

Who Killed SAV?

Strand	Earth Resources
Topic	Interdependency of animals and plants, Effects of human actions on the environment
Primary SOL	3.10 The student will investigate and understand that natural events and human influences can affect the survival of species. Key concepts include a) the interdependency of plants and animals; b) the effects of human activity on the quality of air, water, and habitat.
Related SOL	3.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which j) inferences are made and conclusions are drawn; m) current applications are used to reinforce science concepts. 3.6 The student will investigate and understand that ecosystems support a diversity of plants and animals that share limited resources. Key concepts include d) the human role in conserving limited resources.

Background Information

Submerged aquatic vegetation (SAV) provides an essential link in the balanced health of the Chesapeake Bay and its tributaries. Like grass on a lawn, SAV requires light, water, space and nutrients to survive. In turn, these grasses produce the oxygen necessary for the survival of underwater organisms. Underwater grasses, such as wild celery, eelgrass, and widgeon grass, provide shelter for fish, shellfish, and many other invertebrates. SAV provides food for the animals it shelters and for waterfowl as well. SAV helps to maintain water quality and clarity, working as a natural filter to trap sediment. SAV roots provide stability to the bottom of the bay and its tributaries, playing a vital role in preventing erosion and further sediment pollution. SAV absorbs nutrients for its own benefit, benefiting the underwater environment by helping to keep nutrient levels down.

Materials

Per student:

- “The Trial of SAV’s Killer” worksheets
- Who Killed SAV? booklet

Vocabulary

SAV, survival, nutrients, interdependency, quality, prosecutor, defender, jury

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

Introduction

1. Begin by reading aloud the story *Who Killed SAV?* Stop after page 5 to allow students to make predictions. Ask, “What could possibly have caused SAV to disappear?”

Procedure

1. Continue reading, stopping after each suspect is described to summarize the ways in which that suspect harmed SAV.
2. Divide the class into groups of three or four students each, and assign each group one suspect:

Hurricane Agnes, Clam Dredging, Development, or Nutrients. Designate, one student in each group to be the “accused,” one to be the “defender,” and one or more to be the “prosecutor(s).” Distribute the appropriate “The Trial of SAV’s Killer” worksheets as guides for the various courtroom characters to use in preparing their cases.

3. Allow time for students to prepare and plan their cases as well as to do further research as needed.
4. Set up the classroom as a “courtroom,” and call one group to the front of the courtroom to act out their suspect’s trial before you, the judge. Give the prosecutor(s) time to present the case against the accused; then, allow the accused and defender to defend the charges. Direct the rest of the class to serve as members of the jury and take notes. (Teacher may wish to create a graphic organizer that provides students with spaces to record trial information.) Repeat this step for each suspect.

Conclusion

1. When all groups have presented, lead the class in a discussion of who is guilty among the four suspects. Alternatively, you may choose to have the class determine which suspect is least guilty, since it is impossible to blame only one factor for the demise of SAV. It is important for students to realize that land-use practices and other factors contributing to the decline of SAV levels can be prevented or reversed. Nevertheless, students should recognize that there are two sides to every argument. For example, watermen who dredge for clams, though they are killing SAV, also have the right to earn a living.

Assessment

- **Questions**
 - What is SAV?
 - Why is it important to protect SAV?
- **Journal/writing prompts**
 - Name at least three things that would cause SAV to die. Describe for each how it might be prevented.
- **Other**
 - Assess the students’ Trial Worksheets.
 - Assess the students’ group presentations.
 - Assess students during the class discussion of guilty suspects.

Extensions and Connections (for all students)

- Have students survey the schoolyard to identify land-use practices that contribute to increased sediment and nutrient runoff, and develop an action plan for addressing the problem.
- Have students write persuasive letters to clam dredgers, developers, farmers, homeowners, and others, encouraging them to use the land more wisely in an effort to save underwater grasses.

Strategies for Differentiation

- Provide background knowledge about the purpose and structure of a courtroom (video, transcript, etc.)
- Assign strength-based roles in groups.

- During group work, provided appropriately leveled resources or videos on hurricanes, clam dredging, building and development, and nutrients for reference.
- Preteach vocabulary explicitly associated with the court process, such as *guilty/not guilty* and *self-defense*. Use graphic organizers, alphaboxes, etc.
- Access a virtual field trip to an aquarium on the computer.
- Provide access to visual images of SAV.
- In small groups, create an in-class SAV using a wide-mouth jar, plants, etc.



The Trial of SAV's Killer

Name: _____ Date: _____

You are Clam Dredging!

How do you affect Bay grasses, or Submerged Aquatic Vegetation (SAV)?

What are some other causes of Bay grass decline?

As the Accused, it is your job to

- work with the defender to prove that you are not guilty or that you killed SAV in self-defense;
- explain why some other causes are to blame.



The Trial of SAV's Killer

Name: _____ Date: _____

You are the Defender of Clam Dredging!

How does Clam Dredging affect Bay grasses, or Submerged Aquatic Vegetation (SAV)?

What are some other causes of Bay grass decline?

As the Defender, it is your job to

- prove Clam Dredging is not the only one responsible for SAV's decrease;
- prove Clam Dredging killed SAV in self-defense;
- convince the jury to allow Clam Dredging to continue.



The Trial of SAV's Killer

Name: _____ Date: _____

You are the Prosecutor against Clam Dredging!

How did Clam Dredging affect Bay grasses, or Submerged Aquatic Vegetation (SAV)?

What are some other causes of Bay grass decline?

As the Prosecutor, it is your job to

- prove the decline of SAV is mostly the fault of Clam Dredging;
- prove Clam Dredging could have avoided killing SAV;
- explain why Clam Dredging should be punished or prevented from committing the same crime in the future.



The Trial of SAV's Killer

Name: _____ Date: _____

You are Hurricane Agnes!

How do you affect Bay grasses, or Submerged Aquatic Vegetation (SAV)?

What are some other causes of Bay grass decline?

As the Accused, it is your job to

- work with the defender to prove that you are not guilty or that you killed SAV in self-defense;
- explain why some other causes are to blame.



The Trial of SAV's Killer

Name: _____ Date: _____

You are the Defender of Hurricane Agnes!

How does Hurricane Agnes affect Bay grasses, or Submerged Aquatic Vegetation (SAV)?

What are some other causes of Bay grass decline?

As the Defender, it is your job to

- prove Hurricane Agnes is not the only one responsible for SAV's decline;
- prove Hurricane Agnes killed SAV in self-defense;
- convince the jury to allow Hurricane Agnes to continue.



The Trial of SAV's Killer

Name: _____ Date: _____

You are the Prosecutor against Hurricane Agnes!

How did Hurricane Agnes affect Bay grasses, or Submerged Aquatic Vegetation (SAV)?

What are some other causes of Bay grass decline?

As the Prosecutor, it is your job to

- prove the decline of SAV is mostly the fault of Hurricane Agnes;
- prove Hurricane Agnes could have avoided killing SAV;
- explain why Hurricane Agnes should be punished or prevented from committing the same crime in the future.



The Trial of SAV's Killer

Name: _____ Date: _____

You are Development!

How do you affect Bay grasses, or Submerged Aquatic Vegetation (SAV)?

What are some other causes of Bay grass decline?

As the Accused, it is your job to

- work with the defender to prove that you are not guilty or that you killed SAV in self-defense;
- explain why some other causes are to blame.



The Trial of SAV's Killer

Name: _____ Date: _____

You are the Defender of Development!

How does Development affect Bay grasses, or Submerged Aquatic Vegetation (SAV)?

What are some other causes of Bay grass decline?

As the Defender, it is your job to

- prove Development is not the only one responsible for SAV's decline;
- prove Development killed SAV in self-defense;
- convince the jury to allow Development to continue.



The Trial of SAV's Killer

Name: _____ Date: _____

You are the Prosecutor against Development!

How did Development affect Bay grasses, or Submerged Aquatic Vegetation (SAV)?

What are some other causes of Bay grass decline?

As the Prosecutor, it is your job to

- prove the decline of SAV is mostly the fault of Development;
- prove Development could have avoided killing SAV;
- explain why Development should be punished or prevented from committing the same crime in the future.



The Trial of SAV's Killer

Name: _____ Date: _____

You are Nutrients!

How do you affect Bay grasses, or Submerged Aquatic Vegetation (SAV)?

What are some other causes of Bay grass decline?

As the Accused, it is your job to

- work with the defender to prove that you are not guilty or that you killed SAV in self-defense;
- explain why some other causes are to blame.



The Trial of SAV's Killer

Name: _____ Date: _____

You are the Defender of Nutrients!

How does Nutrients affect Bay grasses, or Submerged Aquatic Vegetation (SAV)?

What are some other causes of Bay grass decline?

As the Defender, it is your job to

- prove Nutrients is not the only one responsible for SAV's decline;
- prove Nutrients killed SAV in self-defense;
- convince the jury to allow Nutrients to continue.



The Trial of SAV's Killer

Name: _____ Date: _____

You are the Prosecutor against Nutrients!

How did Nutrients affect Bay grasses, or Submerged Aquatic Vegetation (SAV)?

What are some other causes of Bay grass decline?

As the prosecutor, it is your job to

- prove the decline of SAV is mostly the fault of Nutrients;
- prove Nutrients could have avoided killing SAV;
- explain why Nutrients should be punished or prevented from committing the same crime in the future.

Who Killed SAV?



written by
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- adapted from the Chesapeake Bay Foundation's "Bay Grasses in the Classes" curriculum

Once upon a time, Submerged Aquatic Vegetation or SAV (also known as Underwater Grasses) lived happily in the Chesapeake Bay and its tributaries. She grew tall and thick throughout the entire Bay and even in the rivers that flowed into the Bay.

She waved back and forth in the tides, soaking up sunlight from above, nutrients from the sandy soil below her, and water from all around.

So, who killed SAV? Was it Hurricane Agnes, Clam Dredging, Development, or Nutrients? You decide.

These extra Nutrients flowed into the creeks, streams, and rivers that flowed into the Bay. They caused algae to grow very fast and thick on the water. The algae was like a blanket on the water. It blocked out the sunlight that SAV needed to survive.

She breathed out oxygen for the fish and other underwater organisms to breathe in.

She provided food and shelter for water birds, crabs, baby fish, and tiny invertebrates in her thick leaves. She hid them from predators while they grew.

Nutrients started out as a pretty innocent guy. He helped plants to grow, including SAV. But then the people who lived in the Bay's watershed started to add lots of Nutrients to the soil. They put fertilizers and chemicals on their grass and crops to make them grow faster.

Development also caused more pollution and poisons to get into the water. With their factories, farms, cars, and lawns, the people put chemicals onto the land that washed into the rivers and streams when it rained. This poison killed lots of animals in the rivers and the Bay, and it also hurt SAV.

She filtered the water that flowed through her, catching tiny bits of dirt and pollution. She was able to help keep the water that flowed into the Bay clean and healthy. She was proud of all that she did.

But then something bad started to happen. SAV started to disappear!

A big hurricane blew across the Chesapeake Bay. The Hurricane's name was Agnes. Hurricane Agnes caused the salty ocean water at the mouth of the Bay to flow much further up into the Bay. SAV could not live with so much salt in the water around her.

Development caused trees to be chopped down and caused a lot more soil to erode into the rivers and streams that flowed into the Bay. The extra soil in the water blocked out the sunlight that SAV needed to live.

The people who lived around the Bay also wanted to build houses for themselves. Later they decided to build lots and lots of houses and other buildings, too. They used these buildings for homes, businesses, and ways to make money to help feed their families. But all of this Development was causing some very bad things to happen in the Bay.

Hurricane Agnes also caused the rivers that flowed into the Bay to flood. They tore through land and picked up lots of extra sediment and nutrients. The sediment blocked out the sunlight that SAV needed to grow and survive.

One day, the people who lived around the Bay found out that the clams and oysters that lived in SAV's shelter were delicious to eat. They decided to take lots and lots of clams and oysters out of the Bay by dredging. This means they would drag a large rake from their boats to scrape the oysters and clams off the bottom of the Bay and into their boats.

Clam Dredging did not scrape just the clams and oysters, though. SAV got caught in the rakes as well. When Clam Dredging scraped for oysters and clams, he also ripped up lots and lots of SAV.

