CRITTERS CLASSIFIED

Questions
- What are the major groups of invertebrates and what do they look like?

Underlying Concept
- Scientists divide organisms into different groups (phyla) according to their shared characteristics. Most marine invertebrates fall into one of the six major phyla.

Science Skills
- observation, comparison, critical analysis

Objectives
- Students will be able to recognize the major phylogenetic groups of invertebrate animals.
- Students will also be able to work through a dichotomous key to identify the phylum of specific invertebrates.

Time Needed
- 2-hour class period

Materials
- Several pictures of various invertebrates within each phylum.
- Dichotomous key.

Vocabulary
- **Body plan:** the overall organization of an animal’s body.
- **Invertebrate:** an animal that does not have a backbone.
- **Phylum:** animals grouped together by their similar body plans.
- **Segmented:** animal whose body is divided into distinct sections so that it looks jointed, such as a centipede.
- **Tentacle:** slender, finger-like extension usually found near an animal’s mouth or head used to catch and handle food.

Teacher Background
Invertebrates are animals that do not have backbones. Over 90% of all the animals on the earth are invertebrates! There are thousands of types of invertebrates to be seen along the shores and in the ocean off Southern California.

Scientists group all animals according to the similarities in their **body plan.** A body plan is the overall organization of an animal's body: what it looks like; what kind of internal and external parts it has and where they are located; how it moves and feeds. A group of animals with a similar body plan is called a **phylum.** Organisms within a phylum have a shared evolutionary history as well, meaning they are "related" to one another through a distant common ancestor. Invertebrates are so diverse that they include dozens of phyla (plural). In contrast, **vertebrates,** animals with backbones, are only a small subgroup within one phylum.

USC Sea Grant Island Explorers
(adapted from "Marine Life of Southern California (2nd Ed.) by Donald J. Reish (1995)
Most commonly seen invertebrates belong to one of these six phyla. *If an animal belongs to one phylum, it does not belong to any other phyla.*

**6 Major Invertebrate Phyla:**
- **Porifera** - sponges  
  *(por IF er ah)*
- **Cnidaria** - sea anemones and jellyfish  
  *(ny DARE ee ah)*
- **Mollusca** - snails, slugs, squids and octopuses  
  *(mall US kah)*
- **Annelida** - segmented worms (repeated body segments)  
  *(a NELL i dah)*
- **Arthropoda** - insects, shrimps, lobsters and crabs  
  *(are thro POE dah)*
- **Echinodermata** - sea stars, urchins, brittle stars  
  *(ee ky no der MAH tah)*

We can learn to recognize all these different groups by the similarities in their body plans.

**Activity**

**I. Before discussing the major phyla:**
Have 3 pictures of different invertebrates from each of the major phyla. Tell students that you would like them to group the animals into 6 (and only 6) groups and that there should be 3 animals in each group. Have the students work in small teams to decide on their groups.

**II.** As a class, discuss the groups that the student teams have come up with. Ask them to describe why they put certain animals together.

Next, show the students the "correct" groupings of the animals (a key with the proper groups will be provided). These are the groups that scientists have come up with. Ask the students to describe the main "traits" or similarities within each group (i.e., those things that all the animals in a group have in common). The students will not be able to come up with all of the characteristic traits of each phylum just by looking at photographs. But it is important to stress to them that they will be able to experience the same process that scientists go through when they group organisms.

**III. Dichotomous Key** (also contained in PDF file *CrittersClassified.pdf*)
Hand out pictures of 3 different animals, from 3 different phyla, to the teams again. The students will work through the dichotomous key to discover the name of the phylum that each animal belongs to.
DICHOTOMOUS KEY

1. Body shape is regular................................................................. Go to 2
   Body shape is not regular (like a lumpy blob)............................. Porifera

2. Has a head or eyes....................................................................... Go to 3
   Does not have a head or eyes..................................................... Go to 4

3. Body is segmented (it has distinct body sections)....................... Go to 5
   Body is not segmented................................................................ Mollusca

4. Has tentacles ................................................................................ Cnidaria
   Does not have tentacles.............................................................. Go to 6

5. All body segments look the same.................................................. Go to 7
   Body segments do not all look the same (some are different)........ Arthropoda

6. Has spines .................................................................................... Echinodermata
   Does not have spines .................................................................. Go to 8

7. Animal has legs (even tiny ones).................................................. Go to 10
   Does not have legs ..................................................................... Mollusca

8. Animal attached to bottom............................................................. Porifera
   Not attached to bottom............................................................... Go to 9

9. Body very soft and jelly-like ......................................................... Cnidaria
   Body more firm ......................................................................... Echinodermata

10. Animal has hard covering all over body (including legs) ............ Arthropoda
    Does not have hard covering ..................................................... Annelida
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Porifera
Cnidaria (Cnidarians)
Mollusca (Mollusks)
Annelida (Annelids)
Echinodermata (Echinoderms)
Arthropoda (Arthropods)