

Exploring Ocean Realms

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Overview

The world's oceans may be divided into three major ocean basins containing a total of 6 more or less autonomous oceans. In this investigation learners will explore an ocean bioregion of interest. Whatever the region and at whatever scale, the learner will demonstrate the ability to:

- Ask Geographic questions
- Gather Geographic information
- Arrange/explore information
- Analyze Geographic information
- Answer/Ask Geographic questions

The main goal of this project is to provide learners with opportunity to (a) explore the concept of place, region, and system. (b) become aware of the locations of major world oceans, seas and gulfs, and their connection to rivers, estuaries, and watersheds (c) Investigate the physical processes that shape the oceans and all Earth systems to create, sustain, and modify ecosystems. (d) raise questions and propose solutions for problems related to human interaction with Earth's hydrologic system.

Learning Objectives

Upon completion of this project, learners will be able to:

1. Apply the concepts of place, region, and system while presenting oceanographic data/information
2. Know the names of Earth's ocean basins and other major oceans, seas, and related subsystems.
3. Produce an OceanWorld Map layout using ArcView 3.x or ArcGIS 8.x
4. Present poster results to an audience larger than the class
5. Compose an original written document detailing personal contributions and individual learnings

Geography Standards Addressed

Oceans for Life Connections

The World in Spatial Terms:

Oceanography studies the relationships between life, places and environments by mapping information about them into a spatial context

Location of ocean features

Spatial representations and technology

Places and Regions

Oceans and other bodies of water have physical and biotic characteristics that are used to define habitats and regions.

Concept of regions as applied to oceans

Characteristics of ocean habitats

Physical Systems

Physical processes shape the ocean and all Earth systems to create, sustain, and modify ecosystems.

Simple ocean dynamics

Seafloor features and processes

Ecosystem processes

Uses of Geography

Knowledge of oceanography enables people to develop an understanding of the relationships between life, habitats, and environments over time—that is, of Earth as it was, is, and might be.

Influence of ocean features in past events

Using oceanography to integrate multiple disciplines

National Geography Standards

Standard 1: The World in Spatial Terms

How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective

Standard 5: Places and Regions

That people create regions to interpret Earth's complexity

Standard 8: Physical Systems

The characteristics and spatial distribution of ecosystems on Earth's surface

Complete National Geography Standards:

<http://www.ncge.org/publications/tutorial/standards/>

Instructional Tools

PowerPoint presentation: *Five Themes of Geography*

PowerPoint presentation: *Exploring the Ocean*

Hyperlinked Document: *World Ocean Internet Links page*

Spreadsheet Document: *OceanWorld GIS Poster Evaluation Rubric*

OceanWorld Dynamic Poster Presentation Rubric

Individual Assessment Rubric

Software: ArcView/ArcGIS

Procedures:

Review the five themes of geography and extensions (see *Five Themes of Geography* PowerPoint presentation) with a special emphasis on Regions, place, and system

- Brainstorm “World Oceans.”
- Introduce major ocean topics, such as:
 - World Oceans as largest planetary biome including intertidal, open ocean, reef, and continental boundaries;
 - Oceanic systems (currents, tides, tectonic plate movements, biological systems);
 - Non-sunlight dependent ecosystems
- Create a concept map (using Inspiration or similar tool) to map thoughts and ideas related to the topics above and other ocean-related topics as they arise in the course of the investigation. (Ongoing individual and/or team assignment)
- Explore webpages related to world oceans (see World Oceans Internet Links Page)
- Ask geographic questions related to the investigation of world oceans (Written Document)
- Collect information and data potentially helpful in answering/exploring the question under consideration.
- Produce an ArcView layout that presents the info/data relevant to the problem under investigation. This layout must, *at a minimum*, contain the following elements:
 - A GIS map displaying data relevant to the problem under investigation
 - A caption illuminating the connection between the mapped data and the problem under investigation.
 - An image related to the problem under investigation
 - A chart, table or graph of the data selected and displayed as relevant to the understanding or solution of the problem under investigation.

Assessment:

I. Collaborative Evaluation

Evaluate investigation teams' OceanWorld Poster using the provided rubric

Evaluate presentation of dynamic OceanWorld GIS poster using the provided rubric.

Individual Evaluation

Each participant will produce a written document detailing what s/he personally learned. Each participant will briefly discuss his oceanic regional investigation from a geographic perspective. In addition, the report will include a sketch (map or picture) that illustrates what the learner considers to be the most important new learning, including a short caption that explains the sketch.