



# SeaWorld/Busch Gardens Invertebrates 4-8 Classroom Activities

## Create an Invertebrate

### OBJECTIVE

The student will identify the differences between an open and closed circulatory system; bilateral and radial symmetry; and an exoskeleton and hydrostatic skeleton. The student will define various terminology associated with invertebrates. The student will describe the differences between the three types of symbiotic relationships (parasitism, mutualism, and commensalism).

### ACTION

1. Explain that each student will be creating an imaginary invertebrate with both assigned and selected characteristics. Each student is free to design an invertebrate of any shape, size, or color with any behaviors or adaptations. However, he or she must incorporate his or her assigned and selected characteristics into their design.
2. Assign half the class the following characteristics: open circulatory system, bilateral symmetry, and hydrostatic skeleton. Assign the other half of the class these characteristics: closed circulatory system, radial symmetry, and an exoskeleton.
3. Show the *Character Funsheet* on an overhead transparency or write the characteristics on the board. Instruct the students to select five additional characteristics from the list.
4. Divide the class into three sections. Assign the first section commensalism, the second section parasitism, and the final section mutualism. Instruct students to define the relationship they were assigned and create another animal that demonstrates this relationship to their imaginary invertebrate.
5. Instruct students to draw their imaginary invertebrate on posterboard. Next to the illustration, they should define each characteristic, explain the relationship between their invertebrate and another animal, and give two examples of real invertebrate that exhibit each characteristic. Example: Both ladybugs and butterflies have antennae. Note: the invertebrate design on the posterboard should reflect all the characteristics that were assigned (both assigned and selected).
6. Students may present their imaginary invertebrates to the class. They should explain all characteristics, relationships, and real-life examples.

## TEACHER'S GUIDE

**antennae:** A sensory appendage located on the head of many invertebrates. \*Examples: praying mantis, butterfly, ladybug.

**bilateral symmetry:** A form or shape that has two identical parts on either side of an axis. \*Examples: flatworm, lobster, centipede

**bioluminescent:** Light that is produced by living organisms. \*Examples: fireflies, dinoflagellates.

**closed circulatory system:** The blood in a closed circulatory system is contained within vessels. Blood is pumped by the heart through vessels and does not fill body cavities. \*Examples: earthworms, squids, octopuses.

**commensalism:** One of the three types of symbiotic relationships in which one individual lives close to or on another organism and benefits while the host is unaffected by the association. \*Example: Pilot fishes and remoras with sharks. These fishes get the crumbs left over when the host makes its kill.

**exoskeleton:** A structure that provides support to invertebrates. It is secreted by the ectoderm or epidermis (skin) and is similar to a shell (hard outer covering). \*Examples: horseshoe crab, lobster, insects.

**hydrostatic skeleton:** A support structure that is required for some invertebrates' muscle attachment and movement. This structure has fluid enclosed within a muscular wall. \*Examples: sea anemone, earthworm.

**jointed appendages:** These are appendages with joints and it is a distinguishing characteristic of the phylum Arthropoda. The jointed appendages function for locomotion, feeding, and reproduction. \*Examples: ticks, scorpions, spiders, millipedes, centipedes, insects.

**mutualism:** One of the three types of symbiotic relationships in which the interaction of two different species derive benefit from the association with one another and in fact is necessary for both organism's survival. \*Example: Termites and the protozoa living within the termite's stomach. The protozoa function to digest the wood that the termite consumes and the termite benefits by living off the nutrients the protozoa supplies after the wood has been digested. The two organisms need one another to survive.

**nematocyst:** A stinging cell that delivers venom when wielded into attackers and prey.

## MATERIALS

### For each student:

- library or Internet access
- posterboard
- colored pencils or markers

### For class:

- copy of *Character Funsheet* on overhead transparency
- copy of *Teacher's Guide* on left

Examples: Jellyfish, fire coral, sea anemone.

**ocelli:** The eye structure in many invertebrates. It may be a simple eye or an eyespot. \*Examples: bumblebee, fruit fly, house fly.

**open circulatory system:** The blood in an open-circulatory system is not contained within vessels. Blood is pumped by the heart directly into the body cavity and surrounds the tissues. \*Examples: insects, arthropods, molluscs.

**oscula:** The large openings in sponges that function to filter water out of the organism. \*Examples: red boring sponge, finger sponge.

**ostia:** The small openings in sponges that function to filter water into the organism.

**parasitism:** One of the three types of symbiotic relationships in which the condition of an organism living in or on another organism benefits and the host is harmed. Destructive symbiosis. \*Example: A tick (parasite) feeding on the blood of a dog (host).

**radial symmetry:** The body is symmetrical in shape, size, and position of corresponding parts around a central axis. \*Examples: jellyfish, anemone, seastar, sea urchin.

**radula:** A rasping (rough) tongue that is found in many mollusks. \*Examples: snail, chitin, abalone, limpet.

**spiracles:** These are small external tracheal (windpipe) openings in arthropods. \*Example: ticks, scorpions

**symbiosis:** Is the intimate association between two organisms. There are three types of symbiosis: mutualism, commensalism, and parasitism.

**tentacle:** Is a soft, pliable, un-jointed, protruding appendage. \*Examples: octopus, sea anemone.

\*Note: Student examples may vary.

# Character Funsheet

**muscular foot**

**radula**

**bioluminescent**

**antennae**

**jointed appendages**

**ocelli**

**nematocysts**

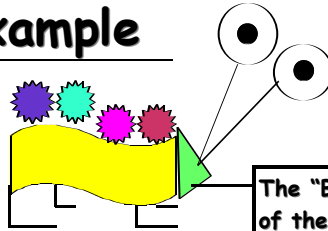
**ostia and oscula**

**spiracles**

**tentacle**

# Teacher Example

Imaginary Invertebrate: "The Bleep"



The "Boop" is a parasite of the "Bleep" because it takes blood from them causing the "Bleep" to become tired and sometimes sick.

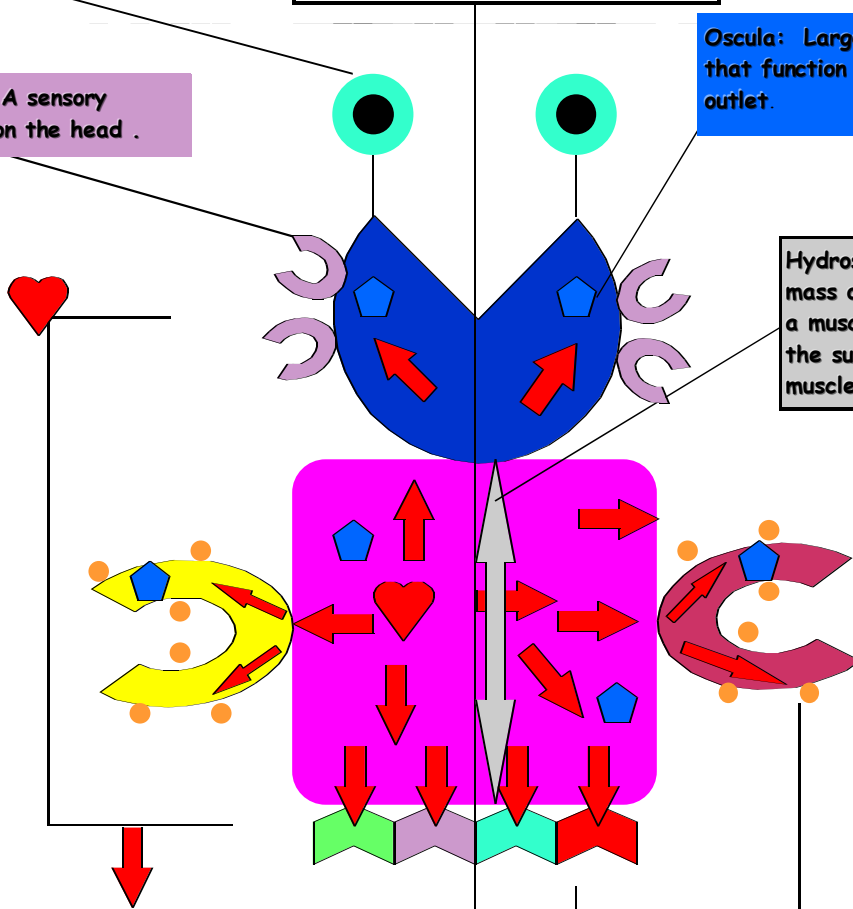
**Bioluminescent Eyes:** The production of light by living organisms.

**Bilateral Symmetry:** A single plane can divide an object into two mirror images.

**Antennae:** A sensory appendage on the head.

**Oscula:** Large pores that function as a water outlet.

**Hydrostatic Skeleton:** A mass of fluid enclosed within a muscular wall to provide the support necessary for muscle action.



**Open Circulatory System:** Blood is pumped by the heart into the body cavity, where the tissues are surrounded by blood.

**Tube Feet:** Hollow appendages connected to the water-vascular system, used in some species for locomotion and in others for feeding.

**Nematocyst:** A capsule within specialized cells of some cnidarians containing a barbed threadlike tube that delivers a paralyzing sting