

GRADE: 7 – 12

## Et tu, Crawfish?

### OVERVIEW:

This lesson focuses upon the habitat of the commercial crawfish in Louisiana in addition to its distribution, anatomy, and ecology.

### ITV SERIES:

*CRAWFISH!*

### LEARNING OBJECTIVES:

Students will be able to:

- ❖ describe the significance of the two ecosystems utilized for commercially harvesting crawfish
- ❖ list the number of crawfish species worldwide and in North America
- ❖ be able to identify the two major species of crawfish in Louisiana
- ❖ be able to recognize the major external anatomical features of the live crawfish and their functions
- ❖ describe how a crawfish feeds, identifying the appendages used in this process.

### MATERIALS:

For each group of 4 students:

- Black Line Masters
  - Crawfish World Distribution Map
  - Crawfish external features
- live crawfish (preferably both white river and red swamp species)
- clear bowl or pan
- water
- toothpicks
- small pieces of liver or other meat
- hand lens
- ruler
- paper and pencil

For class:

- biology books, encyclopedias, invertebrate books with pictures and descriptions of crawfish

### PRE-VIEWING ACTIVITIES:

Crayfish, crawfish, crawdad and mudbug are all different names for the same freshwater cousin of the lobster. Regardless of what they are called where you live, chances are that some can be found in nearby streams and ponds. Wherever land is naturally wet or has been flooded by man, this animal can usually survive.

In Louisiana and in an increasing number of other states and countries, the science of aquaculture has increased the production of crawfish by promoting the pond- raised crawfish. However, in Louisiana, the Atchafalaya Basin still provides a significant number of the crawfish consumed.

There are over 400 species of crawfish in the world, with approximately 250 species in North America. Louisiana has identified 32 different species; however, the white river crawfish (*Procambarus acutus*) and the red swamp crawfish (*Procambarus clarkii*) are the most commonly found species and make up the majority of those harvested both in the swamps and in ponds.

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Review for students the definition of a species if this term has not been used up to this point. Ask students to write down the following: 1) how many species of crawfish they think are known, worldwide; 2) how many species in North America; 3) how many species in Louisiana; and 4) the most common species found in Louisiana.

Many students in Louisiana have eaten crawfish but probably have not paid any special attention to the anatomy of the animal. Observing a live crawfish can reveal much about how the animal swims, feeds, and crawls. As students examine a live crawfish, ask them how they think the crawfish eats and where its mouth parts are located and what the various appendages are used for. By placing the crawfish in a bowl of water and on a table top, students can easily make these observations. Crawfish can be obtained in Louisiana from fish markets from December–June and from bayous and ditches most of the year. Live specimens can also be purchased from supply houses .

### FOCUS FOR VIEWING:

It is important to give students a specific responsibility while viewing. Knowing what they are expected to learn allows them to focus on specific information and concepts while watching the programs. Focus students' attention on the following points:

*As you view the video, be cognizant of the differences and similarities of the pond ecosystem and the natural "basin" ecosystem. Which of these two ecosystems do you think are the most dependable to the crawfish farmer from an economic standpoint?*

### VIEWING ACTIVITIES:

Prior to starting the video, ask students where the crawfish come from that they consume as a food source, i.e. where does the seafood market get them? (Many students may have crawfished along the side of a ditch with a piece of string and meat; however, this is not the most effective manner in which to gather sacks of crawfish!) Relate to students that the Atchafalaya Basin was the original source of crawfish; however, techniques developed in the field of aquaculture have introduced the pond raised crawfish, which is a fast growing industry in Louisiana. **START** the tape where Dr. James Avault begins to speak. Run the tape until the frame shows small children gathered around a series of aquaria. **PAUSE** the tape. Discuss with students the similarities and differences between the ponds and the basin ecosystems which they saw in the video.

Ask students if they think that crawfish are found outside of Louisiana or North America. Ask them to predict how many different species they think are worldwide; in North America; in Louisiana. **START** the tape and run through the discussion by Dr. Avault. **STOP** the tape.

Compare student answers with those provided on the tape. Show students the map of the distribution of the red swamp crawfish worldwide.

If available, show students live examples of both the red swamp and the white river crawfish. Have students examine the two species and see if they can determine how to tell them apart.

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See if students can identify the sex of the crawfish. The adult females have a seminal receptacle between the last pair of walking legs on the underside. The adult male has two “copulatory stylets” which are really modified walking legs which are used to deposit sperm into the female. Most high school biology books have good illustrations of these animals.

**NOTE:** Although crawfish have a hard exoskeleton, they are nevertheless fragile animals. Caution students to handle their specimens with care, being careful to pick the live crawfish up by placing the carapace (middle of the back) between the thumb and forefinger.

### POST-VIEWING ACTIVITIES:

Have students observe the crawfish walking on the table top and swimming in a bowl of water. Let students decide by observation the functions of the various appendages.

Provide students with a clear bowl in which to observe the crawfish swimming. Have them determine which appendages are used for swimming, walking, eating, etc.

Have students measure the lengths of the various appendages and compare specimens across the groups.

Allow students to feed the crawfish raw meat which has been cut into small pieces. The crawfish sense the meat by “tasting” it via the water.

Place the crawfish in a small, shallow pan of water and put the meat in the water near the animal. If the crawfish does not seem interested, place a piece of meat in one of its pinchers. If this does not elicit a response, dip the meat on a toothpick into the water and place it near the mouth so that the water runs into the mouth. Hopefully, the crawfish will take the bait!

### ACTION PLAN:

Have students explain and demonstrate the actions of a live crawfish to younger students who might be in the school setting. Find out from the local Cooperative Extension Service what the current data is regarding number of acres of ponds harvested in Louisiana this past year; also get an estimate on the net worth of the crawfish crop.

Crawfish are considered a “cash” crop. Explore reasons as to why the numbers that are released from such agencies as the extension service are not necessarily the actual numbers.

Check with any popular local restaurant to see how many pounds of crawfish they purchase during a given year, and find out how they come up with that amount.

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### EXTENSIONS:

**MATH AND ECONOMICS:** Contact the Co-operative Extension Service in your area. Find out the number of pounds of crawfish harvested during the last 5 years from both the basin and ponds. Graph the information and explain.

**SCIENCE:** Research is being conducted at various universities to find a practical use for *chitin*, one of the major components in the crawfish shell. Find out what currently is being done or proposed with this chemical ingredient.

Tremendous amounts of crawfish are consumed by the residents of Louisiana on a yearly basis. Find out the nutritional value of crawfish and if these bottom feeders take up any pesticides in their systems.

Many farmers alternate their rice crop with a crawfish crop. Various chemicals are used on the rice crops during the year. Find out what chemicals the crawfish take up into their bodies, which might be stored, and what potential harm, if any, there is to the consumer.

Water is diverted from the Mississippi River into the Atchafalaya River. With the water comes sand and silt which has an effect upon the ecology of the Atchafalaya. Have students investigate this relationship and determine if there are any projections as to how long the basin will be a suitable habitat for crawfish.

**TECHNOLOGY:** If students are connected via a network with other states, conduct a survey and find out how the crawfish is perceived, i.e. is it used as a food, are they plentiful, what species are most prevalent in that particular state?

**SOCIAL STUDIES:** Only a few years ago, rice farmers tried to rid their fields of the pesky crawfish. Today, many rice farmers make as much, if not more, on the crawfish crops that they raise in conjunction with their rice. Find out why the farmers are now welcoming the crawfish and how this symbiotic relationship emerged.

There is a strong connection between the crawfish, the Atchafalaya Basin, the early Native Americans, and the Cajun culture in Louisiana. Investigate the early history of the crawfish in Louisiana and the role of the crawfish other than as a food source.