

6. SUSTAINABLE FUEL: TEAMS OF STEM PROFESSIONALS

1.5–2 HOURS
PLUS 4
WEEKS OF
OBSERVATION

Children are presented with information about three members of a team of scientists. These three people work in different parts of the country, but the role of each is important to the others, to create new fuel cells for use in vehicles. The information is presented in a variety of formats, including game cards, written information, and a map to locate each scientist in the team, to enhance children's understanding of STEM careers.

OBJECTIVES

To use different contexts to maximise pupils' engagement and motivation to study science

To check that a text makes sense, discussing understanding and exploring the meaning of words in context (UKS2 reading comprehension)

Asking questions to improve understanding (UKS2 reading comprehension)

SCIENCE AND OTHER KEY VOCABULARY

STEM (Science, Technology, Engineering, Maths), collaborate, problem-solving, university, qualification, degree

RESOURCES

(per child or per group of four, unless otherwise stated)

- Set of career cards
- **Activity Sheets 7 and 8**
- **PowerPoint presentation:** What job do I do?

ACTIVITY NOTES

Children learn about a 'STEM' team in a science company. They are introduced, via card games, to three scientists who all have different specialisms outlined below. Carry out one or more of these games, depending on the time available. After the game(s), share the presentation, revealing the card 'combination' for each STEM professional.

Once the card games are completed, share **Activity Sheet 7** with the children either on the screen or in hard copy. Read the information together or in groups. Give each group a copy of **Activity Sheet 8**. Ask the children to do any combination of the following:

⁵The science curriculum for England (2014)- Page 3, programmes of study: key stages 1 and 2. In several sections of the non-statutory guidance, it is suggested that children work scientifically by considering the work of real scientists (pages 12, 27, 28, 30, 31, 32).

⁶**Download or purchase from CIEC** at £8.15 for a class set. (Sustainable fuel career cards)

- Place the picture card of each person in the box on the map, near where they work.
- Write information in the box on the map about each person and what they do.
- Add information outside the boxes, around the map, about how they work together as a team. Use two different colours to add the information – one colour representing what you know, and one colour representing your thoughts. Think about what connects them, how they might communicate, why they might be based in different parts of the country.

THE CARDS

Each set of cards is based around three employees from a science company called Johnson Matthey. For each employee there are six cards comprising of the following:

- Name and photograph
- Job title and 'What do you do in your job?'
- 'What are your qualifications?'
- 'What do you need to be good at in your job?'
- 'What did you enjoy at school?'
- 'What are your hobbies?'

GAME ONE

The aim is to encourage children to think about what different jobs might entail, and what sort of people might do certain jobs. There are a variety of ways that you could introduce this activity. For example, you could give children the job title cards and ask them to imagine what those jobs might involve before asking them to match the job titles to the photographs and names.

At this point children are likely to point out that it is not possible to tell; it is valuable to give them the opportunity to articulate this idea, as there is much evidence that, despite what we believe, gender and other stereotypes are deeply embedded in all of us from a young age.

You could support them to talk about their understanding by asking questions such as:

- Can you explain why you think that it would be this person?
- Does everyone agree with that?
- What makes you think that?
- Could it be this person?

Ask children what they think that these people might have enjoyed at school. Then look at the 'What did you enjoy at school?' cards and see if it is similar to what they guessed. Can they think of anyone in their class who likes the same things as this person? Do they like any of the same things as these people?

As long as children are engaged and there is a good level of discussion, keep adding cards or people. You may choose to end the session by using the PowerPoint presentation (see notes below) to show children which cards match with which people. However, it is important that children still understand that their suggestions are valid, even if they turn out not to match the reality as there is no way of telling for sure who does which job.

Show children all the 'What do you do in your job?' cards and the 'What did you enjoy at school?' cards. Challenge them to see if they can match them up. (In some cases there are clear links between early interests and current career, in others there are none, so this should give rise to some discussion).

Give out the 'What are your hobbies?' cards. Do they think that older people still like doing the things that they enjoyed when they were at school? Can they match these cards to the ones that they already have?

Use the PowerPoint presentation (see notes below) to see if they have correctly matched the three sets of cards. Again, ensure children understand that all their suggestions are valid as it is impossible to be completely sure which people have which hobbies.

GAME TWO

Show children all the 'What do you do in your job?' cards and the 'What did you enjoy at school?' cards. Challenge them to see if they can match them up. (In some cases there are clear links between early interests and current career, in others there are none, so this should give rise to some discussion).

Give out the 'What are your hobbies?' cards. Do they think that older people still like doing the things that they enjoyed when they were at school? Can they match these cards to the ones that they already have?

Use the PowerPoint presentation (see notes below) to see if they have correctly matched the three sets of cards. Again, ensure children understand that all their suggestions are valid as it is impossible to be completely sure which people have which hobbies.

GAME THREE

The cards can be used as a stimulus for children to make their own sets of career cards. Challenges could include:

- Making a set of cards for their future selves. Children could make more than one set; encourage them to think of a range of possibilities. For example, you could discuss that they may have more than one career during their adult lives. If their dream job is not in STEM consider the possibility that there may be a connected STEM career; for example, once they have retired as a premiership footballer, they may consider a job a sports psychologist or nutritionist! The sets of cards made by different children in the class could be used as the basis for a display which encourages children to consider the range of options that are open to them. Encourage children to find out what sorts of choices they will need to make to fulfil some of the ambitions on the cards.
- Making a set of cards for famous scientists both past and present. However, be aware of the danger of these being almost exclusively white, able-bodied males and ensure that people from a diverse range of backgrounds are included. Eg. Stephen Hawkins, Rosalind Franklin, Marie Curie, Maggie Aderin-Pocock and Katherine Johnson. Visit the **Famous Scientists website** for examples of famous black scientists.
- Making a set of cards for scientists and engineers that they have met. If they have been on a CCI visit this might include people from the industry that they visited. Alternatively, it could include visitors into school or family members or family friends. If there is the opportunity, children could interview potential subjects or, if this is not possible, allow them to use artistic license to fill in missing facts such as what their subject liked doing at school.

QUESTIONS FOR THINKING

Questions have been added to the appropriate sections above. In addition, you may like to ask:

- Do you know anyone who has a job using science? Is it different to these jobs?
- Do you know anyone who has gone to university? What did they study? What job do they do now?
- What do you know about going to university?
- Some people become apprentices instead of going to university. Do you know what an apprentice is? Do you know how this is different to going to university.

INDUSTRY LINKS AND AMBASSADORS

This activity provides a good opportunity to link with a broad range of STEM careers in industry. If possible, connect with ambassadors who have been to university as well as others who are or have been apprentices, and ask them to share reasons for their choices and what their time as an apprentice or student was like, e.g. 'a typical day' as a student/apprentice.

Request STEM ambassadors well in advance, who can visit your classrooms in person or virtually to discuss their experiences.

STEM CAREERS

The aim of this activity is to introduce children to 'scientists' who have developed their careers in different directions. Johnson Matthey employs a high number of chemists, but as with many science-based companies, employs other scientists (such as Hellen, a physicist) and a wide range of engineers (chemical, mechanical, electrical etc).