

## 4.3 Kingtown – Planning with a Purpose

### AGE RANGE

9th—12th grade

### TIME REQUIRED

80 minutes

### ACTIVITY OVERVIEW

Engage: Kingtown Introduction

Explore: Stakeholders

Explain: Discussion

Elaborate: Resilience Planning

Evaluate: Impact Discussion

### MATERIALS

Student Worksheet

Computers

### BASED ON:

This lesson is used with permission from Museum of Science Boston, NOAA, Arizona State University, and Northeastern University.

**LESSON TOPIC:** Community planning for sea-level rise resilience.

**ACTIVITY SUMMARY:** Students will explore Kingtown and different sea-level rise resilience plans.

### OBJECTIVES:

Students will be able to:

- Explore resilience plan strategies for a city impacted by sea-level rise.
- View results and impacts of different sea-level rise resilience strategies.

**LESSON BACKGROUND:** The Climate Hazard Resilience Forum was developed in partnership with Arizona State University and Northeastern University and supported by a NOAA Environmental Literacy Grant. This deliberative forum brings the participants through the resilience planning process for various generic cities in specific contexts. Each city is based on a real place and uses real data but was anonymized for unbiased deliberation. Participants learn and discuss stakeholder values, consider trade-offs of various resilience strategies, make a final resilience plan, and then experience visualizations of how their plan will affect the city and the people who live there. The fictional towns are visualized through online ArcGIS StoryMaps created by Northeastern University. To learn how to use StoryMaps for this forum, access the training video through this link: <https://www.youtube.com/watch?v=55e2tiLpvcs&feature=youtu.be>.

Kingtown is a fictional town used to demonstrate sea-level rise resilience. In Kingtown, sea levels have risen by about a foot over the last century. Some high-tide flooding occurs, even when there are no precipitation or strong wind events. These floods may be only a foot or two deep, but can

cause roadways to be impassable, flood basements in low-lying areas with saltwater, or negatively impact coastal ecosystems.

Kingtown is now prone to flooding on the streets at high tides and during coastal storms. This matters because the structures we build to protect ourselves are built for the sea level people experienced a century or more ago. When we have high tide and waves from storms on top of sea-level rise, water washes onshore. This means Kingtown is at increased risk to flood impacts and needs to become more resilient.

Students will use visualizations to explore potential vulnerabilities to city infrastructures, social networks, and ecosystems from sea level rise, then discuss potential strategies for addressing the threat, focusing on the priorities and needs of relevant stakeholders. Students will then make recommendations for increasing their city's community resilience.

## VOCABULARY:

Conservation Planning	Specific to maintain natural values and assets in a specific landscape or seascape with competing uses, values, and other threats and opportunities.
Equity	The fair and just practices and policies that ensure all community members can thrive. Equity is different than equality in that equality implies treating everyone as if their experiences are exactly the same.
Historic Preservation	Utilizing planning to protect historic sites and resources (e.g., monuments, buildings) from hazards related to climate change (e.g., acid rain, increased erosion, extreme weather).
Land Use	Management of land, including the social and economic potential that the land use provides (e.g., grazing, timber, and conservation).
Managed Retreat	The purposeful, coordinated movement of people and buildings away from risks. At the same time, natural coastal habitat is enhanced seaward of a new line of defense. Also referred to as strategic relocation or managed realignment.

## ENGAGE:

In this lesson, students will be able to work in groups to determine a resilience strategy for the town of Kingtown. The town and all information is available on the website: <https://arcg.is/15rSzD> . Through this web portal, students will be able to see the effects of their chosen resilience plan.

Start the lesson by showing the students Kingtown on the "Kingtown" tab. Scroll through the infrastructure and the last image of sea-level rise impacts on the city.

## EXPLORE:

Assign students one of the stakeholders from the “Stakeholders” tab: Emergency Room Doctor, Local Resident, Oyster Farmer, Power Plant CEO, Transit Worker, and Economic Development Director. They have 5 minutes to read over the different perspectives.

Students will then discuss in their groups the different stakeholder perspectives, and the demographics of the city on the “Demographics” Tab. There are three strategies for dealing with the impacts of sea-level rise in Kingtown: Keep Water Out, Living with Water, and Managed Retreat. Each strategy has a Plan A (larger and more expensive) and a Plan B (smaller scale and less expensive). Students can explore these options by clicking through the named tabs. As a group, they will prioritize the values of what to protect from sea-level rise impacts and how they will do it with their limited resources. (15 minutes)

## EXPLAIN:

Come together as a class to share which resilience plan each group chose. Look at the results of one resilience plan option. There are 17 possible outcomes so choose one not picked by any of the groups. The tab “Submit Resilience Plan” shows the images of each plan option on the left side, and when those are clicked you are brought to a new story map that reflects changes to the community based on the plan. Walk through all the impacts with the group on the new story map (10 minutes)

## ELABORATE:

Groups go back to working together to explore the impacts from their chosen resilience plan. (20 minutes)

## EVALUATE:

Groups share the resilience plan they chose as well as the impacts to Kingtown based on their decision. Ask them to reflect on what the ramifications of these impacts might mean for the residents living in the town. The new maps for each resilience plan has information describing the changes, and students can summarize this information to present to the class. Students can also be asked to compare their personal decision to that of their assigned stakeholder. (10 minutes)

## STUDENT PAGE | Kingtown – Planning with a Purpose

As a group prioritize the values: Economic, Environmental, and Social. Next to each strategy in the chart below is a star ranking of how the strategy will impact Economic, Environmental, and Social values. Decide which value is the most important to you to protect.

Step 2. Prioritize Stakeholder Values		
 KEEP WATER OUT	 LIVING WITH WATER	 MANAGED RETREAT
ECONOMIC ★★	ECONOMIC ★★★	ECONOMIC ★★★
ENVIRONMENTAL ★★★	ENVIRONMENTAL ★★★★★	ENVIRONMENTAL ★★★★★
SOCIAL ★★★★★	SOCIAL ★★	SOCIAL ★★

Your group is allotted 3 coins for your resilience plan selection.

Plan A costs 2 coins and Plan B costs 1 coin. You cannot spend all three coins on one strategy, and you do not have to spend all three. **Decide as a group which resilience plan you choose on the following page.**



### DO NOW:

Suggest a method for a community to equitably discuss the possibility of managed retreat in a Community Meeting.

### EXIT TICKET:

Which value below is most important to you? Explain.

- Keep Water Out
  - Economic – 2 stars
  - Environmental – 3 stars
  - Social – 3.5 stars
- Living with Water
  - Economic – 2.5 stars
  - Environmental – 4 stars
  - Social – 2 stars
- Managed Retreat
  - Economic – 3 stars
  - Environmental – 4.5 stars
  - Social – 2 stars