Resource 2: Careers

Summary

Teacher / leader notes:
• Activity 2a - Selecting your team
• Activity 2b - Mapping STEM skills

Age: 10-14 years old

Aims of the activities

To develop:
• an appreciation of a range of STEM-related career paths
• an understanding of roles within an interdisciplinary team
• curriculum areas: linking careers to the curriculum (DfE Careers strategy: making the most of everyone’s skills and talents).
• skills: extracting information; focused observation; discuss and debate.

Key terms:
Careers, expedition, budgeting, planning, skills, personality traits, maritime archaeology, 3D printing, photogrammetry

Background information
The Black Sea Maritime Archaeology Project (Black Sea MAP) was a three-year interdisciplinary expedition researching ancient coastlines and seafaring history of the Bulgarian Black Sea. Watch Film 1 ‘Exploring the past’ for an introduction to the project. Film 2 ‘Working at Sea’ introduces the expedition team.

Black Sea MAP linked to learning
Running an expedition requires a huge range of jobs: chefs, navigation crew, cleaners, technicians, engineers, IT experts, divers and mechanics, as well as maritime archaeologists, geoscientists and physicists. Being flexible, thinking creatively and team work are all important personality traits when you are working far out at sea.

www.blackseamap.com/education
Activity 2a: Selecting your team (35 minutes)

Students select a team for a specific on-board challenge, keeping to a given budget*.

Resources
- Film 2 ‘Working at sea’ (05:57)
- Film 1 ‘Exploring the past’ (06:22) for background introduction if needed -- Film 1 refers to how 3D printed models are produced, for example

For each group of 4-6 students
- 16 x mini role cards Sheet 2ai (cut up)
- 15 x career profiles PDF 2a(ii) (available at http://blackseamap.com/resources-films/)

Per student
- Student sheet 2a

Running the activity
1. Arrange students into groups of 4-6.
2. Give out the student sheet, career profiles* and role cards. Outline the task, drawing attention to the three challenges to choose from.
3. Watch Film 2.
4. Allow 5 minutes for ordering of the task list.

Suggested order for the tasks:
- Decide on one of the three challenges
- List the tasks that need to be carried out
- List the skills needed to carry out the tasks
- Match the role cards and career profiles to the skills needed
- Agree on any roles that need high levels of experience and knowledge
- Agree on tasks which can be carried out by less experienced team members
- Make an initial selection of team members that you need
- Add up the cost of your team
- Make decisions about hiring more experienced, more expensive people or less expensive people
- Adjust your team if you are over-budget
- Check that you have people to cover all the roles needed
- Add any further stages to this plan that you think are needed

5. Allow 10 minutes for the groups to choose their challenge and select their teams. You may need to explain some aspects of the challenges, linking these to the film and role cards. For example, the different stages involved in producing a 3D printed model.

6. Groups now pair up to compare their teams and to agree on a single team, if possible.

Plenary
7. Focus on asking groups to justify their choice of team members, relating this to the challenge (tasks and budget).

Lesson reflection
8. Students reflect individually or in pairs using the prompt questions on the student sheet.

*Disclaimer: the figures for day rates are for illustrative purposes only and do not directly represent individual’s actual salaries. Day rates usually represent the overall cost to the employer of involving the employee in a project. This includes salary, as well as overheads and other charges, including profit in the case of commercial organisations.
**Activity 2b: Mapping STEM skills (30 minutes)**

Students identify skills in the expedition team and create career profiles and a career route poster.

**Resources**
- Film 2 ‘Working at sea’ (05:57) (Films 1 and 3 are also useful background for this activity)
- Per student
  - Student sheet 2b
- For each group of 4-6 students
  - 4 x career profile template Sheet 2bi
  - 15 x career profiles PDF 2aii (available at http://blackseamap.com/resources-films/)

**Running the activity**
1. Students watch Film 2, taking notes on skills identified in the film.
2. Get feedback on the skills students have identified to check they have identified a good range.
3. Allow 15 minutes for students to research four career profiles within their group, filling in a career profile template for each person/role.
4. Show students a range of career route posters for inspiration ahead of allowing time for them to design and make a career route poster for their chosen roles. This task could be completed for homework.

Interesting STEM career information:
- [practicalaction.org/careers-poster](http://practicalaction.org/careers-poster)
- [www.oxfordsparks.ox.ac.uk/justaddimagination](http://www.oxfordsparks.ox.ac.uk/justaddimagination)
- [stemcrew.co.uk/careers](http://stemcrew.co.uk/careers)

**Plenary**
5. Encourage students to evaluate each other’s posters.
6. Discuss the range of roles and skills involved in a STEM based expedition, drawing out students’ personal interests in any careers linked to these.

**Lesson reflection**
7. Allow time for students to reflect on their work.

**Ideas for further work**
8. You could set some homework or computer-based research following on from these activities and films.
   Students could:
   - Choose the career that they think they would be most interested in and map the route they need to take.
   - Produce a career profile of another individual they find on the internet.
Student Sheet 2a: Selecting your team

The Black Sea Maritime Archaeology Project (Black Sea MAP) gathered data from the sea bed of the Bulgarian Black Sea. The expedition team researched how sea levels changed over thousands of years. They suggested how that sea level change may have affected ancient communities. The team discovered ancient shipwrecks not seen since the day they sank. The wrecks tell a story of seafaring communities that used the Black Sea for travel and trade.

The ship was equipped with everything needed for research. This included equipment for data gathering, data handling, IT, cooking and boat maintenance, and running specialist tasks. Team members were brought out to the ship, had somewhere to sleep, food to eat, and places to work, rest and exercise.

Task:
You will select a team to undertake one of the three challenges below. There is a set budget for the challenge. The cost of your combined team must be within that budget.

1. Planning the task
In your group, number the following tasks in the order that you will follow:
   - Check that you have people to cover all the roles needed
   - Add any further stages to this plan that you think are needed
   - Adjust your team if you are over budget
   - List the tasks that need to be carried out
   - List the skills needed to carry out the tasks
   - Agree on any roles that need high levels of experience and knowledge
   - Decide on one of the three challenges
   - Make an initial selection of team members that you need
   - Agree on tasks which can be carried out by less experienced team members
   - Add up the cost of your team
   - Match the role cards and career profiles to the skills needed

2. Selecting your team
Carry out the tasks in the order that you agreed.

3. Sharing your work
Share your selected team and your thinking with another group who had the same challenge.
   i. Present the role cards of your selected team to show who you selected.
   ii. Show the total cost of your team next to the budget for the challenge.
   iii. Discuss any differences in your two teams. Did you list a similar set of tasks for the team to carry out?
   iv. Come up with one team that both groups agree on. If you can’t agree, write some bullet points on why each group thinks different people are needed in the team.
   v. Choose one person to feed back to the rest of class about your challenge and how both groups selected their teams.

4. Reflecting on your work
   i. Write three points that you have learnt about selecting a team to carry out a specific challenge.
   ii. List any expedition team roles that you learnt more about through this activity.
   iii. How could you have improved the way you worked in your team?
**Challenge 1: Diving down to look at a wreck**

Overnight the Remotely Operated Vehicle (ROV) spotted something interesting on the sea bed. Your challenge is to investigate this finding. It is in water that is shallow enough for divers to investigate.

You have £6,000 in your budget.

The dive will take six hours in total. The dive will cost £500 for each diver’s equipment. Divers must always work in pairs.

Points to consider: Will you bring up any artefacts found? Why should or shouldn’t you bring them up?

**Challenge 2: Deploy a remotely operated vehicle (ROV) to take photos and then print a 3D model of a wreck**

The team have identified a Roman (2000-year-old) shipwreck found in deep water. The depth of the shipwreck is too great to dive and the team want to know more about its structure and features. The ROV is deployed to take photos to then print a 3D model of the wreck so the team can study its details more closely.

You have £10,000 in your budget.

The ROV will cost £5,000 and will need two pilots to fly it.

The printing materials will cost £25 per model.

Points to consider: The ROV can take thousands of photos of the wreck. These can then be stitched together to build a 3D image (photogrammetry). The 3D image can then be printed. What information will be provided along with the 3D model and who will present this?

**Challenge 3: Sharing the news**

The team want to share information about the work they are doing. They decide to dock in a harbour and invite press and other media on-board to share the news. They want images, film and/or 3D models to help explain the work they are doing to the public.

You have £3,500 in your budget.

A short film will cost £1000.

Photographs will cost £25 each.

3D printed models will cost £25 each.

Points to consider: Who will be on your team to arrange the press event and meet the journalists on the day? What are the most important messages to communicate to the press about the expedition? How does your plan for the content of the press day affect the team you choose?
Activity 2a: Selecting your team. Role cards - sheet i

Cut out each role card along the dotted lines.

<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
<th>Skills</th>
<th>Cost per day</th>
</tr>
</thead>
</table>
| Maritime archaeologist        | Dr Rodrigo Pacheco-Ruiz     | • Photogrammetry  
• Diving (10 years)  
• Communicator                           | £500          |
| Maritime archaeologist        | Professor Jon Adams         | • Team leader  
• Diving (40 years)  
• Artist                               | £800          |
| Maritime archaeologist        | Dr Helen Farr               | • Pre-history specialist  
• Diving (20 years)  
• Communicator                           | £600          |
| Maritime archaeologist        | 3D print technician         | • 3D printing  
• Diving (10 years)  
• Communicator                           | £300          |
| Maritime archaeologist        | Dr Dragomir Garbov          | • Artefact preservation  
• Photogrammetry  
• Diving (20 years)                           | £500          |
| ROV pilot                     | Brian Gåre                  | • Mechanical engineering  
• Piloting ROV  
• Manipulating machinery                      | £600          |
**Activity 2a: Selecting your team. Role cards - sheet ii**

Cut out each role card along the dotted lines.

<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
<th>Skills</th>
<th>Cost per day</th>
</tr>
</thead>
</table>
| ROV pilot             | Atle Monson           | • Team leader  
• Mechanical engineering  
• Piloting ROV                                                        | £700         |
| Offshore manager      | Joakim Holmlund       | • Team leader  
• Physicist  
• Diving (25 years)                                                    | £800         |
| Ship’s captain        | Frode Karlson         | • Team leader  
• Navigation of the ship  
• Time management                                                        | £800         |
| Chief engineer        | Leif Eriksson         | • Mechanical engineering  
• Maintaining and mending machinery                                    | £500         |
| Scientific officer    | Dr Michael Grant      | • Identifying and dating sediment in cores  
• Organisation  
• Communicator                                                          | £600         |
| Chief steward         | Axel Tingvoll         | • Team leader  
• Time management  
• Budgeting  
• Catering                                                              | £500         |
Activity 2a: Selecting your team. Role cards - sheet iii

Cut out each role card along the dotted lines.

**IT support**  
Katarina Wagnerova

Skills
- Problem-solving
- IT technical skills
- Communicator

Cost per day £500

**Medic**  
Stuart Plumbley

Skills
- Emergency medicine
- Dive medic
- Communicator

Cost per day £400

**Data analyst**  
Maria-Pia Birkett

Skills
- Problem-solving
- Team work
- Explaining complex data to others

Cost per day £400

**Cameraman**  
Kier Byatt

Skills
- Cameraman
- Diving
- Creativity

Cost per day £400

**Producer**  
Catrin Evans

Skills
- Team leader
- Communicator
- Time management
- Creativity

Cost per day £400

**Sound technician**  
James Lopez

Skills
- Technical knowledge
- Listening
- Patience

Cost per day £300
Activity 2a: Selecting your team. Role cards - sheet iv

Cut out each role card along the dotted lines.

<table>
<thead>
<tr>
<th>Role</th>
<th>Skills</th>
<th>Cost per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photographer</td>
<td>Communicator, Creativity, Technical, Networking</td>
<td>£300</td>
</tr>
<tr>
<td>Martin Hartley</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student mentor</td>
<td>Communicator, Mentoring, Organisation</td>
<td>£300</td>
</tr>
<tr>
<td>Roger Baker</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Activity 2b: Mapping STEM skills

Task:
Use the films and the career profiles to build a map of the subjects and skills needed for the team roles aboard the ship.

1. Identify skills from the film
As you watch the film note any skills that you see or hear about:

2. Creating a career profile
   i. Use the career profiles and films to research four roles from the ship’s team. You can split this task between members of your group.
   ii. For each team member that you research, complete the career profile template provided (Sheet 2bi).
   iii. In your group, design and make a career route poster that shows a selection of roles on the BSMAP expedition. Your poster should link the roles with the education and training, the skills and personality traits needed.

3. Sharing your work
Share your poster with another group. Give each other feedback on one thing you like about the poster and one area for improvement.

4. Reflecting on your work
   i. How well could you identify skills from viewing the film?
   ii. Which job interested you the most? Why?
   iii. What subjects would you need to study to do that role?
   iv. What skills are important for that role?
### Activity 2b: Career profile template

<table>
<thead>
<tr>
<th>Name</th>
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<table>
<thead>
<tr>
<th>Job title</th>
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</table>

<table>
<thead>
<tr>
<th>Role – what do they do?</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Subjects studied in school</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Subjects studied or further training after school</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Personality traits</th>
</tr>
</thead>
</table>

Highlight the ones needed for this role:

Inventive, methodical, imaginative, collaborative, self-motivated, cooperative, organised, practical, logical, creative, resourceful, curious, efficient, patient, sensitive, friendly, reliable, empathetic.

Add any others you think of:

<table>
<thead>
<tr>
<th>Skills</th>
</tr>
</thead>
</table>

Highlight the ones needed for this role:

IT, manipulating machinery, academic research, diving, photogrammetry software, artefact preservation, 3D printing, communication, foreign language, leadership, motivation.

Add any others you think of: