OKAGE Lesson Plan

Lesson Title: Designed for Flood Prevention and Dry Feet

Grade Level: 6, 7

Purpose/Overview:
Students will examine how the Dutch have altered their physical environment. They will apply close reading strategies to explain the impact of human-environmental interaction in the Netherlands.

National Geography Standards from *Geography for Life*
Geographic Elements & Standards: Environment & Society, Human Systems

Oklahoma Academic Standards for the Social Studies:

OAS 2012	OAS 2019
Content Standard 5: The student will analyze the interactions of humans and their environment in the Eastern Hemisphere.	**7.4** The student will analyze the interactions of humans and their environment in the Eastern Hemisphere.
5.2 Evaluate the effects of **human modification of and adaptation to the natural environment** including **B.** the ***Creation of living space*** through the drainage of seawater and the system of dikes in the Netherlands.	**7.4.4** Evaluate the effects of human modification of and adaptation to the natural environment through transformation caused by agriculture, the use of modern irrigation methods, industry, demand for energy, and urbanization.

Geographic Themes: Human-Environmental Interaction

Objectives:

1. What **key topic/issue**(s) is/are associated with this lesson/unit?
    - In what ways have the Dutch changed the physical geography of their land?
    - What are the environmental consequences of altering the land?
2. **What should students know** after this lesson/unit?
    - The meaning of land reclamation, polder, dike, seaworks, terpen
    - Students should be able to identify and explain the environmental impact of land reclamation.
    - Students should be able to explain the impact of land reclamation on human activity, including the economic advantages.
3. **How will students apply** this lesson/unit **content**?
    - Students will be able to construct an argument, and support it with evidence, as to why land reclamation is or is not a good idea.

Materials:

Handouts
Graphic organizer
colored pencils,

computer/LCD projector
power point
Internet Connection

Time Frame: Two 45-minute periods

Procedures:
Day 1

1. Discuss with students the essential questions:
   Why do humans need land?
   What can humans do if there is not enough land for their growing populations?
2. Place students in groups of four.
3. The teacher will introduce students to the subject matter by explaining the key terms – land reclamation, seaworks, terpen, polder, and dike.
4. Discuss with students where the Netherlands are located and the geographic challenges they face from flooding and the loss of land. (See power point slide 2 for a map of the Netherlands).
5. Explain to students that they are going to complete a 3-2-1 exercise. They will be watching a video clip about the Netherlands and how they create polders and dikes. They are to answer the following questions:
   (handout 1)
   - What are three things you learned from the video?
   - What are two questions you now have?
   - What is one interesting thing you learned from the video?
6. The teacher will show the first 15 minutes of the you tube video clip, https://www.youtube.com/watch?v=aUqrBV4SiqQ . (This video is 44 minutes long, but you need only show a portion of this video for students to understand how the Dutch engineered the massive polders and dikes).
7. When the video is stopped students will answer the 3-2-1 questions.
8. Within their groups the students will share out their answers.
9. The teacher should walk around the room and listen to the answers students are sharing. When students are finished sharing out, clarify any misconceptions they may have. Ask each group to share one answer for each question with the whole class.
10. Check for understanding by using the Recap assessment. This can be given to students as an exit slip so that the teacher can gauge student comprehension.
    (handout 2)
    Answers to the RECAP are:
    1. dikes
    2. polders
    3. seaworks
    4. land reclamation

5. terpens
6. Accept any answer that demonstrates student understanding.

Day 2

1. Distribute copies of handout 3.
2. Students read the handout and complete the "Why-Lighting" strategy. Students will need a highlighter and a pen for this activity.

What is "Why-Lighting"?
• Students read the handout and highlight important passages or sentences from the reading (3 is recommended). *(This can be done as an individual activity or students can be paired and complete the strategy together. This is especially helpful with struggling readers). • Students will use a pen/pencil to write in the margins of each highlighted passage WHY they chose that passage as important. • Students must then discuss with another person (group member) which passages were chosen and why.

3. Students are to share with members of their group which passages they chose and why.
4. Explain to students that they will go through the same procedure with a second reading. Distribute copies of handout 4.
5. Students are to read handout 4 and also complete the "why-lighting" strategy.
6. After sharing out within their groups instruct students to complete the RAFT activity (Assessment).
7. If time permits, share the power point with students. It demonstrates examples of polders, aquatic houses, etc.

Assessment Options:

1) The RECAP /Exit slip (see handout 2) is a quick way to check for understanding. It will also provide the teacher quick data for what might need to be retaught the next day.
2) <u>RAFT activity.</u> There are two good options using the RAFT method. Students could complete the activity individually or each group of four could choose one of the RAFT scenarios and act it out.

RAFT

Role	Audience	Format	Topic
Prime Minister of the Netherlands	Citizens of the Netherlands	Press conference	Explains the government's position on building floating houses near Gouda.
Environmentalist	The Prime Minister of the Netherlands	Email	Describes what will happen to the environment in the government approves more reclamation projects
Dutch fisherman	King Willem-Alexander van Oranje-Nassau	Protest march	Demands the government stop reclamation projects that interfere with fishing.
Home builder	Potential home buyers	Advertisement	Promotes floating houses.

Multiple choice assessment questions:

1. Which statement best explains why the people of the Netherlands engage in land reclamation?

a) They wanted to build large forests for growing grapes.
b) They needed more land for their growing population.
c) They wanted to create barriers to keep the British from invading their country.
d) They thought it would make fishing easier for their seamen.

(b)

2. **Oklahoma Academic Standards 5.2.b Sample Test Items**:

- About 27% of the land lies below sea level
- About 60% of the population lives on reclaimed land
- Uses windmills to help drain water from the land

Which country is described by the list?

A. England
B. France
C. Italy
D. Netherlands

Depth of Knowledge: 2 Correct Answer: D

The areas shaded in black on the maps are most threatened by

A. floods.
B. drought.
C. earthquakes.

D. desertification.

Depth of Knowledge: 2 Correct Answer: A

Resources:

Extreme Engineering: Holland's Barriers to the Sea. You Tube**.** 42:40. Sat. 26 Sept, 2015. https://www.youtube.com/watch?v=aUqrBV4SiqQ

This video is an in-depth explanation of the history of polders and dikes in the Netherlands. It shows how the dikes are created and the difficulties associated with them.

Rosenberg, Matt. "Polders and Dikes in the Netherlands." About.Com. Wed. 20, Sept. 2015. **http://geography.about.com/od/specificplacesofinterest/a/dykes.htm**

Steves, Rick. "The Netherlands: Beyond Amsterdm." YouTube. Web. 26, Sept. 2015. **https://www.youtube.com/watch?v=imjq5yQzNiI**
This video is a tourists' view of the Netherlands.

Talbot, David. "Saving Holland." *Technology Review* 110.4 (2007): 50-56. Military & Government Collection. Web. 20 Sept. 2015. **www.technologyreview.com**/featuredstory/408182/**saving-holland**

Woltjer, Johan, and Niels Al. "Integrating Water Management And Spatial Planning." *Journal Of The American Planning Association* 73.2 (2007): 211-222. *Academic Search Planner*. Web. 20, Sept. 2015. www.tandfonline.com/doi/pdf/10.1080/01944360708976154

Ariel photo of dikes and polders along the North Sea
http://www.lpi.usra.edu/publications/slidesets/humanimprints/slide_11.html
This link is to ariel photos of the Netherlands.

Brooke, Kathleen Lusk and Quinn, Zoe G. **"Protective Dikes and Land Reclamation, The Netherlands."** *Building the World*. Web. 22, Sept. 2015. http://blogs.umb.edu/buildingtheworld/waterworks/protective-dikes-and-land-reclamation-the-netherlands/

Extension and Enrichment/Simplification:
For more advanced students have them conduct a web search about the history of the Great Flood of 1953. Have them report on the kind of devastation that resulted from the flood and how that affected the Netherlands plans for protecting their environment from future floods.

Handout 1

Name _____ Date _____

3-2-1

What are three things you learned from the video?

-
-
-

What are two questions you still have after seeing the video?

-
-

What is one thing you found interesting from the video?

-

Handout 2

Name _____ Date _____

RECAP – Let's check and see if you captured today's main ideas!

Directions: Fill in the blanks with the correct term from the word bank.

dikes **land reclamation** **polders** **seaworks** **terpens**

1. _____ are earthen banks.
2. Land that is reclaimed by diking and draining water is called a _____.
3. Structures that the Dutch used to control destruction from flooding are called

   _____.
4. _____ are high earthen platforms.
5. The process of gaining back land has been flooded is called _____

   _____.
6. Why did the Dutch build dikes and polders in the Netherlands?

Handout 3

Name _____ Date _____

What is the affect of land reclamation on the environment?

WHAT IS LAND RECLAMATION?

Land reclamation: creating new land from the sea, river lands or coastal wetlands. The Countries like the Netherlands have done this through a variety of processes like draining water with the use of windmills and building barriers like polders and dikes. The goal is to reclaim land that was previously lost to flooding. Today land reclamation is normally carried out for agricultural purposes and to increase ports and associated industrial zones.

Polder: A polder is a tract of low land, especially in the **Netherlands**, reclaimed from the sea or other body of water and protected by dikes.

Dike: a long wall, ditch or embankment built to prevent flooding from the sea

Few countries exist in which humans have had a greater influence in shaping the landscape than the Netherlands. There is a long history of flood protection and land reclamation in this small Western European country. Living in the lowland delta of three major rivers, the Dutch have applied many approaches to protect their land from floods and to reclaim previously flooded land.

Land reclamation activities are often closely related to coastal defense projects and the mining of sand and gravel. The largest number of land reclamation sites are located in the Greater North Sea.

They can have unfavorable effects on the marine environment.

Land reclamation activities normally take place along the coast and influence marine habitats *such as* sandbanks, estuaries, mudflats, and salt marshes.

Species in these habitats like grey seals, terns (seabirds) and black sea ducks are also affected. Their habitats are permanently lost where land is reclaimed from the sea. This has been the case in the Netherlands.

Local fishermen are also affected by the loss of coastal fishing grounds. The reclaimed land will take up a small area where fishing currently takes place. This concerns fishing by smaller vessels, such as cutters. The land reclamation process requires fishing restrictions and threatens the livelihood of these small business fishermen.

Citizens living in the Netherlands are also concerned with air pollution caused by increased dredging while the process of land retrieval is underway. Sand has to be extracted and sea walls have to be constructed. The equipment needed to complete this process uses large amounts of fuel and will leave large amounts of sediment behind.

Source:

Handout 4

Name _____ Date _____

Saving Holland

The lowest point in Western Europe is approximately 21 feet below sea level and falling. It lies in a swampy area of decomposing fertilizer outside the cheese mecca of Gouda, a coastal town in the Netherlands. This community is facing the risks and realities of climate change.

That's because the town of Gouda is considering whether to raise 4,000 houses–some of which might float–just 1.2 miles from this base.

Subdivisions may rise on portions of the sparsely developed farmland, a 20-mile area surrounded by dikes and a canal.

Such reclaimed lowlands are called polders; they're kept dry by pump houses that suck away rainwater and ground-water seepage.

The Dutch have always built on polders, but doing so now, as flood risks rise across the country, will require new approaches that could get an early test in this particularly low region, called the southwest polder or Zuidplaspolder.

"It sounds, sometimes, somewhat illogical," concedes Marco van Steekelenburg, an urban planner with the regional province of South Holland, who took me to the site. "But that is what we have to investigate: how illogical it is. We have been given a challenge: can we find solutions which are climate-proof?"

The country faces ominous trends as global temperatures rise. Already, 55 percent of the Netherlands' land area is below sea level, protected by a vast system of seawalls, storm-surge barriers, and thousands of dikes that crisscross the countryside. Dutch scientists say sea levels in the region will rise between 10 and 33 inches this century. In addition, weather worldwide is expected to become more extreme, on average. This means a higher likelihood of flooding along the Rhine and other rivers, and a greater risk of droughts. All the while, Dutch land will continue to sink–at a rate of 0.2 centimeters annually in some areas–as the peat soil underlying much of it decomposes, exposed to air by Dutch drainage efforts.

Now, in an effort being watched around the world, the Dutch government and several prominent research institutions are trying to figure out how to adapt a whole country to the realities of climate change. The Zuidplaspolder is one of several regions under consideration for developments that float–or *can* float, or at least are flood resistant. Apart from one well-hyped residential demonstration project elsewhere in the country, though, no actual construction has yet begun. Behind the scenes, the Dutch are taking a hard look at their growing vulnerabilities, conducting new analyses and running computer simulations. The researchers hope to submit a plan for adapting to climate change to the Dutch parliament this fall and to take action on it by next year.

Source:
http://www.technologyreview.com/featuredstory/408182/saving-holland/

RAFT

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- **R**ole of the Writer: Who are you as the writer? A movie star? The President? A plant?
- **A**udience: To whom are you writing? A senator? Yourself? A company?
- **F**ormat: In what format are you writing? A diary entry? A newspaper? A love letter?
- **T**opic: What are you writing about?