



Co-funded by
the European Union

Understanding Climate Change and Sea Level Rise Using 3D Models



Funded by the European Union.
Views and opinions expressed are
however those of the author(s) only
and do not necessarily reflect those
of the European Union or the
European Education and Culture
Executive Agency (EACEA). Neither
the European Union nor EACEA can
be held responsible for them

INTRODUCTION



Definition Grade Level: Lower Secondary (Grades 6-8)
Subject: Science (Earth Science/Environmental Science)

Objectives

By the end of this lesson, students will be able to:

1. Understand the basic concepts of climate change and its impact on sea levels.

2. Visualize how rising sea levels affect different landscapes, including meadows and mountains.

3. Discuss the consequences of sea level rise on natural environments and human settlements.

Materials Needed



- 3D printed models of landscapes with meadows and mountains
- Clear containers or trays to hold water
- Water and food coloring
- Rulers or measuring tape

- Interactive digital simulations (optional, if technology is available)
- Worksheets with guided questions and exercises
- Whiteboard and markers
- Computers or tablets (optional)



Lesson Outline

Lesson Duration: 1 hour

1. Introduction (10 minutes)

****Greeting and Attendance**:**

Welcome students and take attendance.



****Hook Activity**:**

- Show pictures or a short video clip of areas affected by rising sea levels (e.g., coastal erosion, flooding).
- Ask students if they have heard about climate change and its impacts.



Climate Change Overview:

- Explain the concept of climate change, focusing on the increase in global temperatures and melting ice caps.
- Discuss the causes of climate change, such as greenhouse gas emissions from human activities.



Sea Level Rise:

- Explain how melting glaciers and thermal expansion of seawater contribute to rising sea levels.
- Use a globe or map to show areas most vulnerable to sea level rise.



Introduction to 3D Models

- Introduce the 3D printed models of landscapes with meadows and mountains.
- Explain that students will use these models to simulate and observe the effects of rising sea levels.



Direct Instruction (15 minutes)

3D printing Activity 1

Step 1

Create an account (if you don't have one) at
www.thingiverse.com

Step 2

Go to the following address:
<https://www.thingiverse.com/thing:4596529>

Step 3

Download only the first file

3D printing Activity 2

Step 4

Upload the file on
the 3D printer

Step 5

Print the
mountain

Guided Practice (20 minutes)



Setting Up the Experiment

Divide students into small groups and distribute the 3D landscape models, clear containers, and rulers.

Place the 3D models in the containers and fill them with water to simulate the sea level.



Simulating Sea Level Rise

Add food coloring to the water for better visibility.

Gradually add more water to simulate rising sea levels and observe the changes in the landscape.

Use rulers to measure the increase in water level and the extent of flooding on the meadows and mountains



Observation and Discussion

Have students record their observations on the worksheets.

Discuss how different landscapes (meadows vs. mountains) are affected by rising sea levels.

Ask guiding questions: What happens to the low-lying areas? How does the shape of the land affect the flooding?

Conclusions (5 minutes)

Review

Summarize the key points of the lesson: the causes and effects of climate change, the process of sea level rise, and its impact on different landscapes.

Q&A

Open the floor for any questions from students.

Exit Ticket

Ask students to write down one thing they learned about sea level rise and one question they still have.

Collect exit tickets as they leave.



Assessment

Formative: Observation during the experiment and discussions, checking for understanding and providing immediate feedback.

Summative: Graded worksheet to assess individual understanding of climate change, sea level rise, and their impacts.



**THANK YOU FOR
YOUR TIME**

