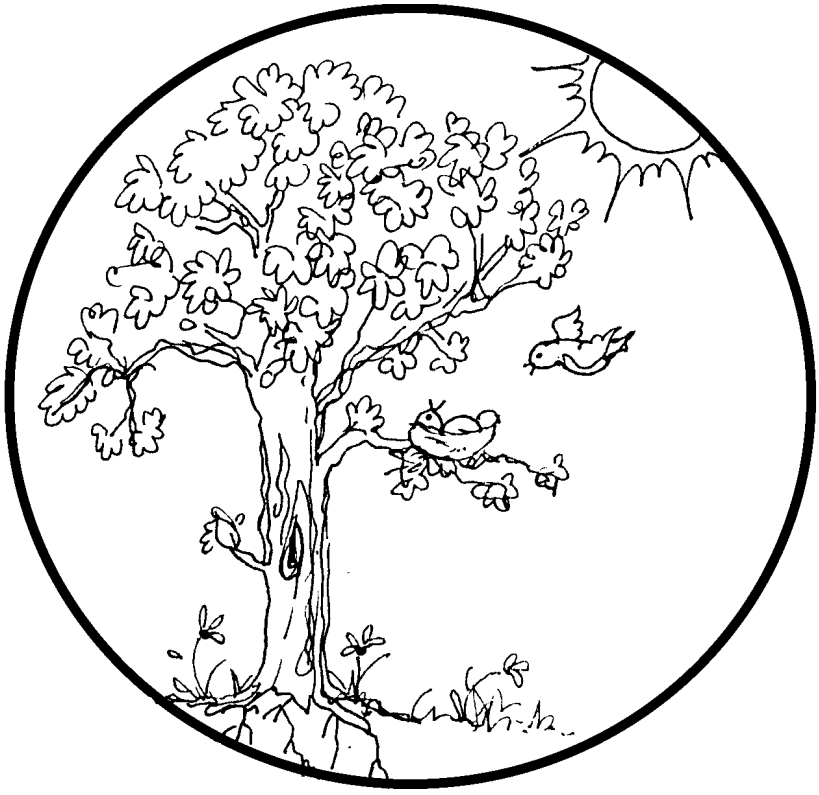
Life Cycle

Diversity in a Balance

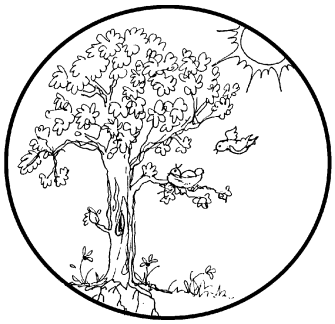
THIRD GRADE

ORGANISMS



2 WEEKS
LESSON PLANS AND
ACTIVITIES

LIFE CYCLE
OVERVIEW OF THIRD GRADE



ORGANISMS

WEEK 1.
PRE: *Comparing and contrasting invertebrates and vertebrates.*
LAB: *Learning about different marine invertebrates.*
POST: *Exploring where marine invertebrates live.*
WEEK 2.
PRE: *Comparing marine and terrestrial invertebrates.*
LAB: *Classifying different types of arthropods.*
POST: *Investigating metamorphosis.*

HUMAN BIOLOGY

WEEK 3.
PRE: *Comparing human organ systems.*
LAB: *Exploring external signs of internal systems.*
POST: *Analyzing components of the respiratory system.*
WEEK 4.
PRE: *Comparing the different sensory organs.*
LAB: *Analyzing how we taste.*
POST: *Investigating the digestive system.*

PLANT LIFE

WEEK 5.
PRE: *Investigating requirements of growth.*
LAB: *Designing an experiment testing two variables.*
POST: *Comparing how plants reproduce.*
WEEK 6.
PRE: *Exploring plant characteristics.*
LAB: *Comparing cellulose from different plant products.*
POST: *Investigating the importance of plants.*

NATURAL ENVIRONMENT

WEEK 7.
PRE: *Comparing the world's biomes.*
LAB: *Comparing locations of plant and animal biomes.*
POST: *Identifying the local vegetative biome.*
WEEK 8.
PRE: *Comparing how organisms obtain food.*
LAB: *Comparing herbivores and carnivores.*
POST: *Analyzing the importance of natural environments.*

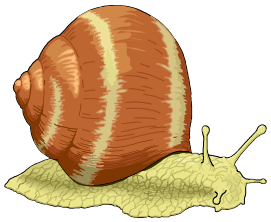
LIFE CYCLE - ORGANISMS (3A)

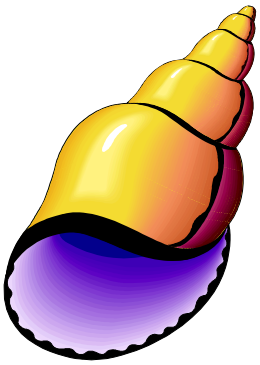
PRE LAB

Students look at different sealife specimens.

OBJECTIVES:

1. Exploring invertebrates.
2. Comparing and contrasting vertebrates and invertebrates.





VOCABULARY:

backbone
invertebrate
vertebrate

MATERIALS:

samples of invertebrates from Sealife Display Kit

BACKGROUND:

There are many organisms that live on Earth. Some have feet, some swim, and some fly. They come in all shapes and sizes. They all have two things in common: (1) they have to reproduce and (2) they have to eat. In order for humans to determine how many organisms there are, scientists developed a way to name and group them. The more we learn about organisms the more we refine our groups. In ancient Greek times, Aristotle grouped things into Animal and Plant. Now we group them into 6 kingdoms including: Animals, Plants, Fungi, Protist, Eubacteria (true bacteria), and Archaeobacteria (primitive type of primitive bacteria.)

Students have previously learned about large animals, and now we turn their attention to the smaller animals, or those called invertebrates. The animal kingdom is divided into two major groups according to the presence or absence of a spinal column (backbone). Animals with a backbone are called vertebrates and those without are called invertebrates. The development of the backbone was a major step in large animal evolution because it allowed these organisms to develop a successful life on land.

PROCEDURE:

1. Ask students which animals they think belong to either vertebrates or invertebrates. If they say "insects" or "crabs," put them under "invertebrates." As they give you examples, group them into the two groups on the board. Get the students to see that vertebrates tend to be larger organisms. Show students examples from the Display Kit of Invertebrates.

VERTEBRATES	INVERTEBRATES
birds	crabs
fish	clams
lions	lobsters
bears	bugs

2. Use the following diagram to illustrate students that invertebrates are a diverse group. They account for most of the biomass on Earth. Go over the key characteristics of each group. Students will be looking at the invertebrates in lab by observing with their eyes and the microscope. However, they need to develop a way to describe these organisms.

GROUP	EXAMPLES	CHARACTERISTICS
Porifera	sponge	pores, no organs
Cnidaria	corals, jellyfish	digestive organs
Arthropods	barnacles, shrimps, bugs	organs developed
Annelids	worms	segmented
Mollusca	clams	organs developed
Echinoderms	sand dollars, sea urchins	organs developed

3. Have students take notes. If you have internet access you may want students to start to find more information that will help them describe the different samples they will see in lab. Use some of the children's search engines.

LIFE CYCLE - ORGANISMS (3A)

LAB

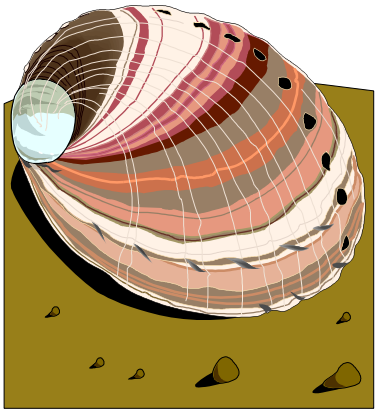
Students examine sealife specimens.

OBJECTIVES:

1. Learning about different marine invertebrates.
2. Comparing and contrasting their similarities.

VOCABULARY:

barnacle
bivalve
coral
gastropod
mollusca
sand dollar
sea urchin
sponge



MATERIALS:

Life Cycle - Organisms (3A)
Swift-GH Microscope

BACKGROUND:

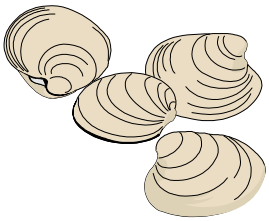
The best way for students to learn about invertebrates is to touch, observe, and record information about each group. Below is some background information on each of the organisms that the students will look at in lab.

SPONGE: The sponge is a very primitive organism. It has no organs nor tissues. It is basically a group of cells that live together. If you strain a sponge in a sieve, it will come back together. Have the students look at the pores, which are used to obtain nutrients by the sponge. Remind students that this is an animal and the sponges that you buy in the store today are usually artificial.

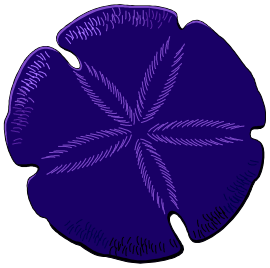
barnacle

CORAL: Coral belong to a family that include jellyfish. The sample is the skeleton of a once living organism. You may want to show the students pictures of what real coral looks like. Each hole on the skeleton represents one coral; corals live together in what is called a colony. Corals have primitive organs of digestive system and nervous system.

BARNACLE: The skeleton represents an outer covering of a living shrimp-like organism. The skeleton will adhere itself onto a surface and the animal will live there. Barnacles have a digestive, nervous, and circulatory system, but are relatively primitive. They belong to the largest grouping of invertebrates, the arthropods.



MOLLUSCA: Mollusks are usually familiar to students. Most students have seen snails and clams. Mollusks have developed organs and are very abundant in a normal seashore environment. Included are bivalves (2 shells) and gastropods (1 shell).



SAND DOLLAR AND SEA URCHIN: Sand dollars belong to a family that is very advanced compared to other invertebrates. Sea stars and sea cookies all belong to this group. Notice the 5 part symmetry.

PROCEDURE:

1. Give students the packet of organisms and identify the different organisms. However, do not say much about them. You may want to give them some clues of descriptive words to help them along like holes, spiral, etc.

2. After they finish describing each, go over them as a class. Use the information on each group to provide the students with more information.

LIFE CYCLE - ORGANISMS (3A) LAB

PROBLEM: Are there different types of invertebrates?
PREDICTION:

_____

PROCEDURE: Look at the different invertebrates by using your eyes, hand lens, or microscope. Draw and describe your specimens.

INVERTEBRATE	DESCRIBE	DRAW
SPONGE		
SNAIL		
CLAM		
SEA COOKIE		
CORAL		
BARNACLE		

CONCLUSION: What words can be used to distinguish the different invertebrates?

_____
_____

LIFE CYCLE - ORGANISMS (3A)

POST LAB

Students use research materials to find the color of marine organisms.

OBJECTIVES:

1. Exploring where marine invertebrates live.
2. Coloring exercise on sealife.

VOCABULARY:

beach
benthos
deep ocean
nearshore
nekton
plankton

MATERIALS:

worksheet
Internet

BACKGROUND:

There are many picture books and websites on sealife that can help students to investigate the environments in which invertebrates live. The marine environment is rich with life but just like land, there are certain areas where specific animals prefer to live. These preferred areas can be called marine habitats. Some habitats can be on the beach, on the bottom of the sea floor (benthos), floating on the water (plankton) swimming (nekton), in the deep ocean or nearshore. Some organisms prefer warm water and others cold. Emphasize with students that organisms, even marine ones, live with other organisms in a community.

PROCEDURE:

1. Give students the worksheet as a homework assignment. Ask students to try and find the true colors of each of the groups. Suggest going to the library, internet (do a search), or even television.

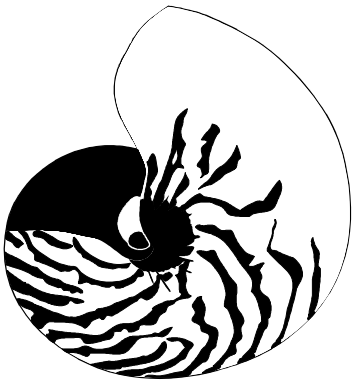
2. Go over the range of colors that students come up with. Organisms from the sea are very colorful. Barnacle (pink - purple shell, living, white to pinkish); nautilus (browns);chiton (browns-bright colors); sea stars (oranges, reds, yellows, brown, pink, blue, most colors); snail (any color); lobster (red - orange); sea anemone (any color)

LIFE CYCLE - ORGANISMS (3A) POST

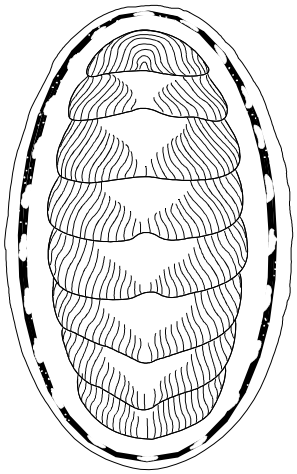
MARINE INVERTEBRATES

Use the Internet or books to find the real colors of these organisms that live in the sea.

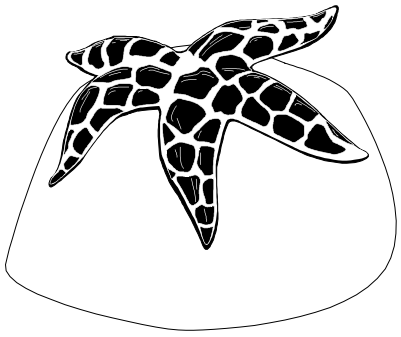
Barnacle (Arthropod)



Nautilus (Mollusca)

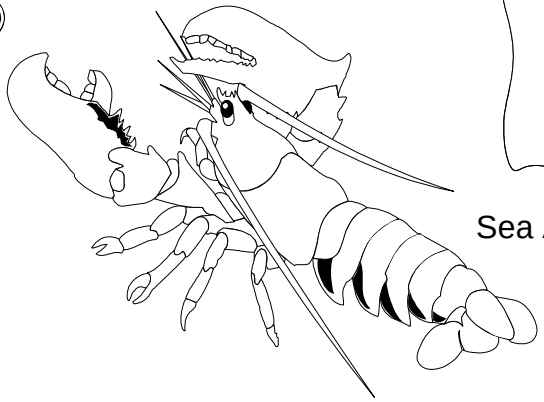


Chiton (Mollusca)

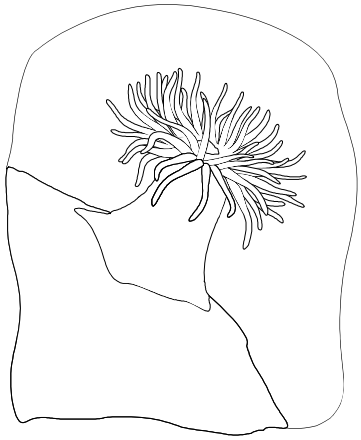


Seastar (Echinoderm)

Cone shell (Mollusca)



Lobster (Arthropod)



Sea Anemone (Cnidaria)

LIFE CYCLE - ORGANISMS (3B)

PRE LAB

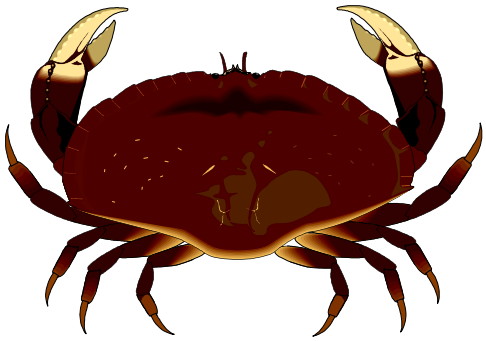
Students make a list of organisms on land and sea.

OBJECTIVE:

1. Comparing marine and terrestrial invertebrates.
2. Introducing arthropods.

VOCABULARY:

annelid
arthropod
mollusk



MATERIALS:

books on land and marine invertebrates
Internet

BACKGROUND:

Many groups of invertebrates have representatives that live in the oceans and on land. There are many invertebrates that live on land. Worms, insects, spiders, land snails, and many miscellaneous bugs are all land invertebrates. Shrimp, crabs, and clams are examples of marine invertebrates. Ask the students to describe the similarities and differences of each of the groups listed below. As they give their answers plot their data.

Organisms that live on land require mechanisms to make them mobile, in the ocean organisms can swim and float to find food. Imagine a seal on land getting food! A seal's body is not meant to be on land. There are smaller organisms that live in the oceans who get nourishment just by assimilating the needed minerals directly into their body. For instance, a person must each foods that contain calcium and phosphorous for strong bones. Clams on the other hand, can just take calcium directly from the ocean water and use it almost directly into its shell.

Birds have developed a way to fly, while it is not necessary for marine organisms to fly. Trees on land group large, while you do not have large plants that live in the oceans.

PROCEDURE:

1. Provide the students with books and/or internet access. It is an important skill for students to research information. You as a teacher can never give them all the answers, but providing them with a vehicle to learn on their own is invaluable.

2. In this exercise students will see if they can find any differences. Have them look

at the different books and magazines before they describe differences of invertebrates with some vision of what they look like.

	LAND	SEA
insects ARTHROPOD	many types, small; many fly, usually live in groups, 6 legs, 3 body segments	none
spiders ARTHROPOD	small, spin webs, 8 eyes, hairy legs	none
snails MOLLUSCA	spiral shell in most cases except slugs, breathe air	same except breathe through gills
clams MOLLUSCA	none	2 shells that are identical, shells vary
worms ANNELID	burrow tunnels, no skeleton, plain looking	have external skeletons, very beautiful feather- like bodies

LIFE CYCLE - ORGANISMS (3B)

LAB

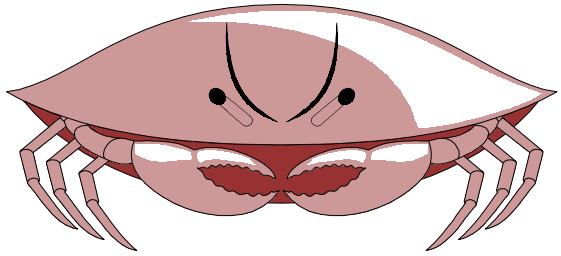
Students look at arthropods under the microscope.

OBJECTIVES:

1. Classifying different types of arthropods.
2. Observing different arthropods.

VOCABULARY:

arthropod
insect
shrimp
spider



MATERIALS:

brine shrimp (purchase from pet store)
Life Cycle - Organisms (3B)

BACKGROUND:

Arthropods are bilaterally symmetrical and have jointed body segments with a pair of appendages attached to each body segment. The body is covered with a cuticle (thickened substance) which comes off ("molts") when the arthropod gets larger. There is no internal skeleton. Their circulatory system is very simple and they reproduce by laying eggs.

Identification of arthropods is not easy, because there are so many "bugs" out there. Below is some information that may help you group arthropods for students. You may want to use books, to help identify the different arthropods. Spiders, scorpions, ticks, and horseshoe crabs belong to a group called the chelicerates. They have no antennae and the first pair of appendages are pincher-like.

The group of arthropods called mandibulates are characterized by their head appendages and include most of the arthropods. We will be concentrating on the more common insect and crustacean groups. Crustaceans, such as brine shrimp, are predominantly aquatic and have gills for respiration. A head, thorax, and abdomen are usually present.

PROCEDURE:

1. Give students a worksheet and bag of plastic insects. Have the students try and find their name. On the worksheet they should draw each of the bug, so they can use the sketch in the post lab. The important objective is to observe the different types of arthropods. Have students look at the head, the body (thorax and abdomen), and

appendages (legs).

Some of the items in the bag are not arthropods. See if students can sort them out. ***(non-arthropods)*** rattlesnake, lizard and cobra (vertebrates, reptiles), snail (invertebrate, mollusca) ***arthropods*** (invertebrates) spider, centipede, scorpion, dragonfly, ant, house fly (2), ladybug, beetle, flying insects (3)

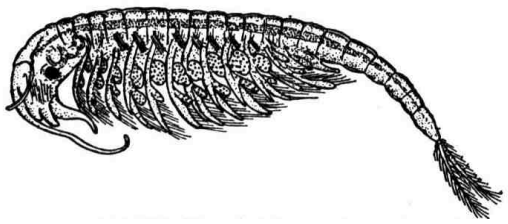
Identification of insects on worksheet: 1. Damselfly; 2. dragonfly; 3. Grasshopper, 4. Katydid; 5. Bug; 6. Stink bug; 7. Cicada; 8. leafhopper; 9. firefly; 10. ladybug; 11. fly; 12. mosquito; 13. butterfly; 14. moth; 15. bee; 16. wasp.

2. Insects are some of the most successful land organisms. Insects bite humans, irritate skin, and sometimes cause disease. The insect body is composed of a head, thorax, and on abdomen with 6 legs. The head has a pair of compound eyes.

3. Pass the horseshoe crab, and ask students if this belongs to the arthropods. Horseshoe crabs are marine organisms that belong to the crustacea group, which is a subgroup of arthropods.

4. Students should look at the crabs and count the legs. Crabs are also an arthropod.

5. Brine shrimp are an effective way to look at arthropods. You can purchase them at most pet stores. Brine shrimp are used to feed larger fish. We suggest using a petri dish or other see through container and look at them with the Swift GH microscope.



Brine shrimp belong to the genus Artemia and are one of many small crustaceans of the order Anostraca (class Branchiopoda) inhabiting brine pools and other highly saline inland waters throughout the world. Young brine shrimp hatched there from dried eggs are used widely as food for fish and other small animals in aquariums. Measuring up to 15 mm (0.6 inch) in length, the body of the brine shrimp has a discrete head with a large eye and stalked compound eyes, a thorax bearing a series of limbs, and a slender abdomen without appendages. Brine shrimp normally swim in an upside down position by rhythmically beating their legs. They feed primarily on green algae, which they filter from the water with their legs

6. As the students are looking under the microscope make sure you direct their observations by comparing, contrasting, and counting all segments.

LIFE CYCLE - ORGANISMS (3B)

PROBLEM: How can you tell one arthropod from another?

PREDICTION:_____

PROCEDURE: Sort the insects using and try to identify them using the worksheet. Describe the head, body and appendages. Fill in the information below.

insect name	head	body	appendages

Look at the horseshoe crab and crab. Describe them.

Horseshoe crab _____

Crab _____

Look at the brine shrimp under the microscope. Draw what you see on the back of the lab sheet. Describe what you see. Can you tell the difference between a female and male brine shrimp? How?

_____

_____

CONCLUSIONS: What characteristics do all arthropods share? _____

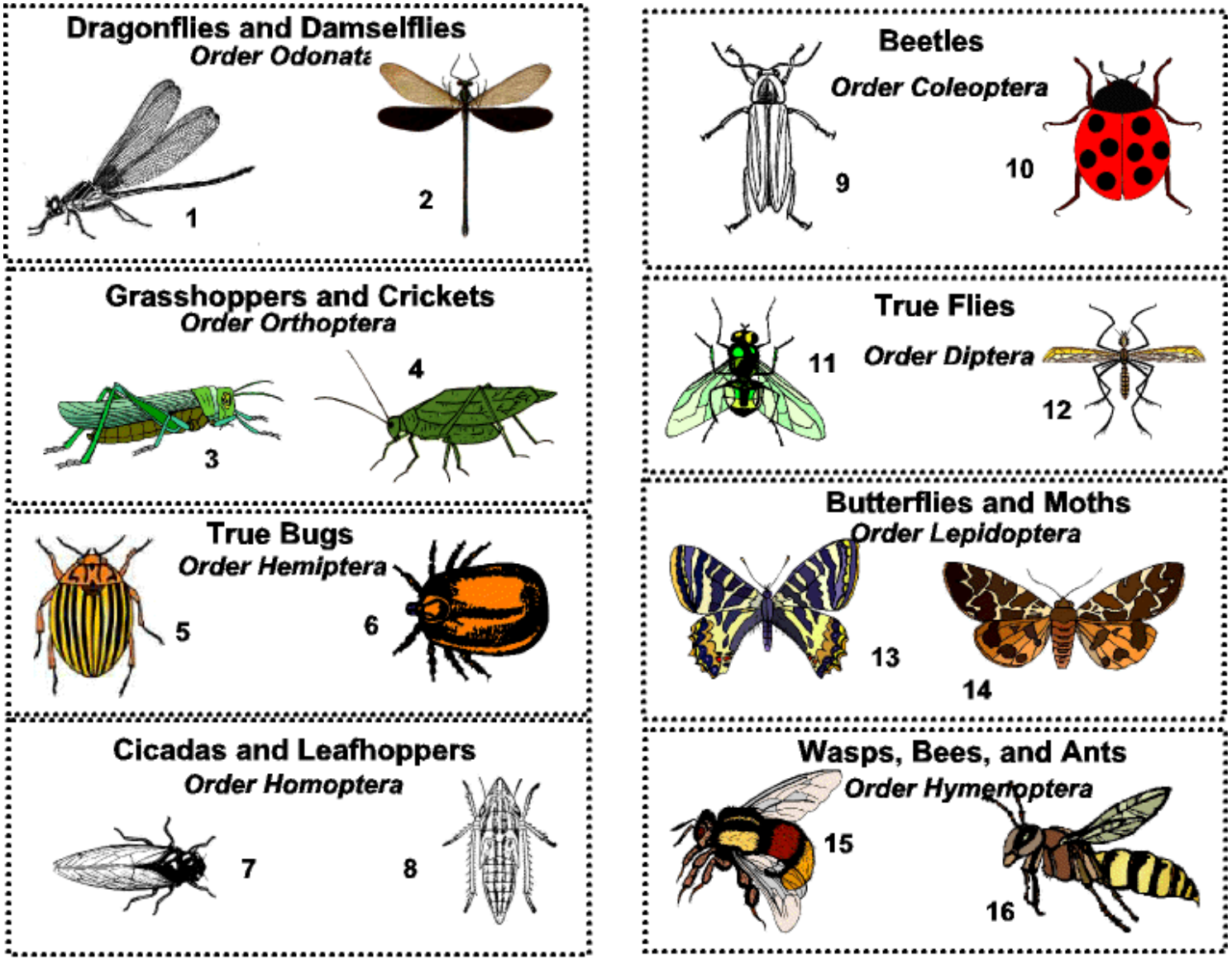
_ _ _ _ _ _ _ _

_____

Describe how the arthropods are different from each other.

_____

INSECTS


Dragonflies and Damselflies
Order Odonata
1
2
Grasshoppers and Crickets
Order Orthoptera
3
4
True Bugs
Order Hemiptera
5
6
Cicadas and Leafhoppers
Order Homoptera
7
8
Beetles
Order Coleoptera
9
10
True Flies
Order Diptera
11
12
Butterflies and Moths
Order Lepidoptera
13
14
Wasps, Bees, and Ants
Order Hymenoptera
15
16

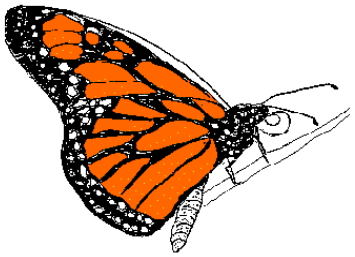
LIFE CYCLE - ORGANISMS (3B)

POST LAB

Student use puppets to write a report on arthropods.

OBJECTIVE:

1. Classifying different types of arthropods.
2. Investigating metamorphosis.



VOCABULARY:

butterfly
insect
metamorphosis
moth

MATERIALS:

arthropod puppets: dragonfly, bee, scorpion, lobster, prayer mantis, firefly, cocker road, ladybug, grasshopper, ant, and spider (if available)
Internet
appropriate books

BACKGROUND:

In this exercise the students will write a report on an arthropod of their choice. The example, of the butterfly and moth, below can be used to show the students how you can use library books to evolve a story. You may want students to give an oral report on their findings.

Moths and butterflies belong to the group called the Lepidoptera. They are medium to large sized insects with mouthparts reduced to form a coiled tube for sucking liquid food. They have antennae that are long and often feathery. They have large compound eyes with two pairs of large and showy wings. Wings have overlapping scales and moths are often hairy. The abdomen or stomach parts have ten segments. Butterflies which sleep at night, have slim bodies and clubbed antennae and rest with wings folded over their back, the hind wings almost covering the forewings. Moths, which are awake at night, never have clubbed antennae and rest with the wings in various positions.

Metamorphosis is a rapid transformation of life that some animals undergo from juvenile stage to the adult form. Metamorphosis is characteristic of amphibians but butterflies and moths also undergo change due to hormonal control. The life of a butterfly is a little different than that of a moth. Moths and butterflies go through four life stages: egg, caterpillar, pupa, and adult. The length of the life cycle varies from species to species.

Butterflies and moths both lay eggs which hatch into caterpillars of different shapes

and sizes depending on the species. The caterpillar feeds usually on leaves and grows very rapidly. It molts (sheds) its skin and develops a new one as the body grows. The metamorphosis begins when the caterpillar uses silk to attach to a plant. The skin hardens to form a chrysalis (for a butterfly) a cocoon for a moth. Within the chrysalis and the cocoon the caterpillar changes to the butterfly and moth respectively. In the adult stage the main purpose is to eat and to lay eggs. Butterflies and moths usually only live for several weeks.

PROCEDURE:

1. Have the students decide what puppet they would like to find out more about. Have the students work in teams. If you have Internet access have them do a search.

2. Instruct students to write a report after they do some research.

3. Have each of the teams give an oral report. Let them use the puppets to provide drama on the presentations.