STEM Careers Coalition

CLASSROOM ACTIVITY

From Rigs to Reefs

OBJECTIVES

Students will be able to:

- **Describe** where offshore oil rigs are located and could be decommissioned to create artificial reefs.
- **Conduct** research on the benefits of using oil rig platforms as artificial reefs.
- **Construct** an infographic to summarize and communicate the benefits of using oil rig platforms as artificial reefs.

OVERVIEW

In this activity, students will discover how offshore oil rigs are decommissioned and sunk to create artificial reefs around the United States. They will explore the connection among fish and other marine life, fishing, and the oil and gas structures in the marine environment. Students will conduct research to identify and describe the type of marine life and communities that find a habitat shortly after a platform is installed. They will create an infographic explaining why fishermen, divers, and coastal states have been concerned with the removal of these structures, how artificial reefs are made, and their benefits.

NATIONAL STANDARDS

Next Generation Science Standards

- **HS-LS2-6 Interdependent Relationships in Ecosystems**
  Evaluate claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.
- **HS-LS2-7 Interdependent Relationships in Ecosystems**
  Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

ITEA/ITEEA Standards for Technological Literacy

- **Standard 5. Students will develop an understanding of the effects of technology on the environment.**
  J. The alignment of technological processes with natural processes maximizes performance and reduces negative impacts on the environment.

Common Core State Standards

- **CCSS.ELA-Literacy.RST.6-8.2**
  Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

API American Petroleum Institute | Discovery EDUCATION

BACKGROUND

Reefs provide habitat for a wide variety of marine life. Sometimes those reefs are natural (coral) reefs and sometimes they are human-made structures placed on the sea floor. Artificial reefs are man-made, underwater structures built to promote marine life within a certain area. They provide hard surfaces where marine invertebrates, such as corals, crustaceans and oysters, attach. Over time, other fish species will start visiting the area, improving the marine habitat. An innovative approach to dismantling out-of-service offshore oil and natural gas production platforms is creating new, thriving habitats for marine life while saving the industry money. The "rigs-to-reefs" approach allows massive offshore platforms to be decommissioned by removing all useful equipment and materials, and then sinking them in a designated location. Once the structure settles to the bottom of the ocean, it provides several acres of living and feeding habitat for thousands of underwater species.

KEY VOCABULARY

- Artificial Reefs
- Offshore Drilling
- Ecosystem
- Community
- Biodiversity
- Habitat
- Erosion
- Ecotourism
- Innovation

MATERIALS

- Internet access
- Free infographic creation websites
    - Piktochart: Create Infographics, Presentations & Reports
    - Free Online Infographic Maker by Canva

TEACHER PREPARATION

- Collage—a collection of images of items being sunk in the ocean to create artificial reefs. (tanks, subway cars, pipes, concrete castings, etc.)

PROCEDURE

1. To introduce the lesson, display the collage of images. Explain that questions are an essential part of science. What makes a good scientific question is that it can be answered by direct observations or with scientific tools. Examples of questions that are not scientific are based on values or opinions such as what people believe is right or wrong, or beautiful or ugly. Have students work with a partner to generate as many scientific questions as they can after examining the images. Invite students to share their scientific questions with the class.

2. Explain that scientists often start with a broad question such as "Is that good for the environment?" Next, they break the question down into smaller questions: What factors are necessary for a healthy marine ecosystem? Are all structures compatible with the aquatic environment in which they are placed? Finally, they state the final question in a way that can be answered by investigation or experiment. A good scientific question is: "What effect does an artificial reef have on a marine ecosystem?"
3. Share with the students that in 1984, the U.S. Congress signed the National Fishing Enhancement Act because of increased interest and participation in fishing at offshore oil and gas platforms and widespread support for effective artificial reef development by coastal states. The Act recognizes the social and economic values in developing artificial reefs, establishes national standards for artificial reef development, and provides for creation of a National Artificial Reef Plan.
4. Ask students to define the term innovation. After listening to responses, share that using decommissioned oil rig platforms as artificial reefs is a perfect example of an innovative idea.
5. Explain that students will be creating an infographic on the Rigs to Reefs program. Share that an infographic is one way to make information more compelling and able to be understood. Infographics are excellent at helping people synthesize data and quickly gain the insights they need and to make the content more memorable.
6. Divide students into small groups of four. Each student in the group will be assigned one of the four research topics to gather information for their group to use for their infographic.
    - A brief description and pictures of how decommissioned oil rig platforms are used to create artificial reefs.
    - A brief description and pictures of at least 5 environmental and/or economic benefits of the program.
    - Include at least two goals the Rigs to Reefs program meets according to the United Nations Foundation Sustainable Development Goals.
    - Images and labels of marine life these artificial reefs support.
7. After group members are done gathering and sharing their research, provide students with the link to various free infographic creation websites, such as Piktochart: Create Infographics, Presentations & Reports or Free Online Infographic Maker by Canva.
8. Students can work individually or with a partner to create a digital infographic summarizing their knowledge on the Rigs to Reefs program.

RESOURCES

Rigs to Reefs

Offshore Drilling

Explore: Artificial Reefs

Artificial Reefs: An Overview

Artificial Reefs Around the World

API Rigs to Reefs

Gulf of Mexico Data Atlas

EXTENSION

As an extension of this activity, students can research different types of offshore oil rig designs (conventional fixed, compliant tower, semi-submersibles, etc.) Students should develop an argument as to which design type works best as artificial reefs. Students can write a short persuasive article on their findings and post it on their social media.

RESEARCH CAPTURE SHEET

Brief description and pictures of how decommissioned oil rig platforms are used to create artificial reefs	**Brief description and pictures of at least 5 environmental and/or economic benefits of the program**
Two goals the Rigs to Reefs program meets according to the United Nations Foundation Sustainable Development Goals	**Images and labels of marine life artificial reefs support**