their environments and their natural instincts to protect their young until they hatch.

Activities:

#8 View live specimens/reproductions/representations

Insects:

Plastic **preying mantis**
Preying mantis egg case with instructions
Collection of plastic insects
Butterfly life cycle cards
The Viewing magnifiers may include:
A dragonfly nymph (simple metamorphosis)
A Caddis fly larva

 # 9. Metamorphosis exercise game

Students crouch down into an egg, stand up with lots of legs, hide behind hands (chrysalis) them fly! singing… Metamorphosis

#9 Classify animals by sorting into groups of Vertebrate, invertebrate; bird reptile, amphibian, insect.

Post-site

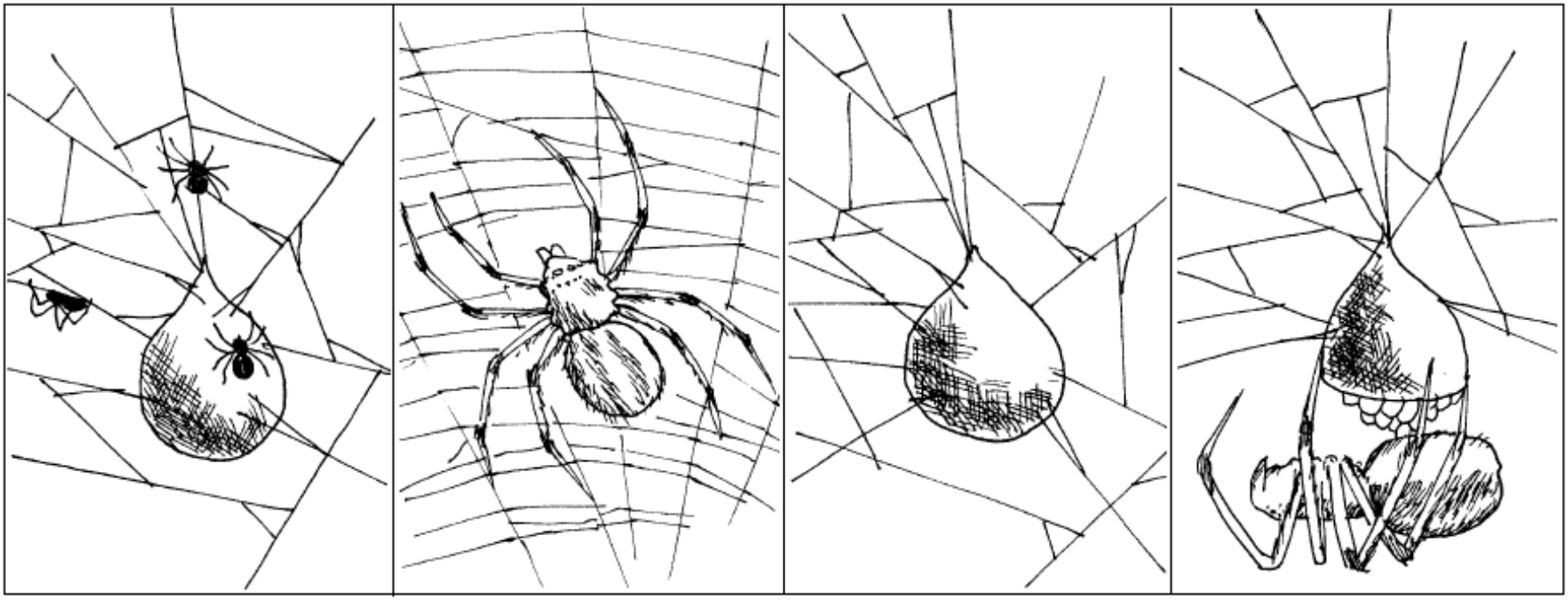
-Make a classification chart in your classroom or journal including the following animals: butterfly, robin, chicken, spider, frog, turtle, fly, snake, salamander, blue jay, and dragonfly. Include the classifications of Insect, bird, Spider, reptile, and amphibian, and then label each as Vertebrate or Invertebrate.

- (optional) make an egg carton "Imaginary Hatchery" Cut out pictures from magazines of things that hatch from eggs, and glue them into an empty egg carton.

Spider life cycle stages worksheet

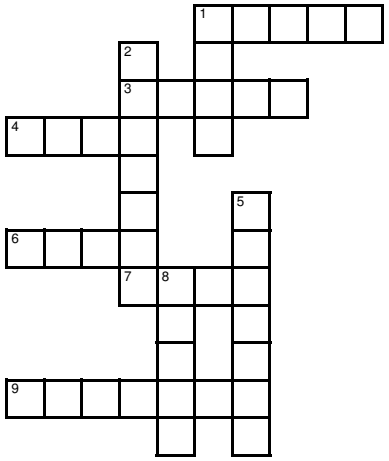
Directions

1. Cut out and color each of the four pictures.
2. Place the pictures in the correct order of the spider's life cycle.
3. Glue the pictures to a larger sheet of paper.
4. Write 1-3 sentences below each picture describing the stages.



Go Further

1. Draw your own cartoon strip that shows something funny that happens in each stage of a spider's development.



Frog Life Cycle

Across

1. What do frogs use to breathe?

3. What do tadpoles eat?

4. A place where a mother frog might lay eggs.

6. What do tadpoles use to swim?

7. What do mother frogs lay?

9. A young frog with a tail still attached.

Down

1. Adult frogs use these to move around instead of a tail.

2. A baby frog.

5. What do adult frogs eat?

8. What do tadpoles use to breathe?

Pre site activity A

Find these frog life cycle words in the grid to the right.

arms
change
eggs
frog
froglet
gills
grow
land
legs
lungs
pond
tadpole
tail
water

P	L	C	P	P	L	I	W	A	S	Z	U
A	X	A	F	P	G	H	I	X	E	V	U
F	S	L	N	T	A	X	Y	L	H	F	O
R	V	U	P	D	F	P	W	Q	V	A	F
O	O	N	X	O	W	A	T	E	R	T	G
G	W	G	J	A	N	V	I	G	J	A	I
E	D	S	C	F	Q	D	V	I	H	D	Q
E	N	G	H	D	R	S	G	L	C	P	F
R	X	J	A	R	P	O	T	L	X	O	C
D	S	A	N	E	E	E	G	S	L	L	D
S	N	R	G	I	C	L	G	L	V	E	T
U	P	M	E	F	L	E	T	G	E	T	A
I	S	S	D	P	M	G	C	K	S	T	I
K	G	R	O	W	H	S	P	C	Y	E	L