



Careers at Sea Conducting Science on the *JOIDES Resolution*

Summary:

In this activity students explore the diversity of careers aboard an ocean research vessel called the *JOIDES Resolution* to learn how the skills and expertise of each individual and the teamwork of the group are essential to the success of the science. Students read brief descriptions about the many jobs represented on the ship, then choose one job of interest. Each student then shares a summary of the work duties associated with their selected career with the class. With everyone in a circle, one student, holding the end of a ball of yarn, tosses the ball of yarn to a shipmate that his/her work affects. This process continues until a web of yarn connects everyone that works on the ship. Through observation, discussion, and manipulation of the web of yarn, students learn several important aspects of doing science: many different jobs are involved either directly or indirectly, teamwork is essential, and jobs and work are multi-disciplinary and valuable.

Learning Objectives:

Students will be able to:

- ✓ Identify at least 4 careers on board the *JOIDES Resolution*
- ✓ Demonstrate that collaboration and teamwork are essential for conducting science
- ✓ Explain how a range of different jobs are valued and play an important role for conducting science
- ✓ Consider a career at sea for themselves
- ✓ Demonstrate an understanding of the scientific process
- ✓ Demonstrate an understanding of the importance of learning multi-disciplines

National Science Content Standards:

History and Nature of Science

- The nature of scientific knowledge

Science in Personal and Social Perspectives

- Science and technology in society: local, national, and global challenges

Science and Technology

- Understanding about science and technology

Earth and Space Science

- How we understand Earth's history, changes and geochemical cycles

Target Age: Grades 5-12

Time: 1 class period

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Materials:

- *Introduction to the JOIDES Resolution* – 1 per student
- *Careers at Sea List* – 1 per student or group
- *Careers at Sea Descriptions* cut up
- Small index cards, paper strips, or Post-Its – 1 per student
- Bowl
- Ball of Yarn
- Job Title Nametags

Preparation:

- Students should be familiar with the mission of the *JOIDES Resolution* and scientific ocean drilling (see Resources section below for Introductory PowerPoint or explore www.joidesresolution.org)
- Make copies of *Introduction to the JOIDES Resolution* and *Careers at Sea List* – 1 per student or group
- Create Career nametags for each student so that each career highlighted *Careers at Sea Descriptions* is represented. Depending on class size, some careers may need to be duplicated
- Cut up *Careers at Sea Descriptions*, and attach each description to the corresponding nametag

Background:

When the *JOIDES Resolution* (JR) sails out to sea, more than one hundred people representing dozens of careers are aboard to ensure its success. The JR sails for months at a time; therefore, everything necessary for daily living and for conducting the scientific research must be taken care of by the people on the ship. It takes many different types of professionals to run a safe and productive expedition, from cooks and doctors to drillers and engineers. Many students do not realize the diversity of skills and expertise necessary for conducting ocean research and therefore may not realize that their own interests may align well with a scientific career at sea.

What to Do:

1. To prepare the students, have them read the *Introduction to the JOIDES Resolution* in class or as homework. Explain that they will become more familiar with the careers on the ship and take on the role of one of the careers to learn how different people work together to get the science done.
2. To help students become familiar with the range of careers at sea, students should read *Careers at Sea List* and identify four of the careers that best match their own interests.
3. Students then write his/her own name on a small index card and toss it into a bowl. Draw the cards at random to allow individuals to select one of



their preferred job title nametags. If their first choice is not available, have them select a nametag with their second career choice and so on.

4. Students should place the nametags on their shirt and read the attached *Careers at Sea Descriptions* so they will be able to give a short summary to the entire class. OPTION: for older students, have them research more details about their career.
5. Organize students in a circle, and have each student take turns explaining who they are and their responsibilities.
6. Explain to students that each person on the ship is part of a team. Ask students to think about who else on the ship their chosen expert might work with during an expedition and how.
7. Explain that they will use yarn to highlight the connections between individuals. Have one student hold the end of a ball of yarn, say who they are, then lightly toss the ball of yarn to someone with whom he/she likely works with during an expedition. As the first student tosses the string, they should share what they perceive the relationship between the two individuals to be.
8. The student that receives the ball of yarn repeats the action above, tossing it to a new person in the circle until everyone is connected.
9. Have students hold their string loosely. Ask students to explain what they think would happen if any of the individuals represented in the group did not exist or could not perform their duty. To show the impact, have different students pull on the string and explain how the rest of the group is impacted. Students should observe that everyone feels a tug on the string when one person pulls it. Therefore, removing any one of the jobs affects the entire scientific production.
10. Have students discuss:
 - When we had one individual pull on the string, representing the removal of that job, what happened? *All the other jobs were affected in some way. Because there is a web of interaction and connection aboard the ship, when one type of expertise is missing, some individuals may not be able to do their job safely, efficiently, to their full capacity, or at all.*
 - Which of the jobs are most valuable? *All of the jobs on the ship are valuable and necessary to accomplishing the science.*
 - How does the science on the JR get accomplished? *Through teamwork.*
 - Which of the jobs surprised you as being a part of a scientific effort? *Answers will vary. Some jobs that surprise people are chefs, photographers, imaging specialists [Note: photographer and imaging specialist are the same job], welders, stewards, doctor.*



11. Have students discuss how individuals specifically impact the expedition. For example,
 - *Without a chef, the entire team would not receive the energy/ fuel/ food they need to work.*
 - *The assistant laboratory officer helps scientists process samples, is responsible for running the lab equipment, and makes sure the labs are well stocked with supplies. Without the lab assistant [this isn't one of the careers on the list – use marine laboratory specialist or research specialist or does this still refer to assistant laboratory officer?], scientists would be unable to generate and analyze important data.*
 - *The tool pusher repairs equipment for drilling cores. Without a tool pusher, researchers could not obtain deep-sea cores if the drilling equipment breaks.*
12. Explain to students that there is a range of skills that different individuals bring to the team. To highlight this, have students review the skills listed for their career, then ask students to step into the circle when you call skills that match (NOTE: Not all of the relevant skills are listed in the career descriptions, so there is lots of room for additional skills and discussion. Encourage students to write down more relevant skills onto the papers). For example,
 - *If your job requires math, please step forward. Now step back.*
 - *If your job requires technical skills/technology, please step forward. Now step back.*
 - *If your job requires writing, please step forward. Now step back.*
13. Discuss the following:
 - *What did this exercise show you? For example, many jobs use math, writing, etc. A single job requires a range of skills. Many people have overlapping skills.*
 - *Why is it important to learn a variety of subjects? Every job has a variety of subjects that you need to apply on the job.*

Resources:

- **Intro to the JR** *This introductory Powerpoint will help students become familiar with the ship, the science, and life at sea*
<http://www.oceanleadership.org/education/deep-earth-academy/>
- **Exploring Ocean Science Careers** *Have students learn more about the careers highlighted in this activity*
<http://www.oceanleadership.org/education/deep-earth-academy/educators/classroom-activities/grades-5-8/exploring-ocean-science-careers-2/>
- **Expedition Science Party and Crew Photos** *and brief descriptions of the scientists and staff sailing on the expedition*
<http://joidesresolution.org/node/54>



- **Crew Profiles and Career History** *Explore a wide range of careers represented on the JR expeditions, from cooks and cleaning staff to engineers and drillers* <http://joidesresolution.org/node/903>
- **Career Profile Interactive** *Explore a photomosaic of ship activity to learn who sails on the JR* <http://joidesresolution.org/node/905>
- **Tales of the Resolution – Jobs on the JR** *Students follow one of three careers represented on the ship to learn how team work and specialized expertise are essential for conducting science*
<http://joidesresolution.org/node/263>
- **JOIDES Resolution Playing Cards** *Cards representing different people on the ship can be used in a variety of ways to engage and inform students about who is sailing* <http://joidesresolution.org/node/2165>
- **Integrated Ocean Drilling Program**
 - Career Profiles
www.oceanleadership.org/education/deep-earth-academy/students/careers/career-profiles/
 - Photo Gallery
<http://iodp.tamu.edu/publicinfo/gallery.html>
 - Friends and Family Photos
<http://iodp.tamu.edu/scienceops/gallery.html>
 - Drill Site Maps
<http://iodp.tamu.edu/scienceops/maps.html>
 - US Drillship Tour and History
<http://iodp.tamu.edu/scienceops/maps.html>
- **School of Rock – Teacher Professional Development Program**
www.oceanleadership.org/education/deep-earth-academy/educators/school-of-rock/
- **NOAA Ocean Explorer**
 - Gallery
oceanexplorer.noaa.gov/gallery/gallery.html
 - Explorations
oceanexplorer.noaa.gov/explorations/explorations.html
 - Technology
oceanexplorer.noaa.gov/technology/technology.html