

The Elizabeth River Project's **Dominion Energy** **Learning Barge**



MISSION: Making restoration of the Elizabeth River a reality.

AWARD WINNING: Students learn by doing aboard the 120'x 32' steel deck barge designed by the University of Virginia and owned and operated by The Elizabeth River Project. The barge is a unique and powerful living laboratory for students to learn about river science, the Elizabeth River watershed, ecosystem, stewardship and restoration efforts. As America's Greenest Vessel, her "green" design demonstrates sustainable practices for home and school. Students come aboard thinking globally and leave equipped to make a difference in their community. The Learning Barge's education program received the 2011 Environmental Excellence Award from SeaWorld Busch Gardens, 2014 Governor's Gold Award for Sustainability and 2015 VA Env. Excellence Award from Dept. of Conservation and Recreation.

2019-2020 **GreenSTEM** **RIVER RESILIENCE** **Project Blue Crab**



Callinectes sapidus

NEW PROGRAM: To foster river stewards and teach resilience, students perform a scientific field investigation to answer, "**How will sea level rise and increased flooding affect me, the blue crab and my community, and what action can I take to protect the future of the blue crab and my community?**"

To begin, students are divided into small groups and rotate to six learning stations performing hands-on activities, identifying species, gathering and recording data and utilizing tools like field scopes, secchi discs, monoculars and water quality equipment.



SAFETY: The barge is Coast Guard certified and stays tied to a dock during the entire program. One chaperone or teacher is recommended per 10 students.

IDEAL GROUPS

20-60, preK-university (90 maximum)
Public, private and home schools
youth organizations and scouts

TO SCHEDULE

Email Robin Dunbar, Deputy Dir. – Education
rdunbar@elizabethriver.org or call 757-392-7132
You can also fill out a Request Form found at
www.elizabethriver.org (Learning Barge Page)

Helpful information to provide when scheduling:

- 1.) How many students
- 2.) Grade level of students
- 3.) Season or month interested in
- 4.) Name of school and your contact info.

PROGRAM TIMES

Monday – Friday. Closed holidays.
Must reschedule if raining or extreme weather.

Typical time slots:

9:30-11am or 10-11:30am
11-12:30pm or 11:30-1pm

Seasons include:

Fall: Oct. 1 – Dec. 13
Spring: April 1 – June 8
Summer: To be determined.

TEACHER RESOURCES

Additional activities are available at
www.elizabethriver.org

PRICE (Sliding Scale – You choose.)

\$9-\$12 **1.5 hour** program

\$5 **1-hour** preschool & summer program

NEW pricing – Please contact Robin Dunbar, rdunbar@elizabethriver.org to discuss pricing and sliding scale. Sliding scale based on your budget. Teachers and chaperones are free.

DOCKING SITE

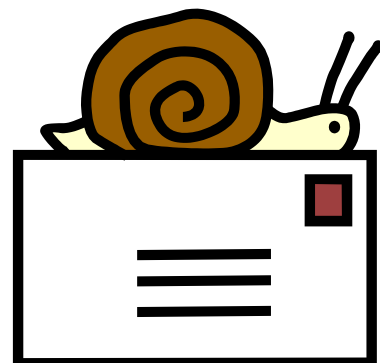
Grandy Village Learning Center
2971 Kimball Loop Terrace
Norfolk, VA 23504

WHAT TO BRING

Sunscreen, water bottle, hat, jacket/
Raincoat, closed toe shoes.

SNAIL MAIL THE CREW

Students are encouraged to SNAIL MAIL the barge crew by writing a letter and sharing what they will do to support a healthy river. Write: The Learning Barge Crew, The Elizabeth River Project, 475 Water Street, C103A, Portsmouth, VA 23704.





VIRGINIA STANDARDS OF LEARNING

SCIENCE: **K:** 1,4, 5, 6, 8, 9,10 **1:** 1, 2, 3, 4, 5, 6, 7, 8 **2:** 1,4, 5, 6, 7, 8, **3:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
4: 1, 3, 4,5, 6,7,8 **5:** 1,4, 5, 6, 7 **6:** 1, 2, 3, 4, 5, 6, 7, 8, 9 **LS:** 1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12,
14, **PS:** 1, 2, 5,6, 10, 11 **ES:** 1, 2, 3, 7, 11, 13 **Biology:** 1, 5, 8, 9

MATH: **K:** 6, 8, 10, 13 **1:** 2, 5, 14 **2:** 1, 3, 5, 6, 14 **3:** 1, 3, 4, 13 **4:** 1, 4, 6, 7, 8, 13 **5:** 1, 2, 4, 5
6: 2, 6 **7:** 3 **8:** 3

HISTORY: **K:** 2, 3, 4, 5, 8, 9 **1:** 1, 4, 5, 7, 8, 10, 11, 12 **2:** 3, 5, 6, 7, 10 **3:** 2, 4, 6, 7, 8 **VA:** 1, 2
Geography: 1

LANGUAGE

ARTS: **K:** 1,2, 3, 4, 6, 10 **1:** 1,2, 3, 4, 9, 11,12 **2:** 1,2, 3, 6, 7, 8,9,11 **3:** 1,2,5,6 **4:** 1, 2,3 **5:** 1, 2
6: 1 **7:** 1 **8:** 7

ART: **K:** 2, 3, 5, 8, 10, 11, 12, 13, 14, 15, 18 **1:** 2, 3, 4, 5, 8, 9,12, 15, 16, 18, 19, 20 **2:** 4, 5, 6, 9, 10,
13, 14, 18, 22 **3:** 2, 4, 5, 10, 14, 16, 17, 23, 24, 26, 27, 28 **4:** 2,3,5, 6, 8 10, 13, 20, 23, 24 **5:** 1,
2, 3, 4, 9, 10, 16, 25, 29 **6:** 2, 6, 15, 17, 18, 21 **7:** 3,4,9,10,24, 27 **8:** 5,
6. 13. 14. 16. 20

21st CENTURY SKILLS

Students rotate through six multidiscipline learning stations that:

- are designed to excite youth about their home river;
- offer an opportunity to discover and explore;
- are research-based utilizing real-world restoration projects;
- utilize critical thinking and problem-solving to stimulate senses and spark curiosity;
- foster a generation of stewards empowered to care for the Elizabeth River.

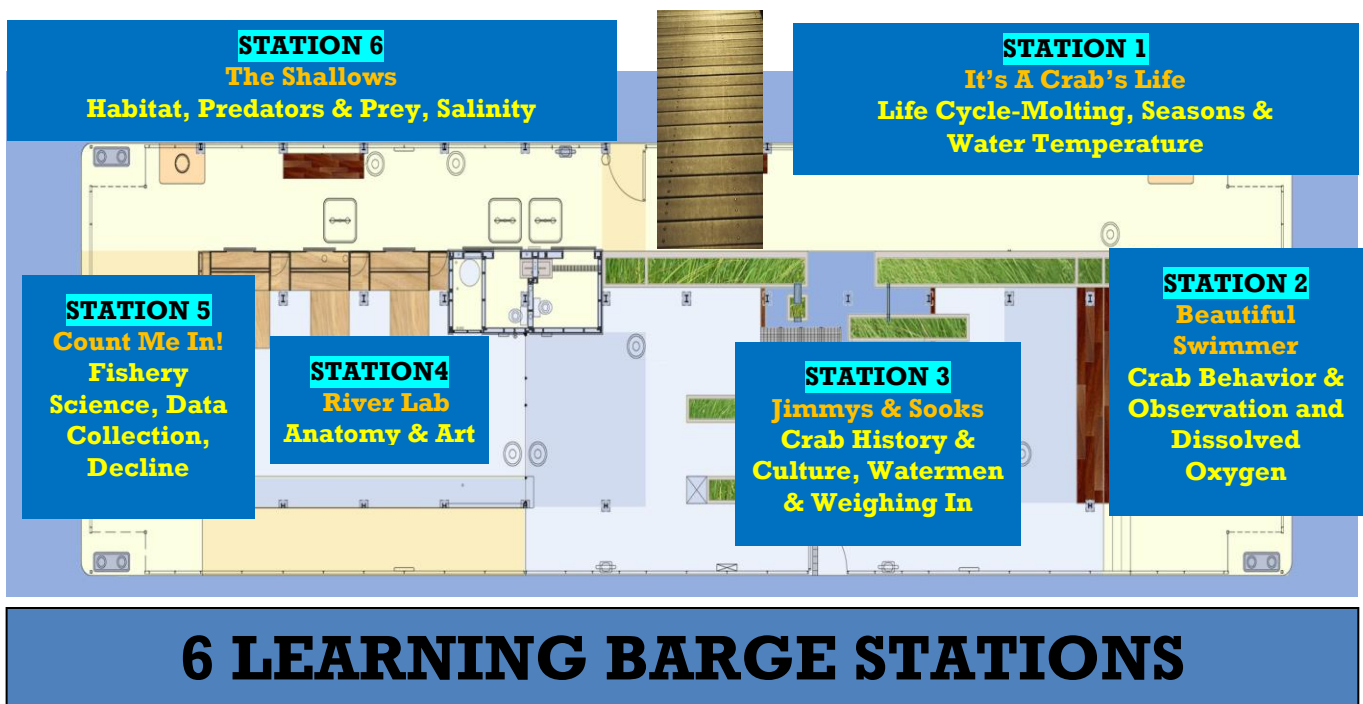
Curriculum addresses Virginia Standards of Learning in science, language arts, math, history and art. Students explore, analyze, map, gather data, graph, identify, predict and compare results. Program begins with a research question and concludes with reflection.

THE BLUE CRAB



Callinectes sapidus

- **The Blue Crab is a 10-legged crustacean that walks sideways** using its three middle pairs of legs and uses its sharp front claws for protection and hunting.
- **The crab's scientific name means "beautiful swimmer."**
- **Gender can be determined by looking at the shape of the underbelly of the crab's apron.** Narrow shape (male); Broad shape (female). Female's claw tips are red.
- **Female crabs seek out the saltiest part of the bay (the mouth of the bay)** to have their babies. Most of the bay's blue crabs are born in or near the Elizabeth River!
- **Adult crabs are omnivorous** and feed on bivalves, crustaceans, fish, marine worms, plants and detritus.
- **The blue crab is one of the most economically important shellfish** in the Chesapeake Bay and recently has been in decline. Learn how you can help! www.elizabethriver.org



6 LEARNING BARGE STATIONS

LEARNING STATIONS

Students investigate: *“How will sea level rise and increased flooding affect me, the blue crab and my community, and what action can I take to protect the future of the blue crab and my community?”*

Beautiful Swimmer

Observation, Crab Behavior and Dissolved Oxygen

Students use observation skills to answer, *“How could sea level rise affect the Elizabeth River’s dissolved oxygen levels and the blue crab?”*

Students discover how blue crabs swim, eat, sleep and regenerate appendages. They learn how they hunt as omnivorous scavengers and how healthy crabs behave differently than unhealthy crabs. Students test the dissolved oxygen at the barge site and learn how crabs need high levels of DO to survive and human actions can create dead zones.



Blue Crab, *Callinectes sapidus*, translated from Latin means “beautiful savory swimmer.”

The Shallows



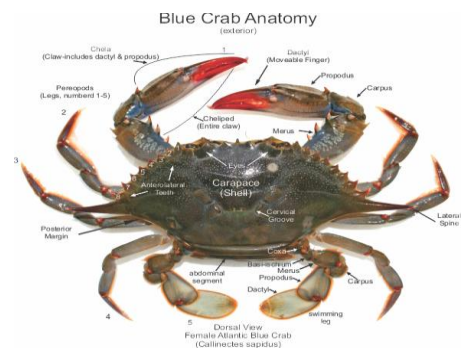
Habitat, Predators & Prey, Salinity

Students learn that crabs have several habitats and answer, *“How does flooding and sea level rise impact habitats?”* They learn crabs migrate to from the benthos to the shallows and to the wetlands to the Atlantic. They discuss how rising seas can impact salinity and discover female crabs seek out the saltiest part of the Bay to have their babies. They’ll learn predators include the Great Blue Heron, fish and eels and prey includes: shrimp, detritus and crabs as they are cannibalistic. They’ll learn the value of wetlands and what they can do to help.

River Lab

Anatomy & Art

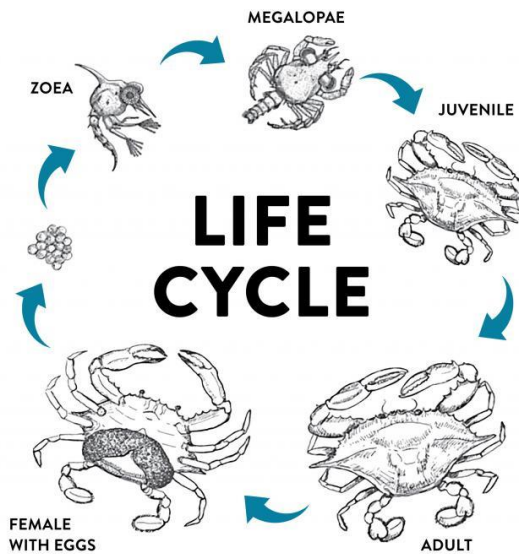
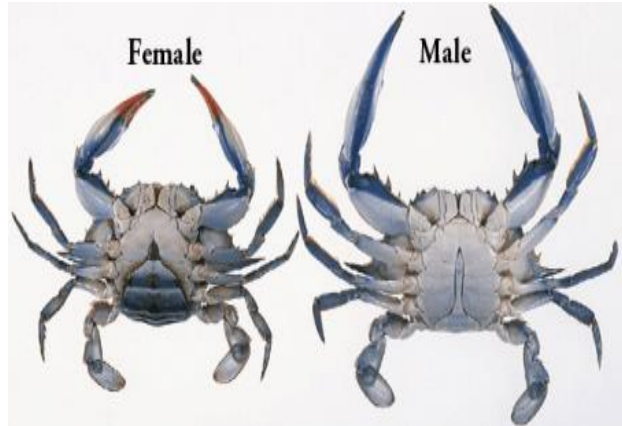
Students build crab models while learning anatomy. They learn what makes a crab a crab and answer *“How can sea level rise affect aquatic animals?”* With water colors, student paint blue crabs and celebrate with a crabby, sideways walk song! Click, click, clack!



Jimmys & Sooks

Crab History, Culture, Watermen & Weighing In:

With historic photos, students learn the history and importance of the blue crab while answering, *“What impacts can humans have on the Atlantic Blue Crab fishery?”* They learn how local watermen identify the crabs by color, size, weight and gender. Students’ exam how crab pots are engineered and the different methods used for crabbing and what ghost crab pots are.



It's a Crab's Life

Molting Life Cycle, Season & Water

Temperature: Students discover that crabs can molt twenty-seven times, live up to 3 years and weigh 10 lbs. With thermometers, they measure the river's temperature and answer, *“How can warming temperatures impact migratory animals like the Atlantic Blue Crab?”* Students discover water temperature determines a crab's growth and when it molts it can become vulnerable to predators while it can take 2-3 days for a crab's shell to harden.

Count Me In!

Fishery Science, Data Collection, Graphs, Impacts & Decline:

Students learn the blue crab female population in the Chesapeake Bay has declined from 250 million in 2009 to about 147 million in 2018. Together they answer, *“Why do scientists study population of the Atlantic Blue Crab?”* They learn the difficulty in counting crabs and how scientists help Virginia set harvesting limits to help protect and manage the population of this important economic fishery. They view historical data and graphs while discussing causes of decline of the blue crab including: habitat loss, increase in nutrients, fossil fuel emissions and over harvesting.



Dominion Energy

**Batten Educational Achievement Fund of Hampton Roads
Community Foundation**

**BWET ~ National Oceanic Atmospheric Administration
Hampton Roads Community Foundation**

**Chesapeake Bay Restoration Fund Advisory Committee – Made possible by
the Sale of Chesapeake Bay License Plates
Colonna's Shipyard
Dollar Tree Foundation
Norfolk, Portsmouth, Chesapeake & Virginia Beach Public Schools
Norfolk Redevelopment and Housing Authority
Norfolk Southern Foundation
SeaWorld & Busch Gardens Conservation Fund
Virginia Natural Gas**

The Maintenance Advisory Committee's generous in-kind support keeps our barge floating!

**BAE Systems - Norfolk Ship Repair
Coastal Services
Crofton Industries & Diving
Earl Energy, Inc.
East Coast Steel Fabrication, Inc.
Ireland Marine, Inc.
Marine Chemist Atlantic
Matherne Marine Design, Inc.
MHI Ship Repair and Services
Michael Petrus and Phoebe Crisman
Norfolk Tug Co., Inc.
Robbins Maritime, Inc.
Solar Services, Inc.
Virginia Ship Repair Association
Yacht Systems Services**



**475 Water Street, C103A
Portsmouth, VA 23704**

MORE INFORMATION

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757-392-7132

www.ElizabethRiver.org