GEORGIA AQUARIUM

Georgia Aquarium

Teacher's Guide

Grades 9-12

Content created by TurnKey Education, Inc. for Georgia Aquarium
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Welcome to Georgia Aquarium!

What to Expect on Your Field Trip

Georgia Aquarium is a must-see field trip destination for students (and teachers!) of all ages. On your class trip, you will experience one of the largest indoor ,aquatic habitats and one of the most abundant collections of marine life in the world.

Georgia Aquarium is dedicated to global leadership in the research and conservation of aquatic animals. Since its founding, Georgia Aquarium has been committed to educating and inspiring current and future generations through the respectful display of marine mammals, fish, invertebrates and many other aquatic species. Aquarium staff, volunteers and partners positively impact the future of our planet by instilling in your students an appreciation for these extraordinary animals and empowering them to become advocates on their behalf.

The seven distinct galleries and more than 100 exhibits within Georgia Aquarium represent aquatic environments ranging from arctic to tropical waters. Your students will discover a diverse assortment of animals sure to amaze, inspire and engage them like never before.

Ocean Voyager Built by The Home Depot is the largest exhibit at Georgia Aquarium and represents "our one world ocean." The habitat holds 6.3 million gallons of water and features the whale shark, which is the largest fish in the world, and the only manta rays in a U.S. aquarium. This is also where you can spot Tank, the 450-pound sea turtle!

In **Cold Water Quest,** you will see animals from arctic regions and temperate seas, including beluga whales, southern sea otters and African penguins. If you are lucky, you may see a penguin waddling by during your visit. Trainers lead several African penguins on a daily **Waddle Walk** across the main Atrium.

Students can learn firsthand about the plight of this endangered species and the Aquarium's preservation efforts.

Tropical Diver is the colorful home to more than 300 species of fish and other aquatic animals representing Pacific reef ecosystems. With 164,000 gallons of water, the Pacific Barrier Reef habitat is one of the largest living reef exhibits in the United States. Look closely. Approximately 25% of the reef wall is live coral.

Southern Company River Scout is an immersive experience showcasing the diversity of freshwater species around the world. In this gallery, students walk amidst the waters of an overhead river to discover the incredible variety of animals found in the lakes and rivers of Africa, South America, Asia and right here in Georgia. Watch out for the piranha!

SunTrust Pier 225 is home to the charismatic California sea lion. These playful pinnipeds (the name for marine mammals that have front and rear flippers) and their dedicated trainers give students the chance to see training activities firsthand while they learn about sea lion conservation and what they can do to help.

Upstairs in **Aquanaut Adventure: A Discovery Zone,** your students will navigate through a series of activities and challenges. Along the way, they will learn about aquatic animals and ecosystems to become a certified "Georgia Aquarium Aquanaut!"

AT&T Dolphin Tales features an educational presentation that shows your class how the incredible dolphins at Georgia Aquarium are trained and cared for and how to protect dolphins in their natural habitat. In addition, the newly renovated **4D Funbelievable Theater** employs interactive seats and special effects built into the theater itself. There is a rotating

series of 20-minute films based on animated theatrical releases. Your field trip tickets include the theater and all animal galleries and presentations. Please know that presentations are subject to availability and are on a first come, first served basis.

Georgia Aquarium offers your students a unique opportunity to see STEAM (science, technology, engineering, the arts and math) learning at work, both above the ground and under the water. You will find that you can use the topic of aquatic life, along with the enriching experiences at the Aquarium itself, to connect the educational themes of the galleries to your national and local STEAM curricula and content requirements.

Using this Teacher's Guide

As a companion to your experience at Georgia Aquarium, this Teacher's Guide has been created to complement your classroom instruction and make the most of your school field trip. It contains original, assessable, STEAM-related classroom lesson plans for you to use and share.

The High School Teacher's Guide includes dynamic activities and assignments for students in grades nine through twelve. There are also Teacher's Guides for Elementary School and Middle School. Each Guide is designed to be flexible and used to best meet the needs and capabilities of your class. You know your students better than anyone else!

Following this **Introduction**, you will find **"STEAM Stream,"** a section consisting of five interdisciplinary Classroom Lesson Plans, each featuring a gallery you will visit on your field trip to the Aquarium. The lesson plans begin with instruction pages and answer keys for teachers that include a list of the appropriate content areas and skills addressed by the activities in the lesson. Rounding out the lessons are ready-to-copy Student Activity worksheets that center on key STEAM topics featured on your tour.

The first lesson plan is "**Cold Water Quest: Classify and Collaborate**." Students will study four species to learn how they are classified and named: penguin, whale, otter and octopus. Then, they will design and build a new enrichment activity for one of these four marine animals based on the requirements and guidelines provided.

"**River Scout: Electrifying Eels,**" the second lesson plan, presents primary sources to show how humans have tried to understand, interpret and describe the electric eel. The selections are accompanied by activities that explore the history, arts and science of this amazing freshwater resident of Georgia Aquarium.

In the next lesson, "**Pier 225: Now Serving Fish Smoothies!**" students will learn more about the nutritional needs of sea lions and why understanding what they eat in their natural habitat helps rescuers save as many as they can during a UME (unusual mortality event).

"Tropical Diver: Chemistry of Coral" includes an experiment highlighting the effects of ocean acidification on coral reefs followed by a very creative, and pH-neutral, option to compensate for centuries of reef-damaging human activity.

The fifth lesson plan is **"Ocean Voyager: Take Out the Trash!"** Students will analyze data on the single most frequent type of marine debris—plastic—and "think globally, act locally" by designing a marine debris awareness campaign specific to their school and community.

Next, in **"Make a Splash,"** games and puzzles relate to themes you encounter on your visit to Georgia Aquarium. Included are a crossword, a word search and Aquarium Jeopardy. These are excellent activities for your bus ride to and from the tour or to assign for extra credit as you see fit. Under **"Beneath the Waves,"** the next section in this Teacher's Guide, you will find facts and figures, a list of Aquarium awareness days and a timeline of Aquarium history.

We know how important it is to justify field trips and document how instructional time is spent outside of your classroom. To that end, this Teacher's Guide is directly correlated to the Common Core State Standards for Mathematics and English Language Arts, the Next Generation Science Standards, the C3 Framework for Social Studies State Standards and the National Core Arts Standards. These correlations are

organized by content and grade level. You can readily see how they fit into your required curriculum, making it easy to connect a field trip to Georgia Aquarium with your classroom instruction. Following the national curricula, you will find the Georgia Performance Standards and Standards of Excellence. In addition, specific requirements are provided for Alabama, Florida, North Carolina, South Carolina and Tennessee.

This Teacher's Guide features a curriculum designed to offer a memorable learning classroom experience that is interdisciplinary and applicable across several grade levels. You can use this Guide before and after your visit to Georgia Aquarium, year after year. It will help prepare students for the teachable moments found throughout Georgia Aquarium. When you get back to school, refer to the Guide as you continue to explore connections between the themes of the field trip and your classroom STEAM instruction.

Ready to get started? Let's blow the trainer's whistle and dive right in!

Lesson Plan 1
Cold Water Quest: Classify and Collaborate

Teacher Instructions

Biologists develop systems and categories to classify and organize all living things on the planet. In the 18th century, a Swedish botanist named Carl von Linné divided everything into two kingdoms: plants and animals. He based these classifications on whether or not the organisms could move around or make their own food (photosynthesis). Since then, thanks to advances in technology, we have discovered many more living creatures. Today, there are six recognized kingdoms of life.

Cold Water Quest at Georgia Aquarium is home to many members of the animal kingdom. Species in this gallery showcase amazing adaptations to harsh environments. From the coasts of South Africa and Japan, all the way north to the Arctic Ocean, **Cold Water Quest** provides a glimpse at life in some of the world's cooler ecosystems. Four of the animals in **Cold Water Quest** are featured in this activity: African penguin, beluga whale, giant Pacific octopus and southern sea otter.

Your students will compare and contrast these four species in Part 1, which has a chart showing their classifications. Students may recognize some of the Latin and Greek root terms found in this classification system. (A bonus lesson in word origins!) Using the information provided, students will answer questions about how these four animals are classified and named. Part 1 is designed for students to complete individually or with a partner.

Because all four of these species—penguin, whale, otter, and octopus—are highly intelligent, they require enrichment activities when they are in human care. In Part 2, your class will divide into teams to undertake a design challenge based on several factors that make these four animals more alike than different. Your students will be charged with designing and building a new enrichment activity—or "toy"—for one of the four marine animals based on the requirements and guidelines provided.

But wait - there is a twist to this challenge! Students must make their enrichment items out of materials that are repurposed, recycled or reused. One thing these animals have in common is the threat to their natural environment from manmade trash. Students are responsible for supplying their own materials based on the team's design plan. At the conclusion, they will present their prototype to the class. Students will need a sink or container of water to prove their inventions are waterproof, along with internet access to conduct their background research.

Part 2 can be done in less than a week or it can be as involved as you would like it to be! Start by dividing your class into groups and either assigning a species to each group or letting each team select one. If time permits, begin by instructing each student to submit their own design idea to be voted on by their team. At the other end of the project's timeline, students can build a new and improved model based on what they learned during their design process.

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Answer Key

Part 1

1. (a.) giant Pacific octopus; (b.) Mollusca
2. Chordata
3. The class “Aves”
4. (a.) 8, “octo” means eight; (b.) octagon; (c.) a person in their 80s
5. Sea otter
6. Whale and otter; both in the mammal class
7. It’s the first part of the name.
8. Answers will vary, but should address the shape of the wing and/or the shape of the body in general.
9. The beluga is a white marine animal similar to a dolphin without the dorsal fin (“wing”) normally associated with whales.
10. Giant Pacific octopus

Part 2

Criteria	**0 points**	**1 point**	**2 points**
Collaboration	Team did not work together well	Team worked together, but struggled	All team members were collaborative
Research	No ideas or website listed	1 or 2 websites and ideas listed	3 websites and ideas listed
Brainstorm	0 or 1 item addressed	2 to 4 items addressed	All 5 items addressed
Plan	No materials or sketch	Missing list of materials or design sketch	Completed list of materials and provided a sketch of the design
Build & Demonstrate	No complication described, and prototype not tested in water	Either complication described or tested in water, but not both	Complication described and prototype tested in water
Evaluate	None of the questions answered	1 question answered	Both questions answered

Total: _____ /12 points