

On the Trail of the Blue Crab

Students will practice subtraction skills by tracking the movements of blue crabs in the Hudson River estuary.

Objectives: Students will solve word problems that require them to:

- subtract using data from tagged crabs to calculate distance traveled and elapsed time;
- understand that blue crabs migrate.

Grade level: Elementary (Grades 3-5)

Subject Area: Math, Social Studies (Geography), Science

New York State Learning Standards:

Mathematics, Science, & Technology Standards 3, 4
Social Studies Standard 3

Skills:

- Use whole numbers to identify locations and measure distances.
- Subtract two digit whole numbers.
- Apply mathematics in real world settings.
- Reason mathematically.

Duration:

Preparation time: 5 minutes

Activity time: 40 minutes

Materials: Each student should have:

- Worksheet: On the Trail of the Blue Claw Crab
- Hudson River Miles map
- Pencil

Background:

The blue crab's life cycle involves migration between regions of high and low salinity in estuaries. This migration is aided by back legs, shaped like paddles, that enable the animal to swim rapidly. To track crab migration, scientists attach numbered tags to blue crabs. People who catch tagged crabs contact the scientists using a phone number on the tags. The data they provide adds to knowledge of how far and how fast the crabs migrate.

Also called blue claw crabs, these crustaceans are born in the saltiest parts of the estuary around New York Harbor. They then migrate upriver into less salty areas of the Hudson which serve as nurseries, providing plenty of food and shelter from predators. Male crabs tend to go further north than females, entering fresh water and sometimes reaching the Federal Dam at Troy. Females stay downriver, closer to the high salinities that their eggs will need to develop properly. As winter approaches, blue crabs move back downriver to New York Harbor.

Distances on the Hudson are often measured in Hudson River Miles. Hudson River Miles start at the southern tip of Manhattan. This spot, called The Battery, is River Mile 0. The estuary part of the Hudson ends at the dam in Troy at River Mile 153. Only two digit milepoints are used in this lesson, though blue crabs do travel more than 100 miles upstream.

Activity:

1. In preparation for this lesson, have students do the Readings in Hudson River Natural History lesson titled "Blue Claw!"
2. Discuss the concept of migration and how it fits into the blue crab's life cycle.
3. Introduce the Hudson River Miles system; show students the Hudson River Miles map.
4. Go over the worksheet with the class or hand out as an in-class or homework assignment.

Assessment:

- Have students share answers to questions from worksheets, or collect and grade sheets.
- Make up similar elapsed time/distance problems for quiz.

Vocabulary:

estuary: a body of water in which fresh and salt water meet

fresh water: water that is not salty like ocean water (rainwater is freshwater)

Hudson River miles: distance measured north from the Battery at Manhattan's southern tip

life cycle: the stages of form and activity

through which a living thing passes as it develops from a beginning stage to an adult able to reproduce and restart the cycle

migrate: animals moving from one place to another

recapture: to capture again

scientist: a person skilled in science

Resources:

There are many websites about blue crabs, among them "Blue Crab Info" at <http://www.bluecrab.info/>. While much of the research and information available on crabs focuses on the Chesapeake Bay, a brochure and technical reports about Hudson River crabs are available from DEC at <http://www.dec.ny.gov/animals/6953.html>.

On the Trail of the Blue Crab: ANSWER KEY

On the Trail of the Blue Crab



The blue crab lives in **estuaries** like the Hudson River. In its **life cycle**, this animal **migrates** between very salty water and less salty water. Sometimes blue crabs even swim into **fresh water**.



Scientists attach numbered tags to blue crabs to learn about crab migrations. A phone number is printed on each tag. A lucky person who catches a tagged crab can call to report where and when the crab was caught.

Use the Hudson River Miles map to answer the questions below. They use information about crabs tagged in 2005. Show your work.

1. A blue crab with tag #1328 was released on September 14 near Newburgh at **Hudson River Mile** (abbreviated HRM) 56. This crab was **recaptured** on September 23 at HRM 36 near Haverstraw.

(a) How many days did this crab take to swim from Newburgh to Haverstraw? 23
 23
 $- 14$
 9 days

(b) How many miles did the crab travel?
 $56 - 36 = 20$ miles

(c) Using the Hudson River Miles map, tell which direction the crab traveled on its journey from Newburgh to Haverstraw. south

2. On August 10, a crab with tag #1527 was released near the Beacon-Newburgh Bridge at HRM 63. It was recaptured on August 19 at HRM 74 near Poughkeepsie.

(a) How long did it take this crab to go from HRM 63 to HRM 74? 19
 $\underline{\quad 9 \text{ days} \quad}$ $\underline{\quad - 10 \quad}$
 9 days

(b) How many miles did the crab travel?
 $\underline{\quad 11 \text{ miles} \quad}$ $74 - 63 = 11 \text{ miles}$

(c) In what direction did this crab travel? $\underline{\quad \text{north} \quad}$

3. Blue crab #1872 was tagged and released on August 17 near Newburgh at HRM 56. It was recaptured on August 24 near Poughkeepsie at HRM 73.

(a) How much time went by from when the crab was tagged to when it was recaptured? 24
 $\underline{\quad 7 \text{ days} \quad}$ $\underline{\quad - 17 \quad}$
 7 days

(b) How many miles did the crab travel?
 $\underline{\quad 17 \text{ miles} \quad}$ 73
 $\underline{\quad - 56 \quad}$
 17 miles

(c) In what direction did this crab swim? $\underline{\quad \text{north} \quad}$

4. Blue crab #450 was tagged and released near the Beacon-Newburgh Bridge at HRM 63 on June 20. On June 26 it was recaptured near Croton at HRM 35.

(a) How long did it take this crab to travel from HRM 63 to HRM 35?
 $\underline{\quad 6 \text{ days} \quad}$ 26
 $\underline{\quad - 20 \quad}$
 6 days

(b) How many miles did the crab travel?
 $\underline{\quad 28 \text{ miles} \quad}$ 63
 $\underline{\quad - 35 \quad}$
 28 miles

(c) In what direction did it swim? $\underline{\quad \text{south} \quad}$

5. Challenge question: Imagine that you caught blue crab #450 again one year later. Do you think it would still have its tag? Why or why not? *Hint: How do crabs grow?*

The crab would probably not have its tag. It grows by shedding its shell and along with it the tag.

