Volunteer Walkthrough

Power Changers

STEM Lessons for Primary Schools in the UK and Ireland

Learning from the Past

sse | For a better world of energy

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Volunteers should be aware of the following pieces of information before delivering these lessons:

All lessons in this suite are designed to be delivered in a normal classroom setting, although facilitators could adapt them for use in an assembly.

Each lesson plan contains information about how it can be adapted to suit pupils with SEND provision.

Each lesson plan builds one essential skill step from the Skills Builder Framework for essential skills. This Framework provides a common language for defining and developing eight essential skills. You can explore the Framework here.

Detailed lesson plans, slide decks, worksheets and knowledge organisers for each lesson can all be found on the STEM at SSE website.

Please share your pupils' work on social media, tagging @SSE on Twitter or @SSEplc on Instagram and using the #STEMatSSE tag.

LEARNING FROM THE PAST

Lesson 1

PROBLEMS AND SOLUTIONS

	Introduce yourself as the educator.
	Briefly introduce yourself and explain who SSE are and what they do.
	Do Now (5 mins) Show an image from the past showing someone's home. Ask the following questions: - What is this a picture of? - What can you see? - How is it similar to your home? - How is different to your home? Children to discuss what they can see in the image of the kitchen with their partner, using their existing knowledge of what would be found in a modern-day kitchen to support their discussion.
	Explain key words used in the lesson: - Problem - Solution - The past - The present

Introduction (10 mins)

Using the image, say that this is a picture from the past. The past is a time that has gone by and has already happened. The past could be this morning or it could be a time before any of us were born.

Ask the children to turn to a partner and prompt with these questions:

- Can you tell your partner some things you know have happened in the past?
- Was this a long time ago?

See if the children are able to use time-related vocabulary to support their explanations.

Take ideas from the children and discuss any misconceptions. Explain that today, we are going to be thinking about the past from the time that our parents and even our grandparents might have been very young.

Explain that there are many objects and devices that we see every day which solve a problem. Examine the key vocabulary with the children, reading one word at a time and asking them to talk to their partner about its meaning.

Children to talk to partner and then share with facilitator what they think the following words mean:

- Problem
- Solution
- The past
- The present

Take ideas from the children and clarify the meanings.

Reveal definition for Problem Solving: the ability to find a solution to a situation of challenge

Explain that throughout the lesson, children will be working on Step 4 of Problem Solving: exploring problems by creating different possible solutions.

Optional: Describe when you have demonstrated this skill step in your current role.

Reinforce the vocabulary through using the two very familiar examples. Explain to the children what the problem is and then ask them to give an idea for what the solution might be.

Children to share their ideas for what the solution to the problem could be when:

- They are feeling poorly
- They see someone doing something wrong

Discuss the 'big question' and see if the children have initial thoughts on this. An example could be used that is familiar to them such as the way we travel to school.

Show image of a problem that people face in their homes – wet clothes.

Record with the children (you could scribe these on a board or flipchart, or on a copy of the worksheet that children will be filling out to help them understand their independent task).

1) What is the problem? (wet clothes)
2) What is the solution? (use a tumble dryer)
3) Why is this a helpful device? (it is quick and takes up little space)

Pupil Practice (20 mins)

Children given a worksheet with structure shown on it for recording their ideas.

Children to cut out their chosen problem and then add their solution to the problem, referring to the object / device found in the home.

Finally, children will add their idea for why this device is a good solution to the problem.

In the resources, you'll find:

- a separate sheet including a number of problems commonly found in the home.
- additional resource for children who need to also see the solution.

	Key vocabulary shown on the resource to support word choices e.g. dry, warm, heat, wash Extension task: Children can then go further with this to consider a way to improve on of the solutions. Remember that school teaching and support staff will be able to help you identify any children who might need extra support in the session.
	Introduce the comparison grid shown on the slide, showing three of the solutions from the independent task. Tell the children that they need to think about these items and think of ways that two of them or all three of them are similar and how two or all three of them might also be different. Children to discuss their ideas with their partner(s) focusing on areas such as: - Appearance - How it works - Speed
	Ask the children how they used their problem-solving skills. Open a class discussion around the questions on screen. This will help children understand and communicate the skill they have built alongside their knowledge.
	Use these timings as a guide – this can be adjusted for the session being led

Activity	Time Allocation Guide
Do Now: a home from the past	10 mins
Introduction: exploring vocabulary	15 mins
Provide Model: problem, solution and why it helps	10 mins
Pupil Practise: independent examples	20 mins
Review of Learning: comparison grid	10 mins

HOST FEEDBACK Host Feedback Please share your work with us on social media using our hashtag **#STEMatSSE** @SSE @SSEplc Contact us at ***stem@sse.com*** to request a volunteer from SSE to deliver the lesson 	Please provide feedback via QR link – encourage children to submit examples of pupil work to social media.

A more detailed lesson plan can be found in the SSE ‘Power Changers’ Primary booklet.

ORDERING SOLUTIONS

Lesson 2

	Introduce yourself as the educator
	Briefly introduce yourself and explain who SSE are and what they do.
	Do Now (5 mins) Start off with a quickfire task showing a device from the previous session. Children to use the sentence starters to explain what it is, what problem it solves and why it is a good solution. Model this with the first one for the children: 'The car wash: **this device is used for** cleaning people's cars and other vehicles.' Continue the activity using the next two slides. Children should work with their partner.
	Explain key words used in the lesson - Safer - Cleaner - Efficient

	Introduction (10 mins) Show the slide asking What is a device? Show images from the slideshow and ask the children what they think a device is and which ones are devices. Common misconception will be that they are drawn to the electronic items however all are devices. Explain that a device is a thing made or adapted for a particular purpose. It is likely to be mechanical or electronic equipment. Therefore, it is all of the images shown on the slide.
	Show the slide 'same/different because…' Ask the children to speak to a partner to compare the images shown on the comparison grid, thinking about similarities and differences. Children discuss the three images in the comparison grid shown on the slide: a fire with a cooking pot over, an oven, a microwave. Children to discuss how they are similar / different.
	Discuss the big question in the context of the devices already explored.
	Introduce Creativity as the skill used to think of new ideas. Explain that throughout the lesson, children will be building their understanding of how ideas can be generated to improve something. Optional: Describe when you have demonstrated this skill step in your own role.

	Provide model (15 mins) Show the three images of ways of cooking. Explain that these were used in the past and some are used in the present. Which of these was used first / earliest? How do we know? Click on the screen for it to move into the correct place on the structure. Ask the children what the problem would be if we still cooked like this. Children to suggest why the pot over the fire would be difficult to use now. Facilitator to click the slide and through discussion, introduce the idea that it is cleaner, safer and more efficient. Repeat for the traditional oven and the microwave. With each one of the first two, identify the problem with them and why, therefore, the next one was developed.
	Pupil practice (20 mins) Children will choose a selection of three images of items that are familiar to them. All of them are items that eventually rely on electricity. They will cut them out and place them onto the structure. Children to stick the three items into the correct order on their sheets and then explain what has changed in the different solutions using the key words cleaner, safer and more efficient. Repeat with a second and possibly third example if there is time. Children to use key vocabulary shown on the sheet to support with this. Extension question/task: can you design your own using an example that is not in the kitchen? Children can draw this using a blank piece of paper or blank format. Remember that school teaching and support staff will be able to help you identify any children who might need extra support in the session.

Show all the images (9 in total) on the slide and ask the children to find the related three. Which is the one that is used today out of the three? Why has it been developed this way?

Ensure children have referred to the key words of cleaner, safer, more efficient.

Finally, show three ways of generating power – coal, gas and hydro.

Are children able to sequence these and explain why hydro is the most modern and why? Focus discussion around cleaner, safer, more efficient.

Ask the children what problems SSE are trying to solve when it comes to energy. Ask how Creativity how can be used to solve these types of problems. Guide them towards understanding that creativity is about generating ideas to, in this case, make something better. This will help children understand and communicate the skill they have focussed on alongside their knowledge

Explain that SSE are a company who are changing the way we get our electricity to power many of our devices in our homes. Show the images of SSE renewable energy so children are able to see examples of this in action.

Activity	Time Allocation Guide
Do Now: problem solvers	5 mins
Introduction: what is a device?	10 mins
Provide Model: cleaner, safer, more efficient	15 mins
Pupil Practise: ordering improvements	20 mins
Review of Learning: how we get power	10 mins

Use these timings as a guide – this can be adjusted for the session being led

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CLEANING UP!

Lesson 3

STEM EDUCATION PROGRAMME Learning from the Past Cleaning up! *LO: To **understand** how energy is generated to be safer, cleaner and more efficient.* 	Introduce yourself as the educator
WHO ARE SSE? 	Briefly introduce yourself and explain who SSE are and what they do.
Do now: New technology is created to become s_____, cl_____ and m___ e_____. 	**Do Now (5 mins)** Show statement with gaps shown within: New technology is created to become s_____, cl_____ and m___ e_____. (safer, cleaner and more eficient) Ask the children to verbally complete the statement and then come up with examples from their previous learning and any more from their own knowledge.
Our BIG question Why are new solutions found to the same problems?	Remind children of the big question.

	Introduce Creativity as the skill used to think of new ideas. Explain that throughout the lesson, children will be building their understanding of how ideas can be generated to improve something. Optional: Describe when you have demonstrated this skill step in your own role.
	Show image showing a lot of pollution. Focus on the power station in the image. Does this look safe or clean to you? Explain to the children that the power station burns coal to create electricity. Tell them that this works well but the problem is it creates a lot of pollution, and we will one day run out of coal and it would take millions of years for more to form. Tell the children that you are going to show them a short film about the work of SSE. Tell the children that they need to look for as many ways where SSE are making things safer, cleaner and more efficient.
	Show the SSE video We Power Change - YouTube. When the film clip finishes, children to give suggestions of what they could see that was safer, cleaner or more efficient than the first image we saw.
	Explain key words used in the lesson: - Energy sources - Renewable - Hydro - Wind - Solar
	Provide model (15 mins) Show structure of 'talk to the aliens'. Model the use of this using coal power as an example. Example: This is a COAL POWER STATION. It uses COAL to create electricity.

	It is good because it…PRODUCES THE POWER WE NEED The problem I see is…IT CAUSES A LOT OF AIR POLLUTION. Through questioning, ask the children to explain why they think it isn't safe, linking this where you can to the planet, animals, humans etc. Repeat with clean and efficient.
	Show structure of 'talk to the aliens'. Repeat talk to the aliens using wind turbines as an example and children to complete this with their partners. It uses _____ to create electricity. It is good because it… The problem I see is… At this stage, it is important the children consider questions like 'what if there was no wind?'
	Show structure of 'talk to the aliens'. Now with a focus on hydroelectricity: children to suggest ideas to complete the sentences. This is a _____. It uses _____ to create electricity. It is good because it… The problem I see is… Tell the children that all ways of creating power have limitations however using renewable energy is far more efficient as we will not run out of these energy sources. Then look at a number of images from the previous lessons and ask the children to consider what the future might look like, drawing upon the images that are most relevant.
	Show the crystal ball outline on the slide. Explain to the children that they are going to draw what they would love the future to look like. Ask them to consider what would go in their crystal ball – explain that they can show it in any way they wish. Click to reveal the prompts shown and ask the children to think about them. The facilitator may wish to get the children to close their eyes and

	imagine it or to share each of their ideas with a partner. **Pupil practise (20 mins)** Distribute the sheets and ask children to record their ideas onto their crystal ball. Tell them that they will present their ideas to others at the end of the session. Children to complete their 'crystal ball of hope' for the future. Within it, they need to draw what they want the future to look like to make sure it is clean, safe and efficient. Optional: Underneath this, children to write about what they have drawn. This may be dependent on time available and also the writing ability of the child. Children could be encouraged to go further with this, explaining why they have made their choices. Remember that school teaching and support staff will be able to help you identify any children who might need extra support in the session.
	Review of learning (10 mins) Ask children to present their work to their partner. Tell them to focus on what they have in their picture and why they have chosen this. Children present their work to a partner, small group or the full class. Children then to give the other child verbal feedback using some of the prompts shown on the slide: I like your idea because… I thought it was an intelligent idea because… Have you thought about…
	Ask the children how they used their Creativity skills. Open a class discussion around the questions on screen. This will help children understand and communicate the skill they have built alongside their knowledge

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<tr><th>Activity</th><th>Time Allocation Guide</th></tr>
<tr><td>Do Now: fill in the gaps</td><td>5 mins</td></tr>
<tr><td>Introduction: finding out about SSE renewables</td><td>10 mins</td></tr>
<tr><td>Provide Model: Discussing cleaner, safer, more efficient energy</td><td>10 mins</td></tr>
<tr><td>Pupil Practise: Creating our crystal balls</td><td>20 mins</td></tr>
<tr><td>Review of Learning: Presenting our work to others</td><td>10 mins</td></tr>
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