

Name: _____ Period: _____ Date: _____



Plan an Expedition!



Instructions

1. Imagine you are an ocean explorer planning your next voyage. See the national marine sanctuaries website (<https://sanctuaries.noaa.gov>) and NOAA Ocean Exploration expeditions website (<https://oceanexplorer.noaa.gov/explorations/explorations.html>) for ideas about environments and/or organisms you might investigate.
2. Based on what you learn, write a question related to a national marine sanctuary or monument that could be answered through exploration. Examples:
 - a. What organisms live on Davidson Seamount (in Monterey Bay National Marine Sanctuary)?
 - b. Are corals in Papahānaumokuākea Marine National Monument affected by ocean acidification?
 - c. What processes formed the “bank” rock formation in Cordell Bank National Marine Sanctuary?
 - d. What factors affect how long shipwrecks are preserved in Thunder Bay National Marine Sanctuary?
 - e. How do human-caused sounds within Gray's Reef National Marine Sanctuary affect sharks there?

What question would you like to answer?

3. **Plan your expedition** to help you answer your question. Record ideas below or in science notebooks in sentences and/or pictures.
 - a. Which sanctuary or monument would you choose to explore? Why?
 - b. What would be the purpose (mission) of your expedition? What specific phenomenon would you want to learn about? Write a mission statement that states the specific location, goals and dates of your proposed expedition and what you hope to achieve.
 - c. Why is it important to learn more about this topic?
 - d. What experts would you hire to ensure the mission was successful? Why? Explain how each expert would help you achieve your goal. The *Okeanos Explorer* has 18 crew members to run the ship. You may select up to 10 more people to help with your mission, such as specialists listed on the next page. (The budget estimates below are for educational purposes only and not based on any particular expedition.)

Job Title	Description	Cost	Time Needed	Totals
Chief of Exploration	Plans and assists in the execution of the exploration	\$6,000 per month		
Science and Mapping Coordinator	Provides technical assistance to the team collecting data	\$6,000/month		
Travel and Logistics Manager	Makes arrangements for transportation, supplies and equipment	\$5,000/month		
Marine Archaeologist	Explores underwater cultural and heritage resources, such as shipwrecks, and documents information about those resources	\$6,000/month		
Onboard Scientist	May include biologists, geologists, physical scientists or others. They are present on the ship.	\$6,500/month		
Remote Scientist	May include biologists, geologists, physical scientists or others. They connect to the ship using telepresence.	\$700/day		
Lab Technician	Helps record data about samples collected, preserves specimens and conducts experiments	\$4,000/month		
Seafloor Mapper	Manages the collection of sonar data to create maps that help inform where to send submersibles for exploration	\$600/day		
Remotely Operated Vehicle (ROV)/ Submersible Pilot	Maintains and pilots ROV and operates science collection equipment, video cameras, digital cameras and continuously monitors systems	\$700/day		
Navigator	Their main task is to ensure the ship is in the correct position for scientific operations with ROVs. The navigator acts as a communications bridge between the ROV pilots and science team.	\$600/day		
Underwater Videographer	Films underwater to document the physical and living parts of the ocean environment	\$600/day		
Video Engineer	Manages the recording, storage and sharing of video footage from ROVs and other cameras during an expedition	\$600/day		
Data Engineer	Responsible for ensuring all data is recorded, archived and documented to meet the scientists' needs during expeditions	\$600/day		
Estimated Personnel Costs:				
(Total expedition costs cannot exceed \$800,000, including technology—see next page)				

4. What technology would you bring? How would each of the tools help you achieve your goals? NOAA's "Exploration Tools" page explains options: <https://oceanexplorer.noaa.gov/technology/technology.html>.

- | | |
|--|---|
| <input type="checkbox"/> Autonomous underwater vehicle (AUV) | <input type="checkbox"/> Saildrone |
| <input type="checkbox"/> Drifter | <input type="checkbox"/> Sonar |
| <input type="checkbox"/> Environmental DNA (eDNA) | <input type="checkbox"/> Submersible |
| <input type="checkbox"/> Environmental satellite | <input type="checkbox"/> Submersible collector/Samplers |
| <input type="checkbox"/> Geographic information system (GIS) | <input type="checkbox"/> Technical diving |
| <input type="checkbox"/> Human-occupied vehicle (HOV) | <input type="checkbox"/> Telepresence technology |
| <input type="checkbox"/> Magnetometer | <input type="checkbox"/> Trawl |
| <input type="checkbox"/> Multibeam sonar | <input type="checkbox"/> Uncrewed surface vessel (USV) |
| <input type="checkbox"/> Photogrammetry | <input type="checkbox"/> Other technologies: _____ |
| <input type="checkbox"/> Remotely operated vehicle (ROV) | _____ |

Technology	Description	Cost	Time Needed	Totals
ROV, AUV, or HOV Operations	ROVs, AUVs and HOVs can take photos and video and collect samples of living and non-living materials; cost includes fuel, insurance, planning meetings, port fees, supplies and site coordination	\$50,000 per day		
Mapping Operations	Cost includes mapping technology, planning meetings and site coordination	\$50,000/day		
USV Operations	USVs roam the ocean's surface like boats, collecting data without a human aboard	\$25,000/day		
Telepresence	Technologies that allow a person to feel, interact and collaborate as if they were present at one location when they are at a different location; used by scientists to participate in expeditions remotely	\$500/day		
Satellite Service	Necessary for telepresence and other ship communications	\$3,000/month		
Other:	Options include diving equipment, drifter, environmental DNA, Geographic Information System (GIS), magnetometer, multibeam sonar, trawl, uncrewed surface vessel, etc.	Included with ship & experts you hire		
Estimated Technology Costs:				
Total expedition costs cannot exceed \$800,000, including technology and personnel costs. The budget estimates are for educational purposes only and not based on any particular expedition.				

5. **Budget narrative:** Explain the costs of each person you would hire and the equipment you need, as listed above.

Name: _____ Per.: _____ Date: _____



Plan an Expedition Rubric



Title: _____

Part 1: Content	Maximum Points Possible	Self-Score (fill out before presentation)	Teacher Score
<ul style="list-style-type: none"> Research question clearly stated, including national marine sanctuary or monument to explore 	10		
<ul style="list-style-type: none"> Mission statement states specific location, goals and dates of your proposed expedition 	10		
<ul style="list-style-type: none"> Importance of project clearly explained and persuasive, including how what is learned could benefit the ocean, marine life and/or humans 	10		
<ul style="list-style-type: none"> Personnel and technology needed clearly explained 	10		
<ul style="list-style-type: none"> All expenses explained and justified 	10		
<ul style="list-style-type: none"> Sources of information shared; all from reliable sources 	10		
Part 2: Delivery / Audience Engagement			
<ul style="list-style-type: none"> Enthusiasm for proposed expedition demonstrated and persuasive Speech or video/animation narration delivered clearly at appropriate volume and speed 	10		
<ul style="list-style-type: none"> Speed, volume and voice inflection are varied to engage audience and emphasize key points Speaker connects with audience through eye contact and does not spend too much time looking at notes or screens (if applicable) 	10		
Part 3: Visuals			
<ul style="list-style-type: none"> Visuals help to clearly explain concepts 	10		
Part 4: Writing Conventions			
<ul style="list-style-type: none"> Grammatical and spelling conventions followed 	10		
TOTALS:	100		

Comments: