

The Blue Crab Life Cycle

Objectives:

- 1) Students will learn the life cycle of Blue Crabs.
- 2) Students will learn about the habitats, predators, and prey of blue crabs at each life stage.
- 3) Students will compare the blue crab life cycle to the life cycle in mammals and identify the costs/benefits of each type of life cycle.
- 4) Students will generate questions regarding blue crabs and their life history.

Materials needed:

Each group will need a dissecting microscope and preserved specimens of blue crabs in the zoeal, megalopal, and juvenile and/or adult life stage (If one or more life stages cannot be obtained, a photograph of that life stage can be substituted).

Introduction:

The blue crab, *Callinectes sapidus*, is a marine crustacean (other crustaceans include lobsters). It is an extremely important marine species in the state of North Carolina. Its fishery represents the largest in terms of total weight and dockside value. The blue crab is also commercially important to other states on the East Coast and Gulf Coast of the United States. With so many states relying on the blue crab to provide food and jobs to its citizens, scientists have done much research to further understand blue crabs.

The blue crab, like many other marine invertebrates, have what is called a **complex life cycle**. Animals with complex life cycles have multiple stages throughout their lifetime, each with its own characteristics. Many times organisms in one life stage will live, behave, and feed in ways that are different from their other life stages. Blue Crabs have 4 life stages. This activity will introduce you to each life stage, allowing you to see crabs in each stage and explore the unique characteristics of each stage.

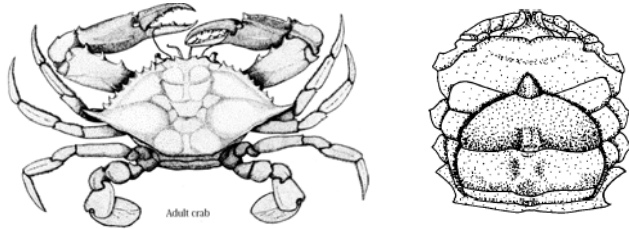
Procedure:

- 1) Read the introduction to each life stage;
- 2) View and draw the blue crab in that life stage;
- 3) Answer the questions that follow;

Life Stage 1: Zoea (Larvae)

Adult blue crabs live in **estuaries**, areas such as Pamlico Sound where salt water and freshwater mix. After mating, a female carries a brood of 800,000-8,000,000 eggs under her apron on the underside of her body (see Fig 1.)

Fig. 1 The adult female blue crab from the top (left) and the underside (right). The apron of the adult female blue crab is the shape that looks rounded with a point on the top (it looks like the capitol dome).



When the eggs are ready to hatch, the female migrates to mouth of the estuary (Oregon Inlet or Hatteras Inlet in NC). The eggs hatch and become **zoea**, or larvae. Upon hatching, zoea are less than 1 mm, and carried by currents out to sea, where they will spend the next 30-45 days in this life stage.

1. Draw a blue crab zoea in the space to the right.

2. Where does a blue crab at this life stage live (open ocean, seafloor, seagrass, etc.), and how is it adapted to live there (hard shell for protection, large eyes to see, etc.)?



3. At this stage, what do you think a blue crab eats, how does it move, and what eats it?

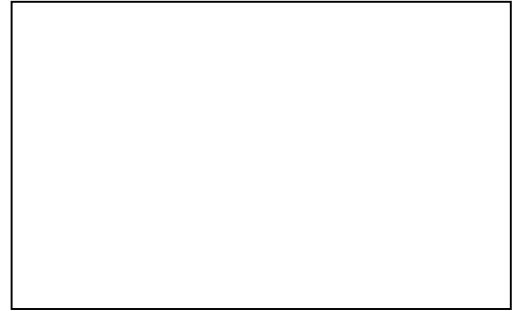
4. Generate one question you have about the blue crab at this life stage. (Ex. How close to shore do zoea live?)

5. How would you answer that question? (Ex. Use a boat to drag nets through the water at different distances from the coast, and see where the most are caught)

Life Stage 2: Megalopa (Post-Larvae)

After 7-8 zoeal stages and 30-45 days, a zoea **metamorphoses** (changes into) to become a **megalopa**, which are 1-3 mm. At the megalopal stage blue crabs use light, turbulence, and salinity to tell them when to swim upward in the water, where they are carried by tides at night into the estuary. In North Carolina, most megalopae enter the Pamlico Sound region through Oregon and Hatteras Inlets. Megalopae look for a settlement with high amounts of food and places to hide. When they find it, they can molt to their next life stage.

1. Draw a blue crab megalopa in the space to the right and explain how it looks compared to earlier life stages



2. Where does a blue crab at this life stage live (open ocean, seafloor, seagrass, etc.), and how is it adapted to live there (hard shell for protection, large eyes to see, etc.)?

3. At this stage, what do you think a blue crab eats, how does it move, and what eats it?

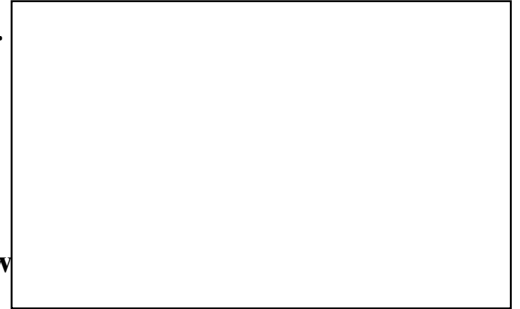
4. Generate one question you have about the blue crab at this life stage.

5. How would you answer that question?

Life Stages 3 & 4: Juvenile and Adult

Once the megalopa finds a suitable habitat to settle (usually seagrass), they metamorphose into juveniles which are 3mm and larger. Juveniles will molt, or shed their outer shell, numerous times to grow into adults, which can grow to 120 mm or more and are sexually mature.

1. Draw a blue crab juvenile in the space to the right and explain how it (and adults) look compared to earlier life stages



2. Where does a blue crab at this life stage live, and how is it adapted to live there?

3. At these stages, what do you think a blue crab eats, how does it move, and what eats it?

4. Generate one question you have about the blue crab at these life stages.

5. How would you answer that question?

6. How does the life cycle of the blue crab compare to the life cycle in mammals (such as humans)? How are they similar? How are they different?

7. What do you think are the advantages/disadvantages of having a complex life cycle, like the blue crab?