



SEA-LEVEL RISE IN THE CLASSROOM CAPSTONE INFORMAL EDU

WHAT TO EXPECT:

The Capstone Informal Education Project is designed to help students to expand their understanding of community resilience. This can be a guided activity in a class OR as a stand-alone, self-directed kiosk.

The capstone walk-through videos introduce the different layers and elements of the town maps. Review these with your students to orient them to the digital tool.

Waterside Village walkthrough: <https://vimeo.com/583124304>

Sunrise Bayou walkthrough: <https://vimeo.com/583124192>

The case study videos provide examples for how to identify, understand, and address sea-level rise impacts in each of the capstone towns.

Waterside Village case study: <https://vimeo.com/583124213>

Sunrise Bayou case study: <https://vimeo.com/583124132>

SET-UP:

TIME: approximately 1 hour

RESOURCES NEEDED: internet access, class monitor, participant tablets/computers (optional)

BACKGROUND INFORMATION: The Basics of Sea-level Rise in the Northern Gulf (5 min 22 sec)

<https://vimeo.com/channels/gulfslr/322867969>, SLR in the Classroom modules, case study videos.

There are two towns developed: Sunrise Bayou and Waterside Village. Sunrise Bayou is a small coastal bayou town surrounded by marsh and rivers. Waterside Village is a larger coastal port city protected by barrier islands. These towns are representative of real locations along the Gulf Coast.

Information about the town is provided through the town maps: population, income, social vulnerability, storm surge inundation from a category 3 hurricane, and 3-foot sea-level rise projections. This activity has a class leader to guide students through one of the two towns.

Waterside Village: <https://arcg.is/0j5eyC>

Sunrise Bayou: <https://arcg.is/1K8KCq>

if the links do not work, copy and paste them into your browser

PROCEDURE:

INTRODUCTION

TIME: 5 min

- Introduce goal of activity
 - Through visualizations of data, we will explore the impacts of vulnerabilities of communities to sea level rise.
 - Explore (query, discuss) what is meant by vulnerability
 - Vulnerability is the degree to which a system, or part of it, may react adversely during the occurrence of a hazardous event. As resilience increases, the degree of damage for a given intensity hazard decreases.
- Pick a community (Waterside Village or Sunrise Bayou) to explore first as a group. The other town will be explored through the problem scenario.
- Describe how to interpret the maps
 - Aerial images (land use 'color')
 - Map layers
- Query participants about what features and infrastructure cities and towns have.
 - Schools, airport, water treatment facility, community agencies & buildings, banks, hospital, businesses, power plants, parks.
- Ask students to describe neighborhoods in their community – how separate are they geographically, what ways do they differ, how is city infrastructure located relative to these neighborhoods (distributed among all, located in only some). Use this to connect the maps to their lived experiences.

COMMUNITY EXPLANATION

TIME: 10 min

- Select one of the towns to explore as a group with the guiding question – what is the impact of sea-level rise on this community?
 - Scroll through the “Introduction” tab for a tour of the community’s featured sites of interest. You can also click directly on the icons on the map.
 - Explain the additional data layers: population, income, social vulnerability index (SVI), storm surge for a Category 3 hurricane, and sea-level rise (SLR). Ask guiding questions to make sure the group can interpret the colors correctly. Examples below:
 - Population – Where are the most/least people located?
 - Income – Where are the higher/lower income houses located?
 - Social vulnerability index (SVI) – Where are the most vulnerable areas located?
 - Storm surge – How far inland does storm surge push water greater than 3 feet?
 - Sea-level rise (SLR) – What does SLR look like around rivers?
 - Alternatively show the students the walk-through video for one of the towns.
 - Waterside Village walkthrough (4 min 5 sec): <https://vimeo.com/583124304>

- Sunrise Bayou walkthrough (4 min 13 sec): <https://vimeo.com/583124192>
- On the SLR tab talk about the inundation of 3 ft of sea-level rise – is 3 feet of inundation high or low?
 - In the Northern Gulf of Mexico, sea-level rise will be about 25% higher than the global average. We could experience between 1 to 11 feet of sea-level rise by the year 2100.
- Still using the SLR layer, zoom in on different areas.
 - What is the impact of salinity changes or water depth on coastal areas like the Sunrise Bayou oyster farm or the Waterside Village cruise terminal?
 - Discuss direct and indirect impacts of SLR on infrastructure. Show examples on the map as participants share answers. Ask if it is even across neighborhoods.
 - Ask what functions of the town will be compromised with increased sea-level.
- On the Comparisons tab look at the interaction of storm surge and sea-level rise with population, income, and social vulnerability.
 - Income vs SLR: does not affect each neighborhood the same.
 - SVI vs SLR: more socially vulnerable communities might be more at risk to SLR.
- Discussion potential resilience solutions: living shorelines, raising roads, updating stormwater management, building a berm, and more.
 - Alternatively, the case study video corresponding to this community can be shown.
 - Waterside Village case study: <https://vimeo.com/583124213>
 - Sunrise Bayou case study: <https://vimeo.com/583124132>

GROUP DECISION MAKING

TIME: 15 min

- Bring up the town not used for the group exploration. Set up the group with the prompt below:
 - The [Waterside Village or Sunrise Bayou] community has recently received a multimillion-dollar grant from a federal program designed to assist communities in increasing their resilience – both infrastructure and human knowledge – from flooding due to sea-level rise. The mayor has appointed numerous citizens, including you, and city employees to a task force to research, describe, and prioritize possible actions and projects to undertake.
 - The task force’s primary goal is to maximize the reduction in vulnerability. However, the grant was not enough to either move the entire town (which has been done!), nor to install floodgates or physical barriers around the town (which has also been done!). You must work within the existing community.
- Depending on the classroom setting the group leader can write questions on the board, use as handout, divide participants into working groups, or lead audience as a group through socratically.
 - What area (neighborhood) of the city appears to be most vulnerable to flooding? What evidence supports your conclusion?

- What area (neighborhood) of the city appears to be most socially vulnerable? What evidence supports your conclusion?
- Given the goal of minimizing monetary costs and physical damage and maximizing the ability to continue to function after flooding (water, power, access to city services), what area (neighborhood) would you choose to focus task force efforts on? Explain your reasoning. (Note – there may be several different answers.)
- Zooming in on this area, what aspects or features are vulnerable? What would be the impacts of not addressing the potential damage from flooding? Explain your reasoning.
- What additional areas in your neighborhood are likely to be affected by storm surge from a Category 3 hurricane?
- What strategies could your task force implement to reduce potential damage and increase resilience in these areas? Zooming in to the level of roads, bayous, and important buildings, give at least one specific example of an action or project which, when implemented, would reduce vulnerability.
- Discuss as a group potential resilience solutions.

RECOMMENDED CURRICULUM CITATION:

Vedral, Sonia, Collini, Renee C., Miller-Way, Tina, Rellinger, Alison N., Sempier, Tracie T., Smallegan, Stephanie M., Sparks, Eric. (2021). Sea-Level Rise in the Classroom. MASGP-21-056

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