NOAA Teacher at Sea Program
Lesson Plan

Activity Title: Alternatives to Piracy: Careers on the High Seas

(adapted from: Jobmatch! Card games for careers education**,** by Tony Crowley)
http://www.scribd.com/doc/23386784/Jobmatch-Card-games-for-careers-education-Key-Stage-3-4-Tony-Crowley

Subject (Focus/Topic): This lesson introduces student to the variety of skills required by NOAA Careers.

Grade Level: 9-12 (may be modified for 6-8; see game variations)

Average Learning Time: One to Two 45-minute class periods depending on which games are played.

Lesson Summary (Overview/Purpose): Students will participate in two games to acquire an understanding of the range of skills required to perform a variety of NOAA Careers

Overall Concept (Big Idea/Essential Question): What types of careers are available with NOAA? What skills do you need to possess in order to obtain a career with NOAA? Are some of these skills common to all NOAA jobs; are some skills unique to specific careers?

Specific Concepts (Key Concepts):

1. The skills and personal qualities required for specific jobs varies.
2. Taking different subjects and participating in extra-curricular activities can help prepare students for NOAA careers.
3. It is very important to acquire a range of key skills in order to be employable.

Focus Questions:

1. What skills and personal qualities must be cultivated to become employable?
2. How do students acquire and practice these skills?

Objectives/Learning Goals:

1. Students will know the job title and skills required for at least three NOAA careers.
2. Given six focus questions, students will write a short reflection essay that satisfies 75% of the content and writing requirements (see rubric).

Background Information: Students should be aware that in order to be successful in school or at a job, there are certain skills they must possess. The game format is somewhat different than traditional card games with which students may be familiar. The first few rounds may take longer than expected and the teacher may be facilitating more than usual when playing games. As the rounds progress and students become more familiar with the rules and method of play, each round will take less time.

Common Misconceptions/Preconceptions: Often students (especially young women) may think that science, leadership positions, or jobs requiring some manual labor are for men. Many of the cards were created with this misconception in mind and bear images of women performing these jobs.

Materials:

- Deck of Jobs Cards
- Deck of Skills Cards
- Pirate Cards
- Game Rules

} For each team

- Reflection Essay Questions/Grading Rubric (per student)

Technical Requirements: No technology required except for preparation.

- Creation of cards:
  - Printer (color printer ideal to help distinguish card type)
  - Laminating machine (ideal but not required)

Teacher Preparation: About 1 hour initial prep to make card sets. All the cards need to be copied with the back of the deck on the back of the same sheet (the resulting set will look like a regular deck of cards: the card should have the back design and when flipped over have either the job, skill, or pirate on the opposite side). It is strongly suggested that the cards be laminated for repeated use.

Keywords: marine careers, NOAA

Pre-assessment Strategy/Anticipatory Set:

1. A short class discussion prior to the game activity would be useful. Students can be divided into small groups (maybe the teams they will be playing with) and asked to brainstorm what skills they currently use in school or at their jobs. A spokesperson for each group can then share with the class the skills they discussed.

2. Total Physical Response (TPR) has been shown to aid students who are English Language Learners (ELL) or have various learning disabilities. It is a wonderful way to engage kinesthetic learners and provide the class an opportunity to get out of their seats and move around. For more information on TPR, see the following website: http://www.tprsource.com/asher.htm

   Teachers can engage their class in a modified version of the popular summer camp game, "Captain's Coming!". The different motions will need to be demonstrated by the teacher to students prior to beginning the game. The first time each career is called out, the teacher may need to show students the motion again. Some students will pick up the motions faster than others; students who don't remember will look to them for the motion. This is also a fun game to play throughout the year when students need a break from the more traditional classroom format.

   Directions: Assign one person to be the "Captain." The role of the Captain is to call out the actions or careers and dismiss the players who don't do the actions quickly enough or who break from character. Once the captain calls an action, each player has 4-5 seconds to start performing the action. If they don't find a group fast enough or perform the right action, they are out of the game. At the end of play, the only remaining person gets to be the "Captain" the next time around or can be given a small prize.

   Here is an explanation of each of the actions...

   - **Captain's Coming!:** Everyone stands at "attention" (in a salute), and they can't move from this position until the caller says, "At Ease!" If they laugh or break from the attention position, they are dismissed.
   - **Deckhand** (individually): pretends to haul in ropes hand over hand.
   - **Bosun** (individually): stands on tip-toe, pretends to move levers, and calls out "secure the buoy"
   - **Cook** (individually): holds out hand horizontally (reading recipe) and pretends to flip burgers with the other hand.
   - **IT Guy** (Information Technology Specialist) (individually): pretends to sit in a chair and swivel back and forth between computer keyboards.
   - **Marine Geologist** (individually): plugs nose and "dives" to floor and "resurfaces" carrying a very heavy rock.
   - **Physician's Assistant** (pairs): take the blood pressure of the other person.
   - **ROV Pilot** (pairs): team up - 1 person moves pretend joystick levers while the other person crouches down and spins around the pilot.
   - **Hydrographer** (groups of 3): 1st person calls out "Ping", 2nd person travels to 3rd person, bounces off of them and returns to the 1st person. Upon return, they call out "Pong".
   - **Science Teacher** (groups of 5): 1 person shows the other 4 people an imaginary fish.
   - **Biological Technician** (group of 4): 1st person baits a hook and passes it to the 2nd person who "throws" the line. It is passed to the 3rd person who "reels" in a fish and the 4th person removes the fish from the hook.

- **Chemist** (individually): pours things together. If you want, "mixing" causes an "explosion" and students call out "Boom!" (they love this).
- **Ecologist** (individually): pretends to snorkel (do breast stroke motions with hands), pausing to look through a magnifying lens.
- **Environmental Technician** (individually): "scoops" a water sample and "records" results in a field book.

Some fun "extra" commands which are mainly for the teacher's or captain's entertainment because they are hilarious and get students laughing:

- **Mermaids** (individually): stand on one leg, wave, and call out "Hi, sailor!"
- **Seasick** (individually): pretend to "throw up"
- **Mess Hall** (groups of 4). pretend to huddle around a table, spoon food to mouths, and make eating sounds: "Nom, nom, nom" or "Yum, yum, yum".

Lesson Procedure:

Conduct class discussion about skills and which ones might be useful for various careers. Alternately, the "Captain's Coming!" game could be played.

Divide the class into teams (sizes and number depend on the game version played). Distribute game decks to each team along with a print out of the game rules. Each team will also need a copy of the student version of the job descriptions since many of the NOAA careers will be unfamiliar to students.

Go over the rules with students and allow them to play the game for the designated time frame.

Have students write the reflection essay either in class or as homework. Alternatively, use the provided questions to conduct a post-game class discussion.

Assessment and Evaluation:

Formative Assessment: students in the class can be asked to list necessary skills needed for a randomly chosen career. Students should be able to identify skills that correspond to at least three different careers without using any notes.

Summative Assessment: the short reflection essay should satisfy 75% of the content and writing requirements (see rubric).

Standards:

National Science Education Standards Addressed:
Content Standards, Grades 9-12

- Content Standard B: Science as Inquiry:
  - An appreciation of "how we know" what we know in science.
  - The dispositions to use the skills, abilities, and attitudes associated with science.
- Content Standard H: History and Nature of Science:
  - Science as a human endeavor.

Ocean Literacy Principles Addressed:

- The ocean and humans are inextricably interconnected.
  - Fundamental concepts: b, c, and g
- The ocean is largely unexplored.
  - Fundamental concepts: a, b, c, d, and f

Wyoming State Science Standards Addressed:

- SC11.2.4: Science as Inquiry
  - Students investigate the relationships between science and technology.
- SC11.3.2: History and Nature of Science in Personal and Social Decisions.
  - Students examine how scientific information is used to make decisions.
    - Interdisciplinary connections of the sciences and connections to other areas and career opportunities.

Next Generation Science Standards (NGSS) - (based on May 2012 draft - subject to change with future revisions):

- HS-ETS-ETSS: Links Among Engineering, Technology, Science, and Society.
  - ETS2.A: Interdependence of Science, Engineering, and Technology
    - Science and engineering complement each other in the cycle known as research and development (R&D).
    - Many R&D projects may involves scientists, engineers, and others with wide ranges of expertise.
  - ETS2.B: Influence of Engineering, Technology, and Science on Society and the Natural World.
    - Modern civilization depends on major technological systems, including those related to agriculture, health, water, energy, transportation, manufacturing, construction, and communications.

Additional Resources: Teachers may want to make copies of the individual careers from the Bureau of Labor Statistics' Occupational Outlook Handbook available for students. (http://www.bls.gov/ooh/)

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Alternatives to Piracy: Careers on the High Seas
Card Games to Introduce Students to NOAA Careers

(adapted from: Jobmatch! Card games for careers education, by Tony Crowley)
http://www.scribd.com/doc/23386784/Jobmatch-Card-games-for-careers-education-Key-Stage-3-4-Tony-Crowley

Purpose: These games are designed to help students analyze the duties and skills of different marine related jobs. Students will become more aware of the wide range of skills and personal qualities required by many of today's careers.

Version 1:

Materials per group: Several groups can be formed from the class depending on size. Each group is divided into a maximum of four teams each consisting of two students.

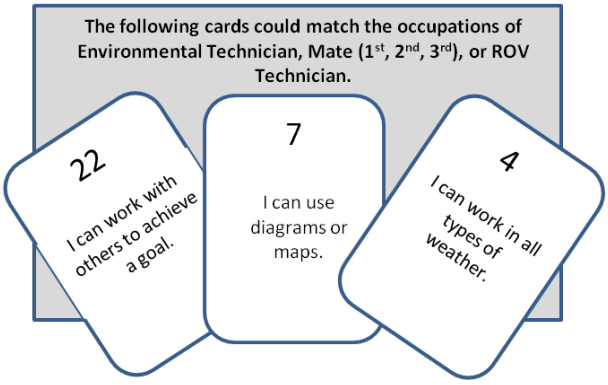
- One deck of Job Cards
- One deck of Skill Cards
- Four Pirate Cards

Time Required: varies

Game Challenge: Find three skills which are shared by two different jobs.

Rules:

1. The team with the youngest player begins the game. Play proceeds in a clockwise direction.
2. Shuffle the Job Cards and place them face down in the center of the table. Shuffle the Pirate Cards into the Skill Card deck. Each team receives three Skill Cards and the rest of the deck is placed face down next to the Job Cards.
3. Two Job Cards are revealed and teams take turns to see if their demand cards match both jobs. The game passes to the team on your left. The figure below is an example; the cards could also represent several other careers.



4. A Pirate Card acts as a "wild card" and can be used to represent any skill chosen by the team from the list of Skills. It must be exchanged if a successful match is established.

5. When it is your team's turn, if your Skill Cards match both jobs, call "Ahoy!". You must be able to explain your reasoning to the other teams. Your instructor will resolve any disputes.
6. If your cards match, keep the pair of Job Cards as winning tokens, and exchange one of your Skill Cards with a new one from the deck. Place the rejected card in a pile of used cards. Turn over two new Job Cards from the top of the deck and continue the game.
    a. If your cards don't match, the team to the left will be given a chance to win the round.
7. If no team can make a match, each team replaces one of its Skill Cards with a fresh one from the Skill deck. The rejected card is placed in the used Skill Card pile.
8. When there are no more Skill Cards, shuffle and reuse the pile of used cards.
9. The winning team is the one holding the most Job Cards at the end of play.

Game Variations:

- **To simplify the game:** Match one rather than two Job Cards.
- **To increase the difficulty:** Deal and match four Skill Cards.

Version 2:

Time Required: approximately 5-10 minutes per round. As play progresses and students become more familiar with the process, the pace of each round will increase.

Materials:
Per pair of teams:

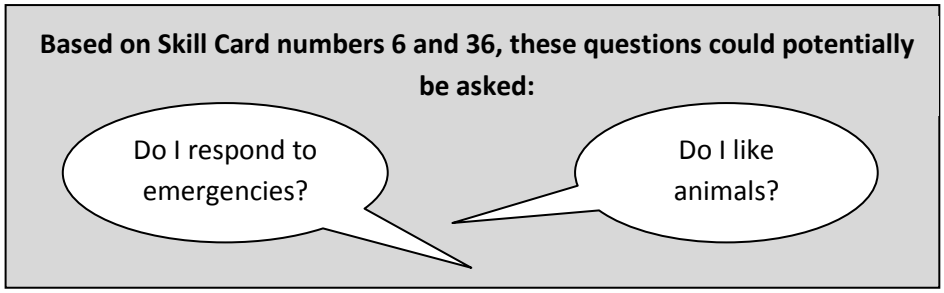
- One pack of Job Cards
- One pack of Skill Cards
- Set of Pirate Cards

While not required, it may be helpful to have some career reference materials available to students. A good source is the U.S. Bureau of Labor Statistics Occupational Outlook Handbook (http://www.bls.gov/ooh/).

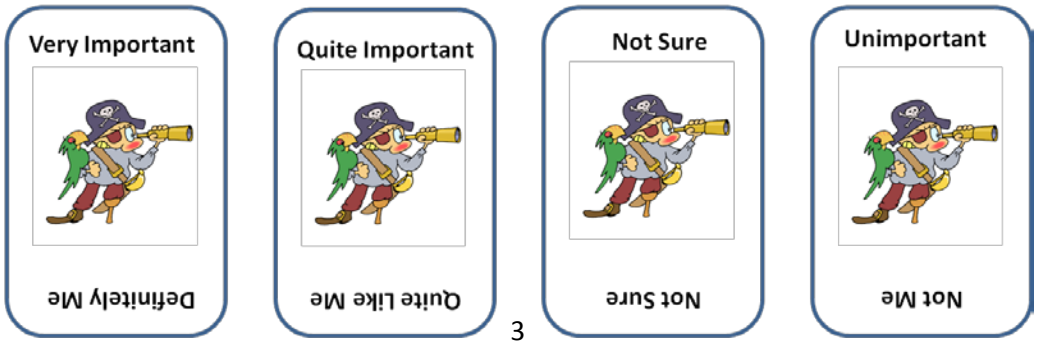
Game Rules:

This game is played with two teams. Each team may have up to six members each.

1. Team A is given one pack of Job Cards and one pack of Skill Cards.
2. A member of Team B chooses one Job Card at random and shows it to the other members of his team. After everyone on Team B has seen the card, it is replaced in the deck. Team A is **never** shown the card.
3. The Job Cards from the deck are now distributed among Team A.
4. Each member of Team A can now ask Team B questions about the job using the pack of Skill Cards as guides for forming their questions. For example:



5. The four Pirate Cards are laid out as shown below:



6. Depending on answers given by Team B, Team A places each Skill Card in a pile beside each Pirate Card that carries the most relevant heading. For example: If the answer to Skill Card number 6 is "YES", it could be placed either by the "Very Important" or "Quite Important" Pirate Card. If the answer to Skill Card question number 36 is "NO", then it could be placed by the "Unimportant" Pirate Card. As the line of questioning progresses, Skill Cards may be rearranged next to the Pirate Cards.
7. When all the Skill Cards have been used, Team A has to decide which job best fits their Skill Card designations. To do this, they go through the Job Card deck and through the process of elimination, attempt to determine which job requires the "Very Important" skill set.
8. After a final job has been chosen, Team B reveals the correct job to Team A. If correct, Team A earns a point.
9. Teams A and B then switch roles and another round is played. The team with the most correct job matches at the end of class wins.

Group Game Variations:

These alternatives can be played with more than one large team (e.g. divide the class into 2-4 groups), with each team possessing one pack of Job Cards and one pack of Skill Cards.

1. Compete to identify the name of a job.
   a. The instructor chooses one job and without telling students which job it is, gives the teams the list of associated Skill Card numbers.
   b. Members of each team remove the respective cards from the Skill deck and lay them out across the table.
   c. Using the cards in the Job deck, members of the team try to identify the correct job associated with the Skills.

2. Compete to identify the demands associated with a particular job.
   a. The instructor give the students the name of a job.
   b. Members of the team select Skill Cards they think would be associated with the job.

Individual Variation:

1. Using the Pirate Cards, the student can go through the pack of Skill Cards and place them in piles that best describe themselves: "Definitely Like Me", "Quite Like Me", "Not Sure", or "Not Me". (The pirate cards should be rotated 180° from their orientation shown in the diagram on page 3.)
2. Based upon the Skill Cards in the assigned piles, the student can then use the Job Spreadsheet to determine which careers require these skills or qualities.
3. Further exploration of each career matching their "Definitely Like Me" pile can be conducted or discussed.

Post-Game Reflection Essay: (These questions could also be used for a class discussion instead of an assignment.)

1. Of all the skills on the cards that your team received, which ones would you say are generally useful in many jobs? Explain why.
2. Which of the skills you explored would be limited to a small range of jobs? Explain why.
3. Can you give examples of school subjects, extra-curricular, or spare time activities in which these skills could be developed?
4. Can you think of three other important skills that are not found within the Skill Card deck? Describe these skills and relate them to the careers where they would be most valuable.
5. What sort of jobs did you find easy to match? Why?
6. What sort of jobs did you find were difficult to match? Why?

Job Descriptions
Instructor Version

Job Demand:

A = > 21% growth
B = 16-20% growth
C = 11-15% growth
D = 6-10% growth
E = 0-5% growth
F = declining demand

Administrator (C) $78,000/yr
Plan, direct, and coordinate services within an organization. Supervise personnel. Recommend changes to policies or procedures to improve the organization. Plan budgets. Monitor the facility for safety and efficiency. Ensure that organization complies with governmental and industry regulations.

3, 9, 14, 15, 16, 17, 18, 19, 21, 24, 29

Biochemist (A) $79,500/yr
Plan and conduct complex projects in basic and applied research. Manage laboratory teams. Isolate, analyze, and synthesize proteins, enzymes, DNA, and other molecules. Research the effects of substances on tissues and biological processes.

8, 9, 12, 14, 17, 19, 20, 22, 23, 29, 33, 36

Biological Technician (C) $39,000/yr
Set up, maintain, clean laboratory instruments and equipment. Gather and prepare samples; conduct biological tests and experiments; document procedures, observations, and results; analyze experimental data; write reports.

3, 8, 10, 12, 14, 17, 19, 20, 23, 24, 25, 30, 31, 36

Bosun (Boatswain) (C) $50,000/yr
Direct crew members (deck hands) in performing activities such as on/off loading cargo; operating, maintaining, repair ship structure and equipment; rig tow lines, open or close gates or ramps; hoist buoys/nets; lower/raise scientific equipment. Lower and maintain lifeboats in the event of emergency.

1, 2, 3, 4, 5, 6, 10, 11, 15, 16, 17, 20, 24, 25, 28

Chemist (E) $70,000/yr
Plan and carry out complex research projects. Analyze substances to determine their chemical and physical properties such as their structure and composition. Determine proper chemical processing and test procedures. Prepare test solutions, compounds, and reagents used in chemical procedures.

8, 9, 11, 12, 14, 17, 19, 20, 22, 29, 30, 31, 33

Chemistry Technician (D) $42,000/yr
Monitor chemical processes and test product quality. Set up and maintain laboratory instruments and equipment. Prepare chemical solutions. Conduct chemical experiments, tests, and analyses. Compile and interpret results. Prepare reports, graphs, and charts summarizing results.

8, 10, 11, 12, 14, 16, 17, 19, 22, 24, 25, 28, 29, 30, 31, 33

Conservation Scientist (A) $57,500/yr
Monitor conservation activities to assure compliance with regulations. Establish plans for managing resources. Determine ways to harvest resources with minimum environmental damage.

4, 7, 8, 9, 12, 14, 16, 17, 18, 19, 20, 22, 23, 29, 30, 31, 33, 34, 35, 36

Cook (D) $40,000/yr

Check freshness of food and ingredients prior to cooking. Weigh, measure, and mix ingredients of recipes. Cook foods. Garnish, arrange, and serve food. Clean work areas, equipment, utensils, dishes, and silverware. Cook, hold, and store food or other ingredients.

2, 3, 13, 16, 17, 21, 25, 26, 27, 28

Deckhand (D) $40,000/yr

Loading and discharging of cargo; maintain and repair ship structure and equipment; rig tow lines, open or close gates or ramps; pull guard chains; hoist buoys/nets; lower/raise scientific equipment. Assist in lowering and maintaining lifeboats in the event of emergency.

1, 2, 3, 4, 5, 6, 10, 11, 14, 17, 20, 25, 26, 27

Diesel Mechanic (D) $41,000/yr

Inspect machinery: braking systems, steering mechanisms, transmissions, engines, other machinery. Test drive vehicles to diagnose malfunctions; interpret test results using dials, gauges, computerized equipment. Routine maintenance; repair or replace malfunctioning components. Disassemble and reassemble equipment and parts.

1, 2, 5, 7, 10, 11, 14, 17, 20, 24, 28

Ecologist (B) $57,500/yr

Study the relationships between plants, animals, and their environments. Prepare field studies based on concerns about the environment. Consider how changes in the environment would affect individual species of trees, plants and wildlife, as well as how the change would affect the ecosystem as a whole.

4, 7, 8, 9, 12, 14, 17, 19, 20, 22, 23, 29, 30, 33, 34, 35, 36

Environmental Protection Specialist (B) $63,000/yr

Collect samples of air, soil, water, food, and other materials for analysis. Analyze samples, surveys to identify and assess threats to environment. Develop plans to prevent, control, fix, or restore environmental problems. Provide guidance to government, businesses and public on hazards and risks.

3, 7, 8, 9, 12, 14, 16, 17, 18, 19, 22, 23, 24, 29, 30, 33, 34, 35, 36

Environmental Technician (A) $41,000/yr

Inspect buildings and natural areas to ensure there are no environmental hazards. set up and maintain equipment used to monitor pollution levels such as remote sensors. Collect samples of air, water, soil, and other materials for laboratory analysis. Perform tests to identify and measure levels of pollutants.

3, 4, 7, 8, 11, 12, 14, 17, 19, 20, 22, 25, 28, 30, 33, 34, 35, 36

Fisherman (F) $40,000/yr

Small boat handling. Ship maintenance and upkeep. Line handling during berthing and departing movement of vessel. Handling of deck equipment and supplies. Fishing gear handling, construction or assembly and repair.

1, 2, 3, 4, 5, 6, 10, 11, 17, 20, 25, 26, 27

Geophysicist (A) $82,500/yr

Use physics principles to learn about Earth's surface. Study the influences of Earth's magnetic, electric, and gravitational forces on the oceans.

7, 8, 9, 11, 12, 17, 19, 20, 22, 30, 31, 32, 34

Hydrographer (C) $82,500/yr

Collect data and information on seabed type, water movements and waves. Managing hydrographic projects and writing reports. Use geographical information systems, global positioning systems, sonar and echo sounders to provide data for nautical charts and maps.

7, 8, 11, 12, 17, 19, 20, 21, 22, 29, 30, 34

Human Resources Manager (C) $89,000/yr

Plan and coordinate an organization's workforce. Handle questions, administer employee services, and resolving work-related problems. Advise managers on organizational policies. Oversee organization recruitment, interview, selection, and hiring. Mediate disputes, firing of employees, and direct disciplinary procedures.

9, 12, 14, 15, 16, 17, 19, 21, 24, 25, 29

Information Technology Specialist (B) $69,000/yr

Test and evaluate existing network systems. Perform regular maintenance to ensure networks operate correctly. Troubleshoot local area networks, wide area networks, and Internet systems. Diagnose computer problems. Repair computer equipment.

3, 8, 10, 14, 15, 16, 17, 24, 25, 28, 29

Marine Biologist (D) $57,500/yr

Develop and conduct experimental studies with animals; collect biological data and specimens. Study the characteristics of animals such as interspecific interactions, reproduction, disease, movement patterns. Analyze influence human activity has on wildlife and their habitats. Estimate populations.

4, 7, 8, 9, 11, 12, 14, 17, 19, 20, 22, 23, 24, 29, 30, 36

Marine Archaeologist (C) $54,000/yr

Plan research projects to answer questions about humans. Develop data collection methods. Collect information from observations, interviews, and documents. Record and manage records of observations taken in the field. Analyze data, laboratory samples, and other sources to uncover patterns about human life, culture, and origins.

7, 8, 9, 12, 14, 17, 19, 20, 22, 23, 29, 30, 35

Marine Geologist (A) $82,500/yr

Plan and conduct field studies, produce geologic maps and charts. Study the materials, processes, and history of Earth's oceans. Investigate how ocean features formed and what has happened to them.

4, 7, 8, 9, 11, 12, 14, 17, 20, 22, 23, 29, 31, 34

Mates (1st, 2nd, & 3rd) (D) $64,000/yr

Steer vessels using navigational devices. Stand watches on vessels during specified periods. Determine geographical positions of ships; participate in activities related to maintenance of vessel security. Supervise crew members.

3, 4, 6, 7, 9, 12, 14, 15, 16, 17, 19, 20, 23, 24, 25, 26, 29

Mechanical Engineer (D) $78,000/yr

Design, develop, build, and test mechanical devices, including tools, engines, and machines. Analyze problems to see how a mechanical device might help solve the problem. Develop and test prototype devices; analyze results and suggest design changes. Oversee production of device.

7, 8, 10, 11, 13, 17, 19, 20, 22, 29, 30, 31

Microbiologist (C) $66,000/yr

Plan and conduct complex research projects. Supervise work of biological technicians. Isolate and maintain cultures of bacteria or other microorganisms. Identify and classify microorganisms found in specimens. Monitor the effect of microorganisms on plants, animals, and other microorganisms and on the environment.

8, 9, 11, 12, 14, 17, 20, 22, 23, 29, 30, 33, 36

Oceanographer (A) $82,500/yr

Study the motion and circulation of ocean waters; physical and chemical properties of the oceans; how these properties affect coastal areas, climate, and weather. Plan and conduct field studies.

4, 8, 9, 11, 12, 14, 17, 19, 20, 22, 23, 29, 30, 31, 32, 33, 34

Physical Scientist (C) $70,000/yr

Support efficient hydrographic data acquisition and processing. Test, evaluate, and operationally implement hydrographic hardware and software systems. Analyze the results of tests and create project plans and reports associated with test and evaluation projects. writing procedural documentation, conducting training, and present papers.

8, 9, 11, 12, 14, 17, 19, 22, 23, 29, 30, 31, 32, 33

Physician's Assistant (A) $86,500/yr

Review patients' medical histories. Do physical exams to check patients' health. Order and interpret diagnostic tests. Make preliminary diagnoses concerning injury/illness. Provide treatments. Prescribe medicines.

6, 9, 12, 14, 15, 16, 17, 19, 20, 22, 23, 25, 26, 29, 36,

Remotely Operated Vehicle (ROV) Pilot (C) $90,000/yr

Launch, fly (drive), and recover ROV from ship's deck or platforms. Navigate through conditions such as poor visibility and tightly confined spaces.

7, 11, 14, 17, 20, 23, 25, 28, 29

Remotely Operated Vehicle Technician (C) $68,000/yr

Keep ROV components in operational and technical order to allow underwater data collection. Identify and solve equipment problems; remove, inspect, test, and/or replace engines, hydraulic components, and pumps. Test equipment cables, video and light systems.

1, 3, 4, 7, 10, 11, 14, 17, 20, 23, 25, 28

Science Teacher (D) $53,000

Plan and teach lessons in the subjects taught. Evaluate students' abilities, strengths, and weaknesses. Grade assignments to monitor progress. Communicate with parents about progress.

3, 6, 7, 8, 9, 11, 12, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24, 25, 29, 30, 32, 33, 34, 35, 36

Science Research Manager (D) $116,000/yr

Supervise the work of scientists. Determine scientific and technical goals of research and development. Make detailed plans to accomplish these goals. Prepare budgets for projects and programs. Determine staffing, training, and technology needs. Review accuracy of data. Establish sampling protocols and standards. Communicate research findings and project status.

3, 8, 9, 12, 14, 15, 16, 17, 19, 21, 24, 25, 29, 30, 32, 33, 34, 35

Secretary (C) $34,500/yr

Maintain executive calendars, scheduling and rearranging appointments. Arrange meetings and conferences. Prepare presentation materials. Prepare minutes for meetings. Receive telephone calls and greet visitors. Manage controlled correspondence.

3, 8, 9, 14, 16, 17, 19, 24, 25, 27, 28

Ship's Commanding Officer (C) $100,000/yr

Overall command of ship. Supervise work of other officers and crew. Ensure that proper safety procedures are followed. Assess crew's abilities. Prepare budgets. Oversees loading/unloading of cargo. Keeps logs and records tracking ship's movement and activities.

3, 4, 6, 7, 8, 9, 11, 12, 14, 15, 16, 17, 18, 19, 20, 23, 24, 25, 26, 29

Ship's Engineer (C) $77,500/yr

Directs and performs maintenance and repair work on the ship systems in accordance with manufacturer's and shipbuilder's technical manuals. Responsible for the maintenance and operational requirements ensuring safe and effective operation of the engineering, electrical, or electrical systems that may be assigned to him/her. Keeps required records, logs, and reports.

1, 3, 5, 6, 7, 10, 11, 14, 16, 17, 20, 25, 26, 28, 29

Surveyor (A) $56,000/yr

Measure distances, directions, and angles between points. Establish official land and water boundaries. Research land records. Prepare plots, maps, and reports. Write descriptions for deeds, leases, and legal documents.

2, 3, 4, 7, 8, 15, 16, 17, 19, 20, 22, 23, 24, 25, 29

Surveying Technician (B) $38,000/yr

Operate surveying instruments; collect data on location. Visit sites to record survey measurements. Search for previous points. Set out and retrieve stakes to conduct surveys. Enter surveying data into computers.

2, 3, 4, 7, 8, 11, 14, 17, 19, 20, 23, 25, 28

Job Descriptions
Student Version

Job Demand:

A = > 21% growth
B = 16-20% growth
C = 11-15% growth
D = 6-10% growth
E = 0-5% growth
F = declining demand

Administrator (C) $78,000/yr
Plan, direct, and coordinate services within an organization. Supervise personnel. Recommend changes to policies or procedures to improve the organization. Plan budgets. Monitor the facility for safety and efficiency. Ensure that organization complies with governmental and industry regulations.

Biochemist (A) $79,500/yr
Plan and conduct complex projects in basic and applied research. Manage laboratory teams. Isolate, analyze, and synthesize proteins, enzymes, DNA, and other molecules. Research the effects of substances on tissues and biological processes.

Biological Technician (C) $39,000/yr
Set up, maintain, clean laboratory instruments and equipment. Gather and prepare samples; conduct biological tests and experiments; document procedures, observations, and results; analyze experimental data; write reports.

Bosun (Boatswain) (C) $50,000/yr
Direct crew members (deck hands) in performing activities such as on/off loading cargo; operating, maintaining, repair ship structure and equipment; rig tow lines, open or close gates or ramps; hoist buoys/nets; lower/raise scientific equipment. Lower and maintain lifeboats in the event of emergency.

Chemist (E) $70,000/yr
Plan and carry out complex research projects. Analyze substances to determine their chemical and physical properties such as their structure and composition. Determine proper chemical processing and test procedures. Prepare test solutions, compounds, and reagents used in chemical procedures.

Chemistry Technician (D) $42,000/yr
Monitor chemical processes and test product quality. Set up and maintain laboratory instruments and equipment. Prepare chemical solutions. Conduct chemical experiments, tests, and analyses. Compile and interpret results. Prepare reports, graphs, and charts summarizing results.

Conservation Scientist (A) $57,500/yr
Monitor conservation activities to assure compliance with regulations. Establish plans for managing resources. Determine ways to harvest resources with minimum environmental damage.

Cook (D) $40,000/yr
Check freshness of food and ingredients prior to cooking. Weigh, measure, and mix ingredients of recipes. Cook foods. Garnish, arrange, and serve food. Clean work areas, equipment, utensils, dishes, and silverware. Cook, hold, and store food or other ingredients.

Deckhand (D) $40,000/yr

Loading and discharging of cargo; maintain and repair ship structure and equipment; rig tow lines, open or close gates or ramps; pull guard chains; hoist buoys/nets; lower/raise scientific equipment. Assist in lowering and maintaining lifeboats in the event of emergency.

Diesel Mechanic (D) $41,000/yr

Inspect machinery: braking systems, steering mechanisms, transmissions, engines, other machinery. Test drive vehicles to diagnose malfunctions; interpret test results using dials, gauges, computerized equipment. Routine maintenance; repair or replace malfunctioning components. Disassemble and reassemble equipment and parts.

Ecologist (B) $57,500/yr

Study the relationships between plants, animals, and their environments. Prepare field studies based on concerns about the environment. Consider how changes in the environment would affect individual species of trees, plants and wildlife, as well as how the change would affect the ecosystem as a whole.

Environmental Protection Specialist (B) $63,000/yr

Collect samples of air, soil, water, food, and other materials for analysis. Analyze samples, surveys to identify and assess threats to environment. Develop plans to prevent, control, fix, or restore environmental problems. Provide guidance to government, businesses and public on hazards and risks.

Environmental Technician (A) $41,000/yr

Inspect buildings and natural areas to ensure there are no environmental hazards. set up and maintain equipment used to monitor pollution levels such as remote sensors. Collect samples of air, water, soil, and other materials for laboratory analysis. Perform tests to identify and measure levels of pollutants.

Fisherman (F) $40,000/yr

Small boat handling. Ship maintenance and upkeep. Line handling during berthing and departing movement of vessel. Handling of deck equipment and supplies. Fishing gear handling, construction or assembly and repair.

Geophysicist (A) $82,500/yr

Use physics principles to learn about Earth's surface. Study the influences of Earth's magnetic, electric, and gravitational forces on the oceans.

Hydrographer (C) $82,500/yr

Collect data and information on seabed type, water movements and waves. Managing hydrographic projects and writing reports. Use geographical information systems, global positioning systems, sonar and echo sounders to provide data for nautical charts and maps.

Human Resources Manager (C) $89,000/yr

Plan and coordinate an organization's workforce. Handle questions, administer employee services, and resolving work-related problems. Advise managers on organizational policies. Oversee organization recruitment, interview, selection, and hiring. Mediate disputes, firing of employees, and direct disciplinary procedures.

Information Technology Specialist (B) $69,000/yr

Test and evaluate existing network systems. Perform regular maintenance to ensure networks operate correctly. Troubleshoot local area networks, wide area networks, and Internet systems. Diagnose computer problems. Repair computer equipment.

Marine Biologist (D) $57,500/yr

Develop and conduct experimental studies with animals; collect biological data and specimens. Study the characteristics of animals such as interspecific interactions, reproduction, disease, movement patterns. Analyze influence human activity has on wildlife and their habitats. Estimate populations.

Marine Archaeologist (C) $54,000/yr

Plan research projects to answer questions about humans. Develop data collection methods. Collect information from observations, interviews, and documents. Record and manage records of observations taken in the field. Analyze data, laboratory samples, and other sources to uncover patterns about human life, culture, and origins.

Marine Geologist (A) $82,500/yr

Plan and conduct field studies, produce geologic maps and charts. Study the materials, processes, and history of Earth's oceans. Investigate how ocean features formed and what has happened to them.

Mates (1st, 2nd, & 3rd) (D) $64,000/yr

Steer vessels using navigational devices. Stand watches on vessels during specified periods. Determine geographical positions of ships; participate in activities related to maintenance of vessel security. Supervise crew members.

Mechanical Engineer (D) $78,000/yr

Design, develop, build, and test mechanical devices, including tools, engines, and machines. Analyze problems to see how a mechanical device might help solve the problem. Develop and test prototype devices; analyze results and suggest design changes. Oversee production of device.

Microbiologist (C) $66,000/yr

Plan and conduct complex research projects. Supervise work of biological technicians. Isolate and maintain cultures of bacteria or other microorganisms. Identify and classify microorganisms found in specimens. Monitor the effect of microorganisms on plants, animals, and other microorganisms and on the environment.

Oceanographer (A) $82,500/yr

Study the motion and circulation of ocean waters; physical and chemical properties of the oceans; how these properties affect coastal areas, climate, and weather. Plan and conduct field studies.

Physical Scientist (C) $70,000/yr

Support efficient hydrographic data acquisition and processing. Test, evaluate, and operationally implement hydrographic hardware and software systems. Analyze the results of tests and create project plans and reports associated with test and evaluation projects. writing procedural documentation, conducting training, and present papers.

Physician's Assistant (A) $86,500/yr

Review patients' medical histories. Do physical exams to check patients' health. Order and interpret diagnostic tests. Make preliminary diagnoses concerning injury/illness. Provide treatments. Prescribe medicines.

Remotely Operated Vehicle (ROV) Pilot (C) $90,000/yr

Launch, fly (drive), and recover ROV from ship's deck or platforms. Navigate through conditions such as poor visibility and tightly confined spaces.

Remotely Operated Vehicle Technician (C) $68,000/yr

Keep ROV components in operational and technical order to allow underwater data collection. Identify and solve equipment problems; remove, inspect, test, and/or replace engines, hydraulic components, and pumps. Test equipment cables, video and light systems.

Science Teacher (D) $53,000

Plan and teach lessons in the subjects taught. Evaluate students' abilities, strengths, and weaknesses. Grade assignments to monitor progress. Communicate with parents about progress.

Science Research Manager (D) $116,000/yr

Supervise the work of scientists. Determine scientific and technical goals of research and development. Make detailed plans to accomplish these goals. Prepare budgets for projects and programs. Determine staffing, training, and technology needs. Review accuracy of data. Establish sampling protocols and standards. Communicate research findings and project status.

Secretary (C) $34,500/yr

Maintain executive calendars, scheduling and rearranging appointments. Arrange meetings and conferences. Prepare presentation materials. Prepare minutes for meetings. Receive telephone calls and greet visitors. Manage controlled correspondence.

Ship's Commanding Officer (C) $100,000/yr

Overall command of ship. Supervise work of other officers and crew. Ensure that proper safety procedures are followed. Assess crew's abilities. Prepare budgets. Oversees loading/unloading of cargo. Keeps logs and records tracking ship's movement and activities.

Ship's Engineer (C) $77,500/yr

Directs and performs maintenance and repair work on the ship systems in accordance with manufacturer's and shipbuilder's technical manuals. Responsible for the maintenance and operational requirements ensuring safe and effective operation of the engineering, electrical, or electrical systems that may be assigned to him/her. Keeps required records, logs, and reports.

Surveyor (A) $56,000/yr

Measure distances, directions, and angles between points. Establish official land and water boundaries. Research land records. Prepare plots, maps, and reports. Write descriptions for deeds, leases, and legal documents.

Surveying Technician (B) $38,000/yr

Operate surveying instruments; collect data on location. Visit sites to record survey measurements. Search for previous points. Set out and retrieve stakes to conduct surveys. Enter surveying data into computers.

Student Name: _____ Class Period: _____

Alternatives to Piracy: Careers on the High Seas
Post-Game Reflection Essay Rubric

CATEGORY	4	3	2	1
Organization	Information is very organized with all 6 questions containing well-constructed paragraphs.	Information is organized with 4 of the 6 questions containing well-constructed paragraphs.	Information is organized, with only 2 of the 6 paragraphs well-constructed.	The information appears to be disorganized.
Amount of Information	All questions are addressed and answered with at least 2 sentences about each.	All questions are addressed and most answered with at least 2 sentences about each.	All questions are addressed, and most answered with 1 sentence about each.	One or more questions were not addressed.
Quality of Information	Information clearly relates to the question. It includes 3 or more supporting details and/or examples.	Information clearly relates to the question. It provides 1-2 supporting details and/or examples.	Information clearly relates to the question. No details and/or examples are given.	Information has little or nothing to do with the question.
Mechanics	No grammatical, spelling or punctuation errors.	Almost no grammatical, spelling or punctuation errors	A few grammatical spelling, or punctuation errors.	Many grammatical, spelling, or punctuation errors.

Total: _____/16 Pts.

Career and Skills Spreadsheet

	1 I can lift heavy objects.	2 I can stand for long periods of time.	3 I can listen carefully.	4 I can work in all types of weather.	5 I can cope with a busy, noisy, dirty, workplace.	6 I stay calm in emergencies.	7 I can use diagrams or maps.	8 I am accurate with numbers and measurements.	9 I can write reports.	10 I can make and repair things.	11 I can operate instruments and machinery.	12 I can remember facts.	13 I am good at designing things.	14 I can ask questions.	15 I can give people orders or instructions.	16 I can answer people's questions.	17 I can work with others to achieve a goal.	18 I can be persuasive.	19 I can keep detailed records.	20 I can visualize objects, distances, and sizes.	21 I am good at managing money.	22 I can draw conclusions from experimental data.	23 I am very observant.	24 I am good at time management and prioritizing.	25 I can multi-task.	26 I may wear a uniform or protective clothing.	27 I will need a high school diploma or GED.	28 I will need a 2-year degree or certification.	29 I will need at least a bachelor's degree.	30 I am good at science.	31 I am good at math.	32 I am interested in forces and motion.	33 I am interested in chemicals and their nature.	34 I am interested in how the Earth is formed and changes.	35 I am interested in how people influence the Earth.	36 I enjoy working with living organisms.
Administrator			■						■					■	■	■	■	■	■		■			■					■							
Biochemist								■	■			■		■			■		■	■		■	■						■				■			■
Biological Technician			■					■		■		■		■			■		■	■			■	■	■					■	■					■
Bosun (Boatswain)	■	■	■	■	■	■				■	■				■	■	■			■				■	■			■								
Chemist								■	■		■	■		■			■		■	■		■							■	■	■		■			
Chemistry Technician								■		■	■	■		■		■	■		■			■		■	■			■	■	■	■		■			
Conservation Scientist				■			■	■	■			■		■		■	■	■	■	■		■	■						■	■	■		■	■	■	■
Cook		■	■										■			■	■				■				■	■	■	■								
Deckhand	■	■	■	■	■	■				■	■			■			■			■					■	■	■									
Diesel Mechanic	■	■			■		■			■	■			■			■			■				■				■								
Ecologist				■			■	■	■			■		■			■		■	■		■	■						■	■			■	■	■	■
Environmental Protection Specialist			■				■	■	■			■		■		■	■	■	■			■	■	■					■	■			■	■	■	■
Environmental Technician			■	■			■	■			■	■		■			■		■	■		■			■			■		■			■	■	■	■
Fisherman	■	■	■	■	■	■				■	■						■			■					■	■	■									
Geophysicist							■	■	■		■	■					■		■	■		■								■	■	■		■		
Hydrographer							■	■			■	■					■		■		■			■	■				■							
Human Resource Manager									■			■		■	■	■	■		■		■			■	■				■							
Information Tech. Specialist			■					■		■				■	■	■	■							■	■			■	■							
Marine Biologist				■			■	■	■		■	■		■			■		■	■		■	■	■					■	■						■
Marine Archaeologist							■	■	■			■		■			■		■	■		■	■						■		■			■		
Marine Geologist				■			■	■	■		■	■		■			■			■		■	■						■		■			■		
Mates (1st, 2nd, & 3rd)			■	■		■	■		■			■		■	■	■	■		■	■			■	■	■	■			■							
Mechanical Engineer							■	■		■	■		■				■		■	■		■							■	■	■					
Microbiologist								■	■		■	■		■			■			■		■	■						■	■			■			■
Oceanographer				■				■	■		■	■		■			■		■	■		■	■						■	■	■	■	■	■		
Physical Scientist								■	■		■	■		■			■		■			■	■						■	■	■	■	■			
Physician's Assistant						■			■			■		■	■	■	■		■	■		■	■		■	■			■							■
ROV Pilot							■				■			■			■			■			■		■			■	■							
ROV Technician	■		■	■			■			■	■			■			■			■			■		■			■								
Science Teacher			■			■	■	■	■		■	■		■	■	■	■		■	■		■	■	■	■				■	■		■	■	■	■	■
Science Research Manager			■					■	■			■		■	■	■	■		■		■			■	■				■	■		■	■	■	■	
Secretary			■					■	■					■		■	■		■					■	■		■	■								
Ship's Commanding Officer			■			■	■	■	■		■	■		■		■	■	■	■	■			■	■	■	■			■							
Ship Engineer	■		■		■	■	■			■	■			■		■	■			■					■	■		■	■							
Surveyor		■	■	■			■	■			■				■	■	■		■	■		■	■	■	■				■							
Surveying Technician		■	■	■			■	■			■			■			■		■	■			■		■			■								