

# Amigos de Bolsa Chica Virtual Wetland Tour Educator's Guide



## To our educators:

Since 1976 the Amigos de Bolsa Chica have been committed to protecting our local wetlands and serving our community - this includes our students and educators. [The short video \*Bolsa Chica Virtual Wetland Tour\*](#) outlines the general biology and ecology of the Bolsa Chica Ecological Reserve and acts as a substitute or supplement to in-person field trips; this educator's guide will aid in helping you engage your students with the video and get them to think critically about the natural processes that take place in the wetlands as well as the native species that call the wetlands home.

Watch the [Bolsa Chica Virtual Wetland Tour](#) video.

The following pages include a grading rubric, short answer questions that chronologically follow the video, open-answer questions that get students thinking critically about the ecology of a coastal wetland as well as human impacts on the environment, and an essay question that prompts them to see the pros and cons of development and conservation, as well as articulate their thoughts on the subject.

The first section of this guide can be used for students of all ages; the second and third sections are aimed at Grades 8-12 but can be modified to meet the needs of younger grade levels. The following **Next Generation Science Standards** apply to the material covered in this video and educators' guide:

Elementary School	Middle School	High School
K-LS1-1	MS-LS1-6	HS-LS2-3
1-LS1-2	MS-LS2-1	HS-LS2-5
2-LS4-1	MS-LS2-3	HS-LS2-6
3-LS4-4	MS-LS2-4	HS-LS2-7
4-LS1-1		HS-LS4-6
5-PS3-1		
5-LS2-1		

(Reference: <https://www.nextgenscience.org/search-standards>)

If you have questions or comments, please email [FLOW@amigosdebolsachica.org](mailto:FLOW@amigosdebolsachica.org). There is a short (4 question) survey at the end of this packet for educators and students to help us understand how we can better serve and educate our community.

We would love your feedback!

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## Grading Rubric

### Short Answer Questions (Answers):

What percentage of coastal wetlands in California have been developed for human use?  
**(90%)**

Why do 50% of commercial fish spend part of their lives in a coastal wetland?  
**(They use the waters as shelter from ocean waves or from predators)**

In terms of oxygen output per square meter per year, saltwater wetlands are as (or are more) productive than \_\_\_\_\_.  
**(A tropical rainforest)**

What are the non-living components that make up an ecosystem?  
**(Sun, saltwater, freshwater, air, mud)**

What is detritus?  
**(Decaying plant material)**

What greenhouse gas does detritus hold onto?  
**(Carbon)**

Which of the living components of the wetland is the most important?  
**(Plants)**

\_\_\_\_\_ is how plants make their own energy from carbon dioxide, water, and sunlight.  
**(Photosynthesis)**

Phytoplankton are critical to life on earth and produce up to \_\_\_\_\_ that we breathe.  
**(Half of the oxygen)**

Name three or more organisms that feed on phytoplankton, algae, and bacteria.  
**(Amphipods, copepods, jellyfish, shrimp, worms, clams, mussels, small fish)**

What is the only plant that lives in the shallow tidal water and acts like a nursery for small fish?  
**(Eelgrass)**

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Name three or more of the fish and shark species that spend part of their lives in Bolsa Chica.

**(Fish: Bass, corbina, anchovy, mullet, halibut**

**Shark: Leopard shark, shovelnose guitarfish)**

“The more \_\_\_\_\_ you see means the more \_\_\_\_\_ is available and the \_\_\_\_\_ that the habitat is.”

**(Birds; food; healthier)**

What is the migratory route that spans from Canada down to South America?

**(The Pacific Flyway)**

Why is Bolsa Chica an important stop for migrating birds? What does it provide for them?

**(Provides food, and a place to raise young)**

What are the three endangered bird species found at Bolsa Chica?

**(CA Least Tern, Belding's savannah sparrow, Ridgeway's rail)**

What man-made pesticide almost caused the Brown Pelican and the Peregrine Falcon to become extinct?

**(DDT)**

While the land may look pretty flat here, the daily fluctuations of the tides creates \_\_\_\_\_ for different \_\_\_\_\_ of plants.

**(Very distinct areas; communities)**

What defines the marine zone?

**(Always under water)**

The coastal salt marsh zone is submerged by rising tides \_\_\_\_ times per day.

**(2)**

Give an example of how a plant in the coastal salt marsh zone deals with high salinity.

**(Cordgrass – extrudes salt crystals out of its leaves**

**Pickleweed – concentrates salt in the ends of its stems and then drops off the ends)**

What kind of soil defines the coastal strand zone?

**(Sandy, dry soil)**

How do the flowering plants in the coastal strand get their water?

**(Nighttime fog)**

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Coastal sage scrub zone plants are drought-deciduous; what does this mean?

**(Look dead or dormant in the dry summer, bloom again after the rain)**

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**Open Answer Questions:**

	<b>1</b>	<b>2</b>	<b>3</b>
<b>Student Answer</b>	Does not answer question; provides zero evidence; question is left blank	Only retells the story told in the video; provides minimal evidence that relates to the answer given	Clearly answers question asked and proves student understood the video; provides good evidence that relates to the answer given

1. Name two to three important rules to remember while at Bolsa Chica and explain why they are important.  
**(example: holding onto trash is important because it keeps animals safe; animals that eat or swallow trash often become sick as it lodges in their stomach)**
2. What are the environmental implications when the mud in the wetlands is disturbed, and the sequestered carbon dioxide is released? (HINT: Think big picture!)
3. Why are both maintenance and continued protection important for wild spaces like Bolsa Chica?

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## Writing Prompt:

	1	2	3
<b>Argument</b>	Unclear or lacking an argument for either side	Basic argument sentence, doesn't fully state their response	Clear argument sentence introducing key elements
<b>Evidence</b>	Minimal or irrelevant use of evidence	Minimally uses evidence to support argument	Uses evidence as solid support for argument
<b>Explanation</b>	No explanation	Minimal explanation	Complete explanation

Let's say that ChemCo is a chemical company that specializes in pesticides; ChemCo is currently producing a chemical to help control the local mosquito population in your county. The chemical, known as ABC, is sprayed directly onto standing water in order to combat a strain of mosquitoes that carry the virus that causes Purple Fever. However, the use of ABC has led to the decline of the osprey population, a species of birds that eat fish found in the wetlands. ABC weakens the shells of osprey eggs and causes them to break when the parents sit on the eggs, and the offspring do not survive.

ChemCo claims that the use of ABC will greatly lessen the threat of Purple Fever in your county, as well as employ hundreds of people as pest controllers. Local environmentalists claim that the decline in the osprey population is indicative of the health of the local wetlands and quality of fish populations, and are proposing the ABC Act to ban the use of ABC. **Write a letter to your state Representative, explaining why you support or oppose the ABC Act.** Make sure to support your position with a complete set of arguments that explain how approving or stopping this Act will affect nature, the economy, and the well-being of current and future generations, locally, regionally, and globally (aim for 1,500-2,000 words).

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## Short Answer Questions:

What percentage of coastal wetlands in California have been developed for human use?

Why do 50% of commercial fish spend part of their lives in a coastal wetland?

In terms of oxygen output per square meter per year, saltwater wetlands are as or are more productive than \_\_\_\_\_.

What are the non-living components that make up an ecosystem?

What is detritus?

What greenhouse gas does detritus hold onto?

Which of the living components of the wetland is the most important?

\_\_\_\_\_ is how plants make their own energy from carbon dioxide, water, and sunlight.

Phytoplankton are critical to life on earth and produce up to \_\_\_\_\_ that we breathe.

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Name three or more organisms that feed on phytoplankton, algae, and bacteria.

What is the only plant that lives in the shallow tidal water and acts like a nursery for small fish?

Name three or more of the fish and shark species that spend part of their lives in Bolsa Chica.

“The more \_\_\_\_\_ you see means the more \_\_\_\_\_ is available and the \_\_\_\_\_ that the habitat is.”

What is the migratory route that spans from Canada down to South America?

Why is Bolsa Chica an important stop for migrating birds? What does it provide for them?

What are the three endangered bird species found at Bolsa Chica?

What man-made pesticide almost caused the Brown Pelican and the Peregrine Falcon to become extinct?

While the land may look pretty flat here, the daily fluctuations of the tides creates \_\_\_\_\_ for different \_\_\_\_\_ of plants.

What defines the marine zone?

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The coastal salt marsh zone is submerged by rising tides \_\_\_\_ times per day.

Give an example of how a plant in the coastal salt marsh zone deals with high salinity.

What kind of soil defines the coastal strand zone?

How do the flowering plants in the coastal strand get their water?

Coastal sage scrub zone plants are drought-deciduous; what does this mean?



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## Writing Prompt:

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ChemCo claims that the use of ABC will greatly lessen the threat of Purple Fever in your county, as well as employ hundreds of people as pest controllers. Local environmentalists claim that the decline in the osprey population is indicative of the health of the local wetlands and are proposing the ABC Act to ban the use of ABC. **Write a letter to your state Representative, explaining why you support or oppose the ABC Act.** Make sure to support your position with a complete set of arguments that explain how approving or stopping this Act will affect nature, the economy, and the well-being of current and future generations, locally, regionally, and globally (aim for 1,500-2,000 words).

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## **Educator Survey:**

On a 1-5 scale, with 1 being the lowest score, how would you rate your experience utilizing this material in a lesson? Please elaborate if possible.

On a 1-5 scale, with 1 being the lowest score, how well did the material engage your students? Please elaborate if possible.

On a 1-5 scale, with 1 being the lowest score, how well did the material provided work with your agenda/syllabus? Please elaborate if possible.

How, if at all, can we improve the educator's guide/student assignment?