

RESOURCE LIBRARY  
ACTIVITY : 50 MINS

## Influences of an Environmental Decision

Students explore the influences on the decision-making process and identify the stakeholders linked to the real case of the Gilgel Gibe III dam in the Lake Turkana region.

### GRADES

9 - 12+

### SUBJECTS

*Biology, Ecology, Earth Science, Geography, Human Geography*

### CONTENTS

1 PDF, 2 Links

## OVERVIEW

Students explore the influences on the decision-making process and identify the stakeholders linked to the real case of the Gilgel Gibe III dam in the Lake Turkana region.

For the complete activity with media resources, visit:

<http://www.nationalgeographic.org/activity/influences-environmental-decision/>

## DIRECTIONS

**1. Have students discuss their prior decision-making experience from the standpoint of a stakeholder.**

Set the stage by connecting back to the previous activity. Remind students that in Activity 1, they explored parts of the Friends of Lake Turkana case study and then were asked to develop a decision statement from only one stakeholder's perspective. Ask: *How did that experience feel? As a stakeholder, did you feel like you were making a balanced decision? Why or why not? What influenced your decision? Was there any additional information you learned*

*from other stakeholders that might have influenced your decision?* Invite a few volunteers to share their thinking with the class. Explain to students that in Activity 1, they experienced a taste of the complexity that surrounds environmental decisions. Environmental decisions are complex because they tend to involve a resource that is shared and highly valued among different stakeholders. For example, in the Friends of Lake Turkana case study, one group of stakeholders values Lake Turkana as it stands. This group sees the lake as a vital resource that supports an economy of fishing and agriculture. For these stakeholders, keeping their particular way of life is important. Another group of stakeholders see the tributaries that flow into the lake as a potential energy-generating resource that could supply electricity to local and regional citizens of both Ethiopia and Kenya. These conflicting visions on how to use the resource create a complex decision with no straightforward answer. Explain to students that in this activity, they will explore the geographic location of the case, examining each of the stakeholders' perspectives, and identifying the level of influence they might have in the decision.

## **2. Have students explore the geography of the Lake Turkana basin.**

Explain to students that part of being a responsible decision-maker is understanding the relationships between all the stakeholders and the resource. Using maps and various kinds of data can help better inform them as decision-makers. Open and project NG Education's MapMaker Interactive and do the following:

- Use the search box at top right, type "Lake Turkana" and hit enter. If the map is zoomed in closely to the lake, use the zoom tool on the left side of the map to zoom out so you can see the whole lake. Using the line tool, draw the Omo River on the interactive map, referring to the provided Omo River map as needed. (It starts near Jima, Ethiopia, and wanders through the land until it empties into Lake Turkana. Reference the Omo map to assist you in this task.) Zoom in and out of the region on the map, as needed, to see the meandering river. Ask: *Why is it important for us to understand where the Omo River is located on the map?* (It helps us to see the relationship between the dam and the affected area of Lake Turkana.) *Why is the river not straight; why does it meander? What evidence does the map provide to support that the Omo River feeds into Lake Turkana?* (If you select surface elevation, you will see that this area is mountainous. The Omo River loses about 1,800 meters (5,905 feet) from its origins in the Ethiopian Highlands to its ending point in Lake Turkana. Water in watersheds runs from higher elevation to lower elevation.)

- Using your best guess and information from the Omo River map, place an X marker where the Gibe III dam will be located. The markers can be accessed by clicking on the marker icon on the left side of the map, selecting the marker you wish to use, and clicking on the map to place it. Ask: How will the dam affect Lake Turkana? (The Omo River feeds into Lake Turkana. A dam will decrease the amount of water feeding into the lake.)
- Explore the area by adding additional layers of information onto your map. In the Layers tab, click Add Layer and you will see a number of data sets you can add onto your map. For each of these Layers ask students to compare upstream where the dam is located with the region of Lake Turkana. Turn on the Precipitation/Rainfall layer and the Population Density layer. Use the transparency slider tool under the layer name to change the visibility of the layers—this allows you to look at patterns across the data sets. Now try this with other combinations of the layers: Population Density and Land Cover; Land Cover and Surface Elevation; Human Footprint and Population Density; and others. Ask: Are there any patterns across the data sets? (Upstream—where the dam is located—is more populated, has greater rainfall, and has a larger human footprint than where Lake Turkana is located.)

### **3. Have students explore stakeholders' influence.**

Explain to students that now that they have a deeper understanding of the geographic area, they will begin to explore each of the stakeholders and their influence on the decision to build the Gilgel Gibe III dam. Remind students about the conversation they had in Activity 1 between stakeholders that have a voice (e.g., people) and those whose voices are silent (e.g., living organisms and physical environment). Distribute the Stakeholder Table worksheet, and model how to complete the first row. Ask students to work in small groups of three to finish the table; grouping in odd numbers supports a more productive discussion. Encourage students to revisit the map as they explore each of the stakeholders involved in this decision. There are no right or wrong answers to the table.

### **4. Have the class reflect on the level of influence each of the stakeholders has in the decision.**

After students have completed their charts, ask each of the groups to share aloud which stakeholder(s) they think have the most influence in the decision-making process. Ask: *Which of the stakeholders have the least influence and why? Which stakeholders will be the most affected by the decision to build a dam? Is there a relationship between the stakeholders that have the least influence and the ones that are the most affected?* (There is no right answer to

these questions. Use these questions to support a lively discussion. When appropriate, reference the map.) Ask students to take notes on the back of the Stakeholder Table worksheet. Ask students to hold onto their notes and Stakeholder Table worksheet. They will use this table and their notes in Activity 4 of this lesson.

## Informal Assessment

The class reflection is an informal assessment to see if students are providing solid reasoning for the level of stakeholder influence. To make this a more formal assessment, have students individually write their thinking instead of participating in the class discussion.

## Extending the Learning

In addition to asking students to explore the geographic region and the stakeholders, have them do further research on one of the stakeholders, using the following questions: How are those stakeholders benefiting or not benefiting from this decision? What is the political climate around this decision?

## OBJECTIVES

## Subjects & Disciplines

### **Biology**

- [Ecology](#)

### **Earth Science**

### **Geography**

- [Human Geography](#)

## Learning Objectives

Students will:

- identify various geographic and political factors that may influence the decision for the social issue they are exploring

## Teaching Approach

- Learning-for-use

# Teaching Methods

- Cooperative learning
- Discussions
- Modeling

# Skills Summary

This activity targets the following skills:

- 21st Century Themes
  - Environmental Literacy
  - Financial, Economic, Business, and Entrepreneurial Literacy
  - Global Awareness
- Critical Thinking Skills
  - Understanding
- Geographic Skills
  - Acquiring Geographic Information
  - Analyzing Geographic Information
  - Answering Geographic Questions
  - Asking Geographic Questions
  - Organizing Geographic Information

# National Standards, Principles, and Practices

## COMMON CORE STATE STANDARDS FOR ENGLISH LANGUAGE ARTS & LITERACY

- Reading Standards for Informational Text 6-12:

Key Ideas and Details, RI.9-10.1

- Reading Standards for Informational Text 6-12:

Key Ideas and Details, RI.9-10.2

- Reading Standards for Informational Text 6-12:

Key Ideas and Details, RI.9-10.3

- Reading Standards for Informational Text 6-12:

Key Ideas and Details, RI.11-12.1

- **Reading Standards for Informational Text 6-12:**

Key Ideas and Details, RI.11-12.2

- **Reading Standards for Informational Text 6-12:**

Key Ideas and Details, RI.11-12.3

- **Speaking and Listening Standards 6-12:**

Comprehension and Collaboration, SL.9-10.1

- **Speaking and Listening Standards 6-12:**

Comprehension and Collaboration, SL.11-12.1

- **Writing Standards 6-12:**

Text Types and Purposes, W.9-10.2

- **Writing Standards 6-12:**

Text Types and Purposes, W.11-12.2

## **Preparation**

## **What You'll Need**

## **MATERIALS YOU PROVIDE**

- Pencils

## **REQUIRED TECHNOLOGY**

- Internet Access: Required
- Tech Setup: 1 computer per small group, Projector

## **PHYSICAL SPACE**

- Classroom

## **GROUPING**

- Large-group instruction
- Small-group instruction

## **BACKGROUND & VOCABULARY**

# Background Information

This work is modified from the decision-making process called Stakeholder Consequences Decision-Making (SCDM) process. This process is generally used when individuals are at the stage of making a decision. The SCDM process consists of four stages: establishing constraints and considerations; identifying consequences; assessing impact on stakeholders; and weighing impacts on stakeholders. The case studies provided have already articulated a decision. The model has been modified to be used as an analysis tool. The modification includes identifying stakeholders, influences over the decision, and consequences of the decision.

## Prior Knowledge

### □ Recommended Prior Activities

- None

## Vocabulary

<b>Term</b>	<b>Part of Speech</b>	<b>Definition</b>
<b>aquatic</b>	<i>adjective</i>	having to do with water.
<b>basin</b>	<i>noun</i>	a dip or depression in the surface of the land or ocean floor.
<b>collective decisions</b>	<i>noun</i>	decisions made by a group of individuals that account for the needs of many others.
<b>conflict</b>	<i>noun</i>	a disagreement or fight, usually over ideas or procedures.
<b>controversy</b>	<i>noun</i>	disagreement or debate.
<b>dam</b>	<i>noun</i>	structure built across a river or other waterway to control the flow of water.
<b>debate</b>	<i>verb</i>	to argue or disagree in a formal setting.
<b>desert lake</b>	<i>noun</i>	large body of water in a desert region, often characterized by high salinity.
<b>ecology</b>	<i>noun</i>	branch of biology that studies the relationship between living organisms and their environment.

<b>Term</b>	<b>Part of Speech</b>	<b>Definition</b>
<b>environment</b>	<i>noun</i>	conditions that surround and influence an organism or community.
<b>environmental impact</b>	<i>noun</i>	incident or activity's total effect on the surrounding environment.
<b>flood-retreat cultivation</b>	<i>noun</i>	agricultural method that relies on silt left on a flood plain (following a flood) to cultivate crops.
<b>geographic</b>	<i>adjective</i>	having to do with places and the relationships between people and their environments.
<b>geo-literacy</b>	<i>noun</i>	the understanding of human and natural systems, geographic reasoning, and systematic decision-making.
<b>human footprint</b>	<i>noun</i>	single person's lifetime use of natural resources.
<b>human footprint</b>	<i>noun</i>	single person's lifetime use of natural resources.
<b>hydroelectric power</b>	<i>noun</i>	usable energy generated by moving water converted to electricity.
<b>indigenous people</b>	<i>noun</i>	ethnic group that has lived in the same region for all of their known history.
<b>individual decisions</b>	<i>noun</i>	Decisions that are made by an individual that only account for that individual's needs
<b>outflow</b>	<i>noun</i>	water, sediment, and chemicals discharged by a river or other flowing body of water.
<b>political</b>	<i>adjective</i>	having to do with public policy, government, administration, or elected office.
<b>region</b>	<i>noun</i>	any area on Earth with one or more common characteristics. Regions are the basic units of geography.
<b>seasonal flooding</b>	<i>noun</i>	overflowing of a body of water from its banks, usually predicted by yearly rains or storms.
<b>stakeholder</b>	<i>noun</i>	person or organization that has an interest or investment in a place, situation, or company.
<b>tourism</b>	<i>noun</i>	the industry (including food, hotels, and entertainment) of traveling for pleasure.
<b>upstream</b>	<i>adjective</i>	toward an elevated part of a flow of fluid, or place where the fluid passed earlier.
<b>waterfowl</b>	<i>noun</i>	birds that live near the water.

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## For Further Exploration

### Articles & Profiles

- [UNESCO: World Heritage—Lake Turkana National Parks](#)
- [National Geographic Education: Wild Winds—Lake Turkana Wind Power Aims to Create Electricity for Kenya](#)
- [Freshwater Ecoregions of the World: Lake Turkana](#)

### Maps

- [National Geographic Education: Geography of Lake Turkana](#)

### Websites

- [National Science Teachers Association: Learning to Make Systematic Decisions](#)
- [Encyclopedia of Earth: Lake Turkana National Parks, Kenya](#)
- [Friends of Lake Turkana: Impact of the Dam](#)
- [National Geographic Magazine: Africa's Last Frontier](#)
- [International Rivers: List of Dam-Threatened World Heritage Sites](#)

