

## Lesson Topic

### Mapping and Climate Change

**Essential Question:** How can we use maps to understand Boston's changing landscape and predict how rising sea levels will affect the city?

Grades 6-8

#### Description:

This lesson reviews the development of Boston and how people have altered the landscape of the city. Students study maps to predict how rising sea levels will affect specific areas and neighborhoods and compare them to the areas impacted on flood projection maps. They review challenges and strategies of maintaining development, businesses and homes in the face of sea level change. There is also an option for students to create a communication vehicle to educate people about this issue.

#### Next Generation Science Standards:

##### [MS-ESS3-2 Earth and Human Activity](#)

Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

##### [MS-ESS3-5 Earth and Human Activity](#)

Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

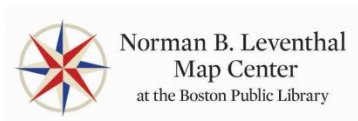
##### [MS-ESS3-5 Earth and Human Activity](#)

Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

#### Massachusetts Science Standards:

7.MS-ESS3-4. Construct an argument supported by evidence that human activities and technologies can mitigate the impact of increases in human population and per capita consumption of natural resources on the environment.

8.MS-ESS3-5. Examine and interpret data to describe the role that human activities have played in causing the rise in global temperatures over the past century



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## Materials:

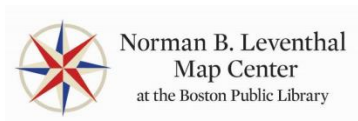
- Electronic device with Internet access (this can be adapted for students without access to individual devices)
- [“Mapping Climate Change in Boston” map set](#) from Leventhal Map Center
- Printed out maps of “Boston over Time”
- Colored pencils or markers
- Activity sheets

## Procedure:

1. Students review [City of Boston Map-Circa 1839](#). Students discuss their observations, including what surprised them and why. Did students know that so much of the city was once underwater?
2. Next, students review [Boston Over Time: Filling in the Land from 1630-Present](#) map and trace borders of three areas that were filled in at different times in the city’s history.
3. Students use current maps of Boston tourist destinations, landmarks and neighborhoods (links included in “Electronic Resources”) to fill out chart on Activity Sheet #1 and label neighborhoods and landmarks on the “Boston Over Time” map. Students may also map places of personal interest, such as their home, favorite restaurant or place to visit.

**Note:** Students may either choose their own landmarks to map, or the teacher may provide a predetermined list of landmarks. A list of possible landmarks is included at the end of this lesson. It is not necessary to use all of the maps provided in the resources.

4. Students review Flood Progression Maps from map set and draw the boundaries of the flood zones onto their “Boston Over Time” maps, using different colors to represent the three time periods represented on the flood maps and create a key that corresponds to these colors.
5. Students review maps and chart and look for correlations between the time period in which neighborhoods were established and their flood risk. They may want to compare their findings with Boston Landmarks: Flood Levels and MBTA Flood Exposure.
6. Student use visualization tool [Boston Under Water](#) to check out what rising sea levels would actually look like in and around Boston.
7. Students may check out [Sea Change: Boston](#) to gain insight into how people are responding to the challenges presented by rising sea levels.



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## Extension Activity:

After completing this lesson, students identify barriers to people acting on climate change. For example, is it because the topic is overwhelming? Is it lack of education? Or is it that the information is not communicated clearly? Is it that it seems “in the future” and does not seem like an immediate threat?

Students create a communication vehicle that addresses the barriers that they identified in their discussions. For example students may complete a 30-60 second video that uses visualization methods to make climate change real to the general public. Another vehicle might create a graphic that communicates the timeline of flooding. Alternatively, student may want to use the [Park City Green Kids Calculator](#) to assess their use of resources and learn about simple ways to reduce their carbon footprint.

## Electronic Resources:

### [Boston Tourist Destinations](#)

This is a fun map because it uses fun icons to map local favorites, including Mike’s Pastry and the Duck Tours, in addition to historical sites. The Google format makes it easy to incorporate into Google Classroom.

### [Boston Landmarks Commission Map](#)

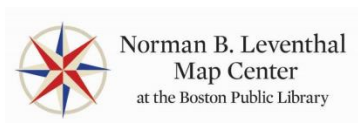
Students can change the base layer on this map to view topography, street names and photographic images.

### [Climate Ready Boston Map Explorer](#)

This is a new map tool created by Climate Ready Boston, an initiative launched by the city to prepare Boston for climate change. The tool allows users to overlay climate change data with population demographics to understand how rising temperatures and sea levels may affect people. It may be a bit abstract for middle school aged students, but offers a fascinating look at challenges facing the city.

### [Sea Change: Boston](#)

This resource shows how architects are devising methods to protect new buildings from the effects of rising sea levels.

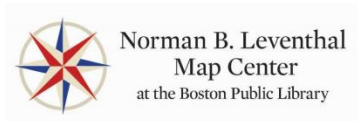


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NAME: \_\_\_\_\_

### ACTIVITY SHEET #1

<b>Neighborhood</b>	<b>Time Period of Development</b>	<b>Landmarks</b>	<b>Flooding Risk (High, Medium or Low)</b>
Beacon Hill			
Back Bay			
North End			
South End			
Fenway			
South Boston			
South Boston Waterfront			
Roxbury			
Dorchester			



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## POSSIBLE LANDMARKS to MAP

- Massachusetts State House
- South Station
- Institute of Contemporary Art
- Fenway Park
- Prudential Center
- Make Way for Ducklings Statues in Boston Public Garden
- Hatch Memorial Shell
- Fanueil Hall
- Rose Fitzgerald Kennedy Greenway
- Paul Revere's House
- Logan Airport
- Boston Convention Center
- Museum of Fine Arts
- Museum of Science
- Frog Pond
- Boston University
- TD Garden
- Isabella Stewart Gardner Museum
- The Old North Church
- New England Aquarium
- Granary Burying Ground
- The New England Holocaust Memorial
- Massachusetts College of Art
- JFK Presidential Library
- Massachusetts General Hospital
- Franklin Park Zoo
- Boston Children's Hospital
- Boston City Hall
- John Joseph Moakley Courthouse
- Any and all T stops
- Mike's Pastry
- Union Oyster House
- Reggie Lewis Track and Athletic Center
- Cheers Boston
- Boston Fish Pier
- UMass-Boston
- Boston Latin School
- City on a Hill Charter School
- Newbury Comics on Newbury Street



Norman B. Leventhal  
Map Center  
at the Boston Public Library

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