

Estuary Project Lesson

Essential Questions:

What is a system?

- What are the components of an ecosystem?
 - What are the components of an estuary?
 - How does an estuarine ecosystem function?
 - How do living and nonliving things interact in an estuary?
- What role does balance play in a system? (optional)
 - What can cause an estuary to become unbalanced?
 - How can human activity affect an estuary?

NCSCoS Objectives:

Grade 5:

Objective 1.02

Identify and analyze the functions of organisms within the population of the ecosystem:

Producers.

Consumers.

Decomposers.

Objective 1.05

Determine the interaction of organisms within an ecosystem.

Objective 1.06 (optional)

Explain and evaluate some ways that humans affect ecosystems.

Habitat reduction due to development.

Pollutants.

Increased nutrients.

Grade 8:

Objective 3.03

Evaluate evidence that Earth's oceans are a reservoir of nutrients, minerals, dissolved gases, and life forms:

Estuaries.

Marine ecosystems.

Upwelling.

Behavior of gases in the marine environment.

Value and sustainability of marine resources.

Deep ocean technology and understandings gained.

Objective 3.04

Describe how terrestrial and aquatic food webs are interconnected.

Objective 3.07 (optional)

Describe how humans affect the quality of water:

Point and non-point sources of water pollution in North Carolina.

Possible effects of excess nutrients in North Carolina waters.

Economic trade-offs.

Local water issues.

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Necessary Skills:

Storyboards

Alice: create a new world, import objects, move, turn/roll, isShowing, say, set vehicle to, camera controls

Workflow planning

*Students should have completed the “Welcome to Alice!” tutorial series or equivalent prior to beginning this project.

Required Components:

1. storyboard that shows the intended world
2. 1-page written document that answers the Essential Questions. (This is an opportunity for differentiation. Questions listed under “Essential Questions” at the beginning of this document are listed in order of abstraction. Students who are more concrete thinkers can focus on the specific, content-area versions of the questions, while students who are more abstract thinkers can move up the scale and tackle more difficult, global-level questions.)
3. workflow planning documentation
4. Alice world

Differentiation:

More abstract thinkers and students more familiar with Alice programming can expand the scope of their world to include human activities and the question of systemic balance.

Students who are very familiar with Alice programming can add interactive components to their world, such as video game formatting, question-and-answer events, or click-to-move events.

Alice requires some vocabulary specific to programming, including, but not limited to, “method,” “coding,” “drag and drop,” “loop,” “event,” “world,” and “animation.”

Alice worlds can be pre-built for students who need extra processing time or for all students when time is limited. Students can then focus their energy on animating the interactions, rather than building the world and setting the scene.

Evidence of learning/means of evaluation:

See rubrics for Estuary Project, Essential Questions

Two versions of the student handouts are attached. The first version uses a pre-built “shell” world, while the second version requires students to build a world from scratch.

Estuary Project

Time to put your wonderful Alice knowledge to good use! You will create an example of a food web for an estuarine ecosystem.

Open the file “EstuaryShell.a2w”. Save it as “[YourName]EstuaryProject.a2w”. For example, I would save my work as “MsBedellEstuaryProject.a2w”.

When you have finished this project, you will turn in the following items:

1. a storyboard that shows your planned Alice world,
2. a 1-page document that answers the Essential Questions for this unit,
3. your Work Planning sheet, and
4. an Alice world that you (and your partner, if applicable) have created.

Alice World Science Requirements:

Your world needs to include

- at least two producers,
- at least two primary consumers,
- at least one secondary consumer, and
- at least one decomposer.

Challenge: include at least one piece of evidence of human interaction with/impact on the ecosystem

Once the scene is complete, you need to use Alice in order to demonstrate that you understand

- how plants and animals might interact in an estuarine food web,
- how energy moves through an estuarine food web, and
- how terrestrial and aquatic ecosystems can interact.

Challenge: demonstrate how human interaction with an ecosystem impacts the ecosystem, either positively or negatively. Focus particularly on the quality of water.

For me to know that you understand these concepts, I will be looking for the following when I play your world:

1. at some point, each object you add (other than pure scenery) is clearly identified by its name and its role (producer, consumer, etc.).
2. at some point, each object you add demonstrates where it gets energy from

Challenge: there is at least one moment when energy is passed from a “land” food web to an “aquatic” food web or vice-versa. (Hint: think about “what-eats-what”...)

Super-Science-Challenge: Use your world to demonstrate what might happen if the ecosystem were to become unbalanced.

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Super-Alice-Challenge: if you are feeling confident with your Alice skills, see how far you can push your creativity. Feel free to experiment with layers of scenery, camera angles, and formats. Maybe you can create a video game or a quiz, or you might find another interesting way for us to learn the material demonstrated in your world.

Alice commands that may be helpful as you program:

- move
- say
- Do together
- Do in order
- isShowing
- set vehicle to
- turn
- resize
- roll

You will probably want to use at least some of the commands listed above as you animate your food web. You may also want to use camera controls such as move, zoom, turn to face, etc. See me when you are stuck or have other questions.

Timelines and Due Dates:

Your initial storyboard is due on _____.

You should plan to spend no more than _____ setting up the scene.

You will have _____ in class for animating your food web. If you need extra time, you may arrange an appointment with me or download Alice to work at home.

Your Work Planning sheet is due on _____.

Your final Alice world is due on _____.

Your Essential Questions are due on _____.

Grading:

Please see the Estuary Project rubric and the Essential Questions rubric. You may use these rubrics to guide your work before you turn it in. I will use the same rubrics to grade your work.

Estuary Project

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Time to put your wonderful Alice knowledge to good use! You will create an example of a food web for an estuarine ecosystem.

When you have finished this project, you will turn in the following items:

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8. an Alice world that you (and your partner, if applicable) have created.

Alice World Science Requirements:

Your world needs to include

- A setting that demonstrates you understand what an estuary is. (Hint: look in the “beach” and “environments” folders to find objects that can help you create the scene.)
- at least two producers,
- at least two primary consumers,
- at least one secondary consumer, and
- at least one decomposer.

Challenge: include at least one piece of evidence of human interaction with/impact on the ecosystem

Once the scene is complete, you need to use Alice in order to demonstrate that you understand

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Estuary Project

Date:	Work Planned:	Work Accomplished:	Reflection:
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