

JUST TRANSITION

STEM Lessons for Primary Schools
in the UK and Ireland



CONTENTS

INTRODUCTION	3
KS1 LEARNING FROM THE PAST	4
PROBLEMS AND SOLUTIONS	5
ORDERING SOLUTIONS	9
CLEANING UP!	13
KS1 CHANGING THE WAY WE LIVE	17
CONSUMPTION CITY	18
MAKING MY CHANGE.....	21
NET-POSITIVE CITY	25
KS2 ENERGY	29
POWER TO THE PEOPLE	30
TAKING CHARGE.....	33
THE FUTURE OF ENERGY	36
KS2 FUTURE SKILLS	39
RISE OF THE ROBOTS.....	40
FUTURISTIC FICTION.....	43
A ROBOT REVOLUTION	46
KS2 GREENHOUSE GASES AND NET ZERO	49
GROWING GASES	50
WHAT CAN WE DO?	55
IMAGINE A WORLD.....	59
KS2 JOBS FOR THE FUTURE	63
MOVING WITH THE TIMES	64
CHANGING CAREERS FOR CHANGING TIMES	68
CELEBRATING OURSELVES	72
APPENDIX	76
LESSON MATERIALS.....	76

INTRODUCTION

Welcome to SSE's 'Power Changers' suite of STEM lessons for primary aged pupils across the United Kingdom and Ireland.

We are delighted to align our primary school suite with some of the key elements which our future workforce and consumers can influence and shape on our journey to supporting net zero. We hope these vibrant lessons help pupils understand their role and the exciting possibilities available to them in their future. As an inclusive employer, SSE understands the benefits of inspiring everyone to consider the energy sector and the wide range of green skills we will require.



The change of the scale and nature needed to achieve net zero brings social consequences, impacting people – employees, consumers, communities, suppliers, and wider society – in many different ways. Our recently published *Just Transition Strategy* provides a framework of 20 principles, helping to guide our decision-making and influence greater fairness for those impacted by the decline of high-carbon economic activity and increase the opportunities of climate action.

We know that STEM-based education for pupils at the primary phase is incredibly important. The lessons found in this booklet teach children much more than science, technology, engineering and mathematical concepts; they also focus on hands-on learning and real-world application, allowing them to develop life-long skills such as problem solving, oracy, creativity, critical thinking and teamwork.

We truly hope you will enjoy delivering these interactive lessons and together we can inspire a whole new generation of innovative and inquiring minds.



Sam Greer, Education & Employability Manager, SSE

Facilitators 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.
- Lesson slide decks, worksheets and knowledge organisers for each lesson can all be found in the appendix ready for download at SSE's STEM website.
- The lessons can be delivered by an in-class teacher or delivered by SSE volunteers. To contact SSE about this opportunity, please email stem@sse.com. It is suggested that if only one lesson is to be delivered, that this is the first lesson in the topic.
- Please share your pupils' work on social media, tagging @SSE on Twitter or @SSEplc on Instagram and using the #STEMatSSE tag.

KS1 LEARNING FROM THE PAST

AGE 5 – 7 YEARS

Title	Length	Subject Links
Problems and Solutions	1 hour	English / Maths / History
Ordering Solutions	1 hour	English / Maths / History
Cleaning Up!	1 hour	English / Maths / History

OVERVIEW OF LESSON SET

The 'Learning from the Past' lesson set contains three lessons that introduce pupils to the idea of solving problems using devices. Pupils will look in more detail about different technological developments throughout history and the reasons for these, exploring the fact that inventors aim to make things cleaner, safer and more efficient. They'll then progress to develop an awareness of SSE's net zero project and their work in increasing the availability of clean, safe, efficient energy.

OVERVIEW OF RESOURCES REQUIRED

Problems and Solutions	<ul style="list-style-type: none"> - Interactive whiteboard - Knowledge organiser - Scissors & glue sticks - Worksheets provided
Ordering Solutions	<ul style="list-style-type: none"> - Interactive whiteboard - Knowledge organiser - Worksheets provided
Cleaning Up!	<ul style="list-style-type: none"> - Interactive whiteboard - Knowledge organiser - Worksheets provided

Delivery materials can be found in the appendix.

Remember to share your pupils' work with SSE and schools across the country on social media!

 **@SSE**
 **@SSEplc**
#STEMatSSE

Would you like a volunteer at SSE to facilitate these lessons? Contact stem@sse.com to request delivery support. More information about SSE's Just Transition programme can be found at <https://careers.sse.com/homepage>

PROBLEMS AND SOLUTIONS

Problems and solutions

Key Stage 1 (Year 1-2)

English, Maths, History

Curriculum links

English NC

English

- Ask relevant questions to extend their understanding and knowledge
- Discussing word meanings, linking new meanings to those already known
- Rules for effective discussions agreed with and demonstrated for pupils
- Use expanded noun phrases to describe and specify

Maths

- Recognise and use language relating to dates including years
- Sequence events in chronological order using language (for example, before and after)

History

- Understand historical concepts such as similarity, difference and significance and use them to make connections, draw contrasts, analyse trends
- Develop an awareness of the past, using common words and phrases to the passing of time
- Identify similarities and differences between ways of life in different periods
- Taught about changes within living memory. Where appropriate, these should be used to reveal aspects of change in national life.

Scottish NC

Health and wellbeing

- Recognise how important it is to behave in a way that can have a positive effect on other people and the environment

Languages

- Develop their ability to communicate their thoughts and feelings and respond to those of other people
- Develop skills in listening and talking
- Use language well to communicate ideas
- Exercise their intellectual curiosity by questioning and developing their understanding
- To enhance their understanding of their own culture
- To extend their skills and listening and talking

Mathematics

- Have an understanding of the application of mathematics, its impact on our society past and present, and its potential for the future
- Develop their knowledge and understanding of issues such as sustainability

Social studies

- Broaden their understanding of the world by learning about human activities and achievements in the past and present

Technologies

- Develop an understanding of technologies and their impact on society -in the past, present and future

Welsh Curriculum

- Humanities
- Science and technology
- Languages, literacy and communication
- Mathematics and numeracy
- Learning about local, national and international contexts

Northern Irish Curriculum

- Languages and literacy
- Mathematics and numeracy
- The world around us
- Personal development and mutual understanding

Republic of Ireland Curriculum

- Mathematics
- Social environment and scientific education
- Primary language
- Social, personal and health education

Big Picture:

This is the first lesson in a three-lesson teaching sequence. In this lesson, the children will understand what is meant by the past and will discuss it in the context of their families. They will be introduced to the idea of problems and solutions and that a device is a solution to a problem. The children will explore a range of devices and objects used in the past and the present and will discuss how these items are solving problems. They will sequence objects with a similar function and discuss why they have changed. In the lessons that follow, the children will look in more detail about different technological developments and the reasons for these, exploring the fact that inventors aim to make things cleaner, safer and more efficient. They then progress to develop an awareness of SSE's net zero project and their work in increasing the availability of clean, safe, efficient energy.

Lesson Objective:

'To understand what is meant by 'the past.'
'To explain how and why technology has changed over time.'

Assessment:

Through discussion, children will show their existing knowledge of items in the home.

The activity will show their understanding of how items form solutions to problems and children will also explain / show how they are good solutions.

Children will also be able to demonstrate any connections made in their learning through the comparison grid discussion task at the end of the session.

Resources:

Facilitators will need to display 'lesson 1' PowerPoint on a large display screen.

All children can see the knowledge organiser provided and copies should be provided for specific children who would benefit from their own copy.

Scissors and glue sticks.

Resources will need printing so each child has their own copy of the most appropriate resources.

Lesson Plan

Key vocabulary for the lesson:

Past, present, future, problem, solution, object, device, home, invention, technology, before, after, earlier, later, compare, similarity, difference,

Additional Adult Role:

Initially, additional adults should support children with their paired discussion, particularly children who may need support with the vocabulary focused on the home / kitchen. Give support to children who may need additional help when recording in the third part of the task (why it is a good solution) as some may need to record through drawing an image or will need help reading and recording the relevant vocabulary.

Timing	Facilitator	Pupil
10 mins	<p>Do Now:</p> <p>Slide 3:</p> <p>Show an image from the past showing someone's home.</p> <ul style="list-style-type: none"> - What is this a picture of? - What can you see? - How is different to your home? 	<p>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.</p>
Check	<p>This activity will show the starting point in terms of vocabulary, background knowledge and awareness of changes. When the children have had time to share their ideas with a partner, ask them for suggestions to see if the children are able to devise sentences comparing the past with the present. See if the children are able to see the differences and can they see devices such as the drying rack and think about what might be used instead today.</p>	
10 mins	<p>Introduction:</p> <p>Slide 4:</p> <p>Discuss the key words with the children: problem, solution and past/present.</p> <p>Slide 5:</p> <p>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.</p> <p>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.</p> <p>Slide 6:</p> <p>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.</p> <p>Take ideas from the children and clarify the meanings.</p> <p>Slide 7:</p>	<p>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.</p> <p>Children to talk to partner and then share with facilitator what they think the following words mean:</p> <ul style="list-style-type: none"> - Problem - Solution - The past - The present

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

Check

- What makes a good solution to a problem?
- Are there other examples of problems you have faced? Did you come up with a solution?
- Is there normally only one solution to a problem? Can you think of an example of a problem where there are lots of possible solutions?
- Are all solutions sensible?

10 mins Provide Model:

Slide 8:

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.

Slide 9:

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

Record with the children

- 1) Problem (wet clothes)
- 2) Solution (tumble dryer)
- 3) Why is this a helpful device? (it is quick and takes up little space)

Check

Ask the children if they can think of any other devices that solve problems in the home. Discuss with the children what the problem would be and why the solution is a helpful device. The facilitator may wish to go further with this discussion and ask the children if there are any other items in the home that is another solution to a given problem e.g. heating food – microwave, oven, hob.

20 mins Pupil Practise:

Slide 10:

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

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

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

Ext: Children can then go further with this to consider a way to improve on of the solutions.

Check

Throughout this time, make sure children are using the resources correctly and using the terms problem and solution.

10 mins Review of Learning:

Slide 11:

Show children the slide showing three of the 'solutions' from the independent task: fridge freezer, radiator and dishwasher.

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

Check The review of learning will show children's understanding of the features of the devices used in the home and will possibly start to make links which is important in the next lessons where children will start to see that inventions are made to make things cleaner, safer and more efficient.

Once the children have discussed their ideas, ask them to feedback and, where possible, draw out ideas around how they work (i.e. electricity use) and how they are similar to each other.

Considerations for inclusive and adaptive teaching:

Pre-teach is important for this lesson for children who do not have the vocabulary needed to discuss the home. This could be done through accessing an available home corner or through using the images from the lesson materials if that is not possible.

Pupils learning EAL or with SEND may benefit from a pre-teach of terminology using the knowledge organiser for this lesson too.

The lesson resources should be printed based on level of need. Most children will be able to use resource sheet 1 and 2 to complete the task and will have the key vocabulary for support. Some children may be able to complete the task with sheet 1 only.

For the third part of each element of the pupil practise task, it may be more appropriate for some children to record their ideas as a picture or may need guidance in selecting the most relevant word from the key vocabulary prompt.

ORDERING SOLUTIONS

Ordering solutions

Key Stage 1 (Year 1-2)

English, Maths, History

Curriculum Links

English NC

English

- Ask relevant questions to extend their understanding and knowledge
- Discussing word meanings, linking new meanings to those already known
- Rules for effective discussions agreed with and demonstrated for pupils
- Use expanded noun phrases to describe and specify

Maths

- Recognise and use language relating to dates including years
- Sequence events in chronological order using language (for example, before and after)

History

- Understand historical concepts such as similarity, difference and significance and use them to make connections, draw contrasts, analyse trends
- Develop an awareness of the past, using common words and phrases to the passing of time
- Identify similarities and differences between ways of life in different periods
- Taught about changes within living memory. Where appropriate, these should be used to reveal aspects of change in national life.

Scottish NC descriptors

Health and wellbeing

- Recognise how important it is to behave in a way that can have a positive effect on other people and the environment

Languages

- Develop their ability to communicate their thoughts and feelings and respond to those of other people
- Develop skills in listening and talking
- Use language well to communicate ideas
- Exercise their intellectual curiosity by questioning and developing their understanding
- To enhance their understanding of their own culture
- To extend their skills and listening and talking

Mathematics

- Have an understanding of the application of mathematics, its impact on our society past and present, and its potential for the future
- Develop their knowledge and understanding of issues such as sustainability

Social studies

- Broaden their understanding of the world by learning about human activities and achievements in the past and present

Technologies

Develop an understanding of technologies and their impact on society -in the past, present and future

Welsh Curriculum

- Humanities
- Science and technology
- Languages, literacy and communication
- Mathematics and numeracy
- Learning about local, national and international contexts

Northern Irish Curriculum

- Languages and literacy
- Mathematics and numeracy
- The world around us
- Personal development and mutual understanding

Republic of Ireland Curriculum

- Mathematics
- Social environment and scientific education
- Primary language
- Social, personal and health education

Big Picture:

This is the second lesson of three and builds on the previous lesson where children were introduced to the concept of the past and how certain objects solve problems. They were also introduced to the idea that these solutions are updated and improved upon. In this lesson, children look in greater detail at a range of technologies and how there are several devices that aim to solve the same problem. They explore how these devices change over time and through observation, order them from the earliest to the most recent. They then go deeper with this concept and they will identify what these changes have in common, introducing them to the idea that changes are made to make things cleaner, safer and more efficient. This concept is developed further in the final lesson where children will start to apply this to SSE and their net zero project, aiming to increase the UK's access to clean, safe, efficient energy.

Lesson Objective:

'To explore why technology changes over time.'

Assessment:

Children will show their ability to sequence different inventions and will show (either written or verbal) how the different solutions change.

The pupil practise task will show how well children have understood that inventions are aimed at making things cleaner, safer and more efficient.

Resources:

Facilitators will need to display 'lesson 2' PowerPoint on a large display screen.

All children should be able to see the knowledge organiser provided for the lesson and copies should be provided for specific children who would benefit from their own copy.

1x sequencing resource per child – some with written element, others able to use tick box version.

Lesson Plan

Key vocabulary for the lesson:

Past, present, future, problem, solution, object, device, home, invention, technology, before, after, earlier, later, compare, similarity, difference, sequence, cleaner, safer, efficient

Additional Adult Role:

Ensure children are using their knowledge organisers to support the task as this will particularly help the children when ticking / writing their answers. Reinforce the definitions for cleaner, safer and more efficient and support children through making sure they use this vocabulary in their verbal and (where appropriate) written responses.

Timing	Facilitator	Pupil
5 mins	<p>Do Now:</p> <p>Slide 3:</p> <p>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.</p> <p>Model this with the first one for the children: the car wash.</p>	<p>Slide 4 and 5</p> <p>Children then to do the other two examples with their partner, doing one of the examples each (washing machine and radiator).</p>
Check	<p>After each example is discussed with the children, choose a pair to say what they came up with and allow other children to add further detail. Check to see if children have remembered that each of the objects found in the home solve problems which are often linked to size, speed and how easy it is. In this lesson, children will be developing an awareness of the main reasons for new solutions being found: to make them cleaner, safer and more efficient. Children may start to show some knowledge of this in this task.</p>	
10 mins	<p>Introduction:</p> <p>Slide 6:</p> <p>Explain the key words used in this lesson: safer, cleaner, efficient.</p> <p>Slide 7:</p> <p>Show the slide asking What is a device?</p> <p>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.</p> <p>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.</p> <p>Slide 8:</p> <p>Show the slide 'same/different because...</p> <p>Ask the children to speak to a partner to compare the images shown on the slide, thinking about similarities</p>	<p>Children to talk in pairs before sharing ideas with the whole class.</p> <p>Children discuss the three images in the comparison grid shown on the slide: a fire with a cooking pot over, an oven, a</p>

and differences: comparing an open fire cooking pot, an oven and a microwave.

microwave. Children to discuss how they are similar / different. Volunteers to share their thinking with the whole class.

Slide 9:

Show the big question: why are new solutions found to the same problems? Support children to discuss this in the context of the fire with a cooking pot over, oven, and microwave. Use the questions below to assess pupil understanding at this point.

Check

- Which of the pictures show what most of us use to cook every day (microwave and oven)?
- Why is a microwave or an oven used instead of the fire?
- Can you think why some people use microwaves to heat up food instead of an oven?

15 mins

Provide Model:

Slide 10:

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?

Move the images into the correct place on the structure. Ask the children what the problem would be if we still cooked like the earliest example.

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.

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.

Check

Make sure the children are clear on the idea that a microwave is cleaner, safer and more efficient. The facilitator may need to explain that ovens are still used however microwaves were invented after ovens because people saw problems with ovens.

20 mins

Pupil Practise:

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.

EXT: can you design your own using an example that is not in the kitchen? Children draw this using a blank format.

Check

Monitor children to ensure they are sequencing the items correctly. If not, ask the child to explain why they are ordering in this way as this may identify a misconception or it could be that the instructions need repeating. Refer to the key vocabulary throughout so children are encouraged to use this in their written responses.

10 mins

Review of Learning:

Slide 12:

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.

Slide 14:

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 YouTube clip of SSE renewable energy so children are able to see examples of this in action: <https://youtu.be/RNNa8Kqbabo>

Slide 13:

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.

Check The review of learning will show if children have understood that devices are invented to make them cleaner, safer and more efficient. Are children able to link this to the ways of generating electricity?

Considerations for inclusive and adaptive teaching:

Lesson resources adapted with some children required to write a sentence explaining the change between devices. Others are required to sequence the events and circle the most appropriate word. They then will explain their decision verbally. Facilitators could adapt the lesson further by only giving the blank structure and the pictures only with no need to record based on the key words given.

Children can deepen their understanding by completing the additional challenge of creating their own 3 device example with no prompts given. This must be from something not found in a kitchen.

Children learning EAL or those with SEND may benefit from a pre-teach of key vocabulary using the knowledge organiser resource to help them access the language needed for the session.

CLEANING UP!

Cleaning up!

Key Stage 1 (Year 1-2)

English, Maths, History

Curriculum Links

English NC

English

- Ask relevant questions to extend their understanding and knowledge
- Discussing word meanings, linking new meanings to those already known
- Rules for effective discussions agreed with and demonstrated for pupils
- Use expanded noun phrases to describe and specify

Maths

- Recognise and use language relating to dates including years
- Sequence events in chronological order using language (for example, before and after)

History

- Understand historical concepts such as similarity, difference and significance and use them to make connections, draw contrasts, analyse trends
- Develop an awareness of the past, using common words and phrases to the passing of time
- Identify similarities and differences between ways of life in different periods
- Taught about changes within living memory. Where appropriate, these should be used to reveal aspects of change in national life.

Scottish NC

Health and wellbeing

- Recognise how important it is to behave in a way that can have a positive effect on other people and the environment

Languages

- Develop their ability to communicate their thoughts and feelings and respond to those of other people
- Develop skills in listening and talking
- Use language well to communicate ideas
- Exercise their intellectual curiosity by questioning and developing their understanding
- To enhance their understanding of their own culture
- To extend their skills and listening and talking

Mathematics

- Have an understanding of the application of mathematics, its impact on our society past and present, and its potential for the future
- Develop their knowledge and understanding of issues such as sustainability

Social studies

- Broaden their understanding of the world by learning about human activities and achievements in the past and present

Technologies

- Develop an understanding of technologies and their impact on society -in the past, present and future

Welsh Curriculum

- Humanities
- Science and technology
- Languages, literacy and communication
- Mathematics and numeracy
- Learning about local, national and international contexts

Northern Irish Curriculum

- Languages and literacy
- Mathematics and numeracy
- The world around us
- Personal development and mutual understanding

Republic of Ireland Curriculum

- Mathematics
- Social environment and scientific education
- Primary language
- Social, personal and health education

Big Picture:

This is the final lesson in the teaching sequence. In the previous two sessions, children have gained an understanding of the past and how our homes have changed over time. They have looked at examples of problems people face in their homes and how different innovations solved these problems in different ways, often leading to another solution. The children have had time focused on the important message that most technological improvements happen because there is an aim to make things cleaner, safer and more efficient. The previous lesson ended looking at examples of sources of energy and they were introduced to SSE. In this lesson, children will build on their awareness of the importance to make things cleaner, safer and more efficient and will look at the work of SSE, talking about how electricity is generated and how renewable energy is better for our planet. Children will then start thinking about a future that is cleaner, safer and more efficient and will present what the world would be like if we achieved this.

Lesson Objective:

'To understand how energy is generated to be safer, cleaner and more efficient.'

Assessment:

Children will show their understanding of the reasons for technological advances (cleaner, safer, more efficient) in the initial task.

Children will use discussion to share their feelings on the changes to the ways electricity is created. This will also help show their level of understanding of how capturing the power of wind and water can create energy that we can use.

Resources:

Facilitators will need to display 'lesson 3' PowerPoint on a large display screen.

All children should be able to see the knowledge organiser provided for the lesson and copies should be provided for specific children who would benefit from their own copy.

The crystal ball activity will demonstrate children's knowledge that a number of areas of life will continue to modernise. The facilitator can look to see if the children are able to give a number of ideas which show their awareness of how things should develop in order to help the planet.

Children will need a copy of the most appropriate resource sheet for them to record their ideas.

Lesson Plan

Key vocabulary for the lesson:

Past, present, future, problem, solution, object, device, home, invention, technology, before, after, earlier, later, compare, similarity, difference, sequence, cleaner, safer, efficient, renewable, energy, wind turbine, hydroelectricity, capture

Additional Adult Role:

Additional adults need to support children with accessing the vocabulary, particularly in the initial tasks. Supporting their discussion about innovations that are cleaner, safer and more efficient will prompt the children in their pupil practise task later in the session.

During the pupil practise activity, any additional adults should be used to either guide a group with their ideas and these children should be chosen based on the levels of understanding shown in the initial tasks and / or previous lessons. Adults may prefer to use an enlarged example of the crystal ball, recording the shared ideas of the group. Either the children or the adult could do the recording.

Timing

Facilitator

Pupil

5 mins Do Now:

Slide 3:

Show statement with gaps shown within:

New technology is created to become s_____, cl_____ and m___ e_____.

Read the statement to the children and ask if they can help fill in the gaps.

(Answer: smarter, cleaner and more efficient)

Slide 4:

Share the big question and ask children what their answer would be to this question?

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.

Check

Give the children an opportunity to speak to a partner to complete the gaps and then take ideas from them to complete them. See if the children are able to see the connection between these words and the big question.

10 mins

Introduction:

Slide 5: 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](#).

Slide 6:

Share the key words used in this lesson: energy resources, renewable and hydro/wind/solar.

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.

- Check**
- How does the image make you feel? Why?
 - What is positive about the work of SSE? Why is this better than the first image?
 - How does energy get from the wind turbines or hydroelectric plants to our homes?

15 mins Provide Model:

Slide 7:

Show structure of 'talk to the aliens', through which pupils will clearly explain using sentence stems. Model the use of this using coal power as an example.

This is a 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.

Slide 8 and 9:

Repeat talk to the aliens using wind turbines as an example and children to complete this with their partners. At this stage, it is important the children consider questions like 'what if there was no wind'. Repeat for hydroelectricity.

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.

Slide 10:

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.

Check When children have had time to think about their ideas, ask them to suggest what they had as their main ideas.
Ask the children to think about how they would record this – would they draw a picture, write the word, include it in a picture with several other ideas?

20 mins **Pupil Practise:**
Keep displaying slide 10:
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.

Check It is important that the facilitator circulates around the children throughout the pupil practise and discusses their ideas to gain an understanding of their drawings as this is a good assessment opportunity. Consider if children are keeping their ideas fixed on one thing and if there are any parts of the prompts from slide that they are not including in their drawings / writing. If so, discuss with children how they can get other ideas into their crystal ball e.g. if there is a wind turbine, what would that power?

10 mins **Review of Learning:**
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...

Check Consider whether the children are using the terms cleaner, safer or more efficient (or similar) in their justifications for the choices made in their crystal ball. Are children using appropriate reasons for their choices?

Considerations for inclusive and adaptive teaching:

The crystal ball activity is open-ended in order to allow children to adapt the way they record their ideas. To give children the opportunity to write, an adapted resource is available to allow them to do this.

An enlarged crystal ball sheet could be used with all children or with specific groups of children so they can show their level of understanding without recording being a barrier. It can instead be a collaborative discussion task led by the facilitator and / or an additional adult.

Vocabulary is available on the resource for children to refer to.

Use the knowledge organiser to pre-teach key vocabulary and concepts to children with SEND or those learning EAL.

KS1 CHANGING THE WAY WE LIVE

AGE 5 – 7 YEARS

Title	Length	Subject Links
Consumption City	1 hour	Science / PSHE / Sustainability
Making My Change	1 hour	Science / Consumption / Sustainability
Net-positive City	50 mins	Science / Consumption / Sustainability

OVERVIEW OF LESSON SET

The 'Changing The Way We Live' lesson set contains three lessons that introduce pupils to the notion of consumption and the impact it has on the world. Pupils will learn about different types of consumption in their everyday lives and understand that consuming things uses up energy. Pupils will make collective and individual pledges to consume less and think of practical ways that they can make greener choices and have a net-positive impact on their environment.

OVERVIEW OF RESOURCES REQUIRED

Consumption City	<ul style="list-style-type: none"> - Interactive whiteboard - Pre-printed plate worksheet - Optional paper plates - Old / recycled magazines or newspapers
Making My Change	<ul style="list-style-type: none"> - Pre-printed pledge worksheet - Colouring and writing pencils - Smartboard to make collective whole-class pledge on DoNation website link
Net-positive City	<ul style="list-style-type: none"> - Pre-printed city outline worksheet - Sugar paper / large paper - Junk modelling materials (recycled plastics) - Scrap coloured paper - Scissors and glue

Delivery materials can be found in the appendix.

Remember to share your pupils' work with SSE and schools across the country on social media!



@SSE



@SSEplc

#STEMatSSE

Would you like a volunteer at SSE to facilitate these lessons? Contact stem@sse.com to request delivery support. More information about SSE's Just Transition programme can be found at <https://careers.sse.com/homepage>

CONSUMPTION CITY

Consumption City

Key Stage 1 (Year 1-2)

Science, PSHE, Consumption and waste, Sustainable development

Curriculum Links:

English NC

Science

- Looking more closely at the natural and humanly-constructed world around pupils.
- Describing how animals and humans depend on each other

Republic of Ireland:

Science

- Developing a sense of responsibility to take care of an improve the environment.
- Identifying, discussing and implementing simple strategies for improving and caring for the environment.

Scottish NC

Science

- Being fascinated by new discoveries and technologies.
- Becoming increasingly aware of, and passionate about, the impact of science on their own health and wellbeing, the health of society and the health of the environment.
- Observing living things in the environment over time and am becoming aware of how they depend on each other.
- Taking appropriate action to ensure conservation of materials and resources.
- Considering the impact of my actions on the environment.

Welsh Foundation phase:

Consumption and waste:

- Learners taking care of their belongings
- Using resources carefully
- Disposing of used resources responsibly
- Understanding that natural resources can run out
- Knowing that some things can be recycled and others reused

Northern Ireland Foundation phase:

Sustainable development:

- Understanding how actions can affect the environment.

Contributors to society:

- Becoming aware of some of the issues and problems in society.”

Big Picture:

‘Consumption City’ is the first lesson in the sequence. The pupils should already be familiar with the notion of protecting the environment and planet. This first lesson will introduce pupils to the notion of consumption and the impacts that this has on the world around us. They will learn about different types of consumption; from transport, diets, water to how we heat our rooms. They will learn this through a story named ‘Consumption City’ and they will reflect on their own consumption in their everyday lives. They will be creating a consumption collage on a dinner plate, identifying the activities they do that consume electricity, fuel, water and gas.

Lesson Objective:

To understand the impact of consumption on the world.

Assessment:

Exit tickets will show an area of consumption that each pupil feels they can limit to limit consumption.

Resources:

Educators will need to have an interactive whiteboard to present the slide deck.

Magazines and internet sources for pictures. Alternatively, pupils may use the pre-selected images provided. These can be replaced with PECS images for inclusivity.

Pupils may use the provided worksheet or optional paper plates to complete the independent activity.

Knowledge organiser

Lesson Plan

Key vocabulary for the lesson: *Consumption, consume, fuel, electricity, water, transport, environment, fast fashion*

Additional Adult Role: An additional adult can be deployed to support children with finding images connected to consumption. Additional adults can promote discussion with pupils about the impact of their consumption. They can assist pupils with understanding technical vocabulary used throughout the lesson, for example those with English as an additional language, special educational needs or a disability.

Timing	Facilitator	Pupil
3-4 mins	<p>Do Now: (</p> <p>Leave the image on the board for pupils to engage with.</p> <p>Pupils will be responding to an image of a 'Consumption City'.</p>	<p>Pupils will reflect on how the city in the image makes them feel.</p>
Check	<p>Ask pupils to share their ideas aloud. For questioning techniques, the facilitator can use a show me on a whiteboard technique or tell me technique. The facilitator can encourage children to talk to their partners.</p> <p>The facilitator will ask questions to gauge emotional response to the image:</p> <p>"What do you like about this city?"</p> <p>"What do you not like about this city? Why do you not like this?"</p>	
10 mins	<p>Introduction:</p> <p>Introduce term 'consumption' and link it to the notion of eating. When we consume something, we eat something and we can't see it anymore but it goes somewhere.</p> <p>Introduce concept that you can consume things that you cannot see.</p> <p>"You consume the fuel that goes into cars. You consume the electricity that powers your TV. You consume the water that comes out of the tap."</p> <p>Facilitator will introduce image as a front cover of a book named 'Consumption City' and open the book on the slides.</p>	<p>Pupils will be linking idea of consumption to eating food. This will aid understanding of consumption producing something that we can use. E.g. We consume fuel so we can travel by car.</p> <p>Pupils should listen to the story and learn about how consumption happens in every action of our lives. They should reflect on how consumption can negatively impact the world.</p>
Check	<p>Ask children what the main character Zahra consumed that day:</p> <ul style="list-style-type: none"> • How did she travel? • What did she use when she went shopping? • How did she get clothes? • How did she wash? • What did she turn on when cold? <p>Ask children what they consumed that day (facilitator can use hands up technique for participation):</p> <ul style="list-style-type: none"> • Hands up, if you came to school in a car • Hands up, if you had a shower • Hands up, if you left the lights on • Hands up, if you used single-use plastics • Hands up, if you used a phone or tablet • Hands up, if you did anything else that consumed fuel, electricity, water or gas 	
6 mins	<p>Provide Model:</p> <p>Model adding pictures to plate template. Just like placing food on a dinner plate, ready to consume.</p> <p>We make choices about what electricity, fuel and water we consume and these go on our consumption dinner plate.</p> <p>Model making dinner plate and thinking aloud technique.</p>	<p>Pupils will listen to the facilitator go through the necessary steps to identify consumption and to create a consumption dinner plate.</p> <p>They will begin to think about their own consumption areas and share ideas about what could go on the plate.</p>

Model sticking or drawing relevant images onto plate:

- “In the morning, I woke up and turned on my **light**.”
- “Next, I used my **kettle** to make a cup of tea and used the **toaster** to make breakfast.”
- “Next, I had a long **shower**.”
- “Then, I drove to work in my **car**.”

Check Check for pupil understanding by asking them to share examples of their own consumption verbally before they begin their independent task.

25 mins Pupil Practise:

Activity will be pre-modelled to ensure understanding of task.

Facilitator will be circulating classroom and checking for understanding on consumption. Facilitator can support children with cutting if they require support.

Suggested questions:

How did you get to school today?

What did you eat for breakfast?

Did you have a shower this morning?

Pupils should reflect on their daily schedule and think about activities they did which consumed fuel, electricity, water or gas.

They should then draw and colour in, or cut and stick pre-selected images for the consumption dinner plate.

Pupils may want to add labels and descriptions.

Check The facilitator can prompt children to recap their daily schedule and consider how they are consuming electricity, water, gas or fuel.

10 mins Review of Learning:

The facilitator is encouraged to bring children back to the carpet to share their own consumption dinner plates.

The facilitator will link back to the story where the character reduced their consumption. They will model sharing what area of consumption they would like to reduce.

E.g., “I can reduce my fuel consumption by not driving to work. I can get the train instead.”

The pupils have an opportunity to share what they have consumed so far in their day.

The pupils can share the areas of consumption they feel they can reduce.

Check The facilitator can gauge pupil understanding when the children are presenting their consumption dinner plate.

The facilitator can assess whether children know what is being consumed in each activity. For example, when I take a shower, what do I consume?

Considerations for inclusive and adaptive teaching:

Pupils with additional learning needs or learning English as an additional language may benefit from a pre-teach before the lesson using the knowledge organiser to help understand technical vocabulary and key concepts.

Pre-selected images provided for learners who might find it challenging to sift through a large number of pictures.

The pre-selected images could be replaced with PECS images for inclusivity, supporting children

For mixed-age teaching, the facilitator may encourage pupils to add detail such as labels and descriptions to identify what is being consumed for each activity on consumption dinner plate.

Future recommendations – Pupils could ask friends and family members to complete a similar review of their own consumption for home learning.

MAKING MY CHANGE

Making My Change

Key Stage 1 (Year 1-2)

Science, Consumption and waste,
Sustainable development

Curriculum Links:

English NC

Science

- Looking more closely at the natural and humanly-constructed world around pupils.
- Identifying that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other”

Republic of Ireland:

Science

- Contributing to strategies that will improve the environment.
- Identifying individual changes such as caring for living and non-living things in the locality, keeping homes, gardens, classrooms and streets clean and tidy.

Scottish NC

Science

- Being fascinated by new discoveries and technologies.
- Becoming increasingly aware of, and passionate about, the impact of science on their own health and wellbeing, the health of society and the health of the environment.
- Observing living things in the environment over time and am becoming aware of how they depend on each other.
- Taking appropriate action to ensure conservation of materials and resources.
- Considering the impact of my actions on the environment

Welsh Foundation phase:

Consumption and waste:

- Learners taking care of their belongings
- Using resources carefully
- Disposing of used resources responsibly
- Understanding that natural resources can run out
- Knowing that some things can be recycled and others reused

Northern Ireland Foundation phase:

Sustainable development:

- Understanding how actions can affect the environment.
- Appreciating the environment and the individuals role in maintaining and improving it.

Contributors to society:

- Becoming aware of some of their rights and responsibilities.
- Becoming aware of some of the issues and problems in society.
- Contributing to creating a better world for those around them.

Big Picture:

‘Making my change’ is the second lesson in the sequence. Pupils previously learnt about the impacts of their consumption on the planet. They learnt that consumption is when energy or resources are used in order to perform an action or make something. Pupils have previously identified different areas of consumption such as plastic usage, fast fashion, fuel, water usage and electricity usage. They created a collage of their consuming activities and then identified areas of consumption that they would like to reduce. This next lesson focusses on the ‘Good Green Jobs’ principle of ‘A Just Transition’. This lesson builds on the areas of consumption the pupils wanted to reduce and showcase how this is possible, through individual changes and green technologies.

Lesson Objective:

To reduce consumption and work towards a greener future.

Assessment:

Pupils will be making their own pledge to reduce consumption and elaborating on how they will reduce this. Pupils will be thinking about greener alternatives for their lifestyles.

Resources:

Pre-printed pledge worksheet
 Colouring and writing pencils
 Smartboard to make whole-class pledge
 Knowledge organiser
 DoNation website link:

Lesson Plan

Key vocabulary for the lesson: *Consumption, reduce, pledge, green jobs*

Additional Adult Role: An additional adult can be deployed to support children identifying area to reduce from their previous consumption plate. Additional adults can promote discussion with pupils about what greener alternatives they will be integrating into their lives.

Timing	Facilitator	Pupil
<p>3-4 mins</p>	<p>Do Now:</p> <p>Facilitator to prompt pupils to think about something that they did that day that consumed energy, electricity, gas or fuel.</p> <p>Model an example using pictures on the whiteboard. For example:</p> <p>“Today, I came to school in a car. This consumed fuel.”</p> <p>“I had a shower, this consumed water.”</p> <p>Recommended questioning techniques are lollypop sticks, talking to partners and sharing, show me on a whiteboard.</p>	<p>Pupils will be utilising knowledge from previous lesson about what consumes electricity, gas or fuel.</p> <p>They will be sharing their actions that consumed energy, electricity, gas or fuel.</p>
<p>Check</p>	<p>The facilitator will encourage pupils to share what they have consumed. Check for understanding if children know what resource is being consumed for each action. For example, if showering is the action, water is being consumed.</p> <p>“What actions did you do today?”</p> <p>“Who came to school by car? Who had a shower this morning? Who had toast for breakfast?”</p> <p>“Did this consume electricity, gas or fuel?”</p>	
<p>5 mins</p>	<p>Introduction:</p> <p>Recap the definition of consumption. Consumption is “when our actions use up energy. This energy can be electricity, water, fuel or gas.”</p> <p>Link definition of consumption to the notion of eating. When we consume something, we eat something and it is no longer there.</p> <p>Reveal image of city that is affected by over-consumption and resultant pollution. Encourage pupils to share emotional responses to image.</p> <p>“What can you see? Why is there lots of smoke? Can you see any green spaces?”</p> <p>Recommended questioning technique – cold calling (no hands up).</p> <p>Imagination task:</p> <p>Facilitator to encourage pupils to imagine a greener, perfect world. What would this look like?</p> <p>“Would there be lots of smoke?”</p> <p>“How do you get to school?”</p> <p>“Are there trees and parks? Are there only buildings?”</p> <p>As pupils describe what they imagine, the facilitator will be drawing the green world that is described. Alternatively, a member of support staff or even a child may want to draw on the smart board as the children share their ideas.</p>	<p>Pupils will be responding to four images on the slides. These images display different forms of consumption: transport, clothing, food intake and disposable materials.</p> <p>Pupils will be reflecting again on a city impacted by over-consumption. They will be sharing their emotional responses to this picture.</p> <p>Pupils will be imagining a green, perfect world. Many will be unfamiliar with the term green but will be imagining a planet that makes them feel happy.</p>
<p>Check</p>	<p>The facilitator may question if we can achieve a green world like the one drawn, even if we continue to over-consume fuel, plastics, water and gas.</p> <p>Use this as an opportunity to reinforce that over-consumption is preventing a greener world and elaborate on key themes: fuel, fast fashion, plastics and energy wastage.</p>	

7-8 mins

Provide Model: Elaborate on key themes that cause over-consumption:

Fuel - Fuel is used to power cars for transport. It causes air pollution.

Encourage pupils to consider alternatives.

"If we don't travel by car, how else can we travel to school? How did you travel to school today?"

Model alternative, greener choices - riding a bike, public transport, walking.

Pupils to brainstorm alternatives for travelling by car.

Fast fashion - Fast fashion means we are making too many clothes and throwing quality clothes away.

Encourage pupils to consider alternatives.

"What could you do instead of buying new clothes?"

Model alternative, greener choices - making your own clothes, recycling clothes and materials, sharing clothes.

Pupils to brainstorm alternatives for buying new clothes frequently. They will be drawing on their own experiences to consider alternatives.

Plastics- The increasing production of single-use plastics and disposal of them.

Encourage pupils to consider alternatives.

"What could we use instead of carrier bags? What could we do instead of throwing away water bottles?"

Model alternative, greener choices - reusable bags, reusable water bottles, recycling.

Pupils to brainstorm alternatives for single use plastics. They will be drawing on their own experiences to consider alternatives. They may share their experience of recycling plastics or using re-usable bottles.

Explore how these are smaller, everyday changes, but bigger changes can be made across the whole country too. This section relates to SSE 'Good Green Jobs' from A Just Transition.

Pupils will be introduced to a greener method of producing electricity. They may have pre-existing experiences seeing wind turbines and dams and can share these experiences.

Explore that there are different ways to create electricity. This includes:

- Wind energy
- Hydro-energy
- People are also making greener choices by boosting biodiversity through Apiary projects.
- Whilst people, like those that work at SSE, are making big changes, small, individual changes are powerful too.

Model drawing and writing a pledge.

Example pledge:

"I pledge to reduce [using a car]. I will reduce this by walking to school.

When I reduce using fuel. The world will be greener and there will be less pollution"

Children will be shown how to write a promise or a pledge. They will be using a sentence scaffold to support them.

The pupils may share ideas for the modelled pledge.

There are 3 differentiated worksheets; a blank one, one with sentence scaffolds and one with just space for an image.

Check

Facilitator may check what pupils will be pledging to do. They will be pledging to reduce an area of their consumption and work towards a greener world. How did you consume today? Could you reduce using a car? What could you use instead? Did you take a long shower? How could you reduce this time?

25 mins Pupil Practise:

The facilitator will be circulating the room and supporting pupils when they are considering with area of consumption to reduce.

Children will be shown how to write a promise or a pledge. They will be using a sentence scaffold to support them.

The facilitator may use consumption dinner plates as a visual resource to support thinking.

I pledge to reduce _____

I will reduce this by _____

The facilitator may leave the sentence scaffolds or images on the board to support pupil practice.

When I reduce _____ the world will be _____

Pupils may use consumption dinner plate from previous lesson to support them.

Check Facilitator may ask the following questions when circulating:

What did you consume today?

What do you think you could reduce?

How could you reduce *this*?

What would the world look like if you reduced *that*?

10 mins Review of Learning:

Facilitator is encouraged to bring children back to the carpet to share their own pledges with the class.

The pupils have an opportunity to share what they will reduce.

Facilitator and pupils can make their own pledge on DoNation and track progress. See instructions on PowerPoint slides.

Link - <https://www.wearledonation.com/>

Check What are you going to reduce? How will you reduce this? What will we reduce as a class? How will this help the environment?

Considerations for inclusive and adaptive teaching:

Pupils with additional learning needs or learning English as an additional language may benefit from a pre-teach before the lesson using the knowledge organiser to help understand technical vocabulary and key concepts.

This activity offers a range of depth; three differentiated versions of the worksheet offer pupils to opportunities for challenge and support, whilst reaching the same objective. For mixed-age teaching, the facilitator may want to assign these sheets accordingly.

Pupils may also refer to sentence scaffolds when writing their own pledges.

Children who do not wish to present their pledge can participate in the audience and may want to present alongside another child.

NET-POSITIVE CITY

Net-Positive City	Key Stage 1 (Year 1-2)	Science, Consumption and waste, Sustainable development
<p>Curriculum Links:</p> <p>English NC</p> <p>Science</p> <ul style="list-style-type: none"> • Having knowledge about diverse places, people, resources and natural and human environments. • Looking more closely at the natural and humanly-constructed world around them. They should be encouraged to be curious and ask questions about what they notice. • Identifying that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. <p>Republic of Ireland:</p> <p>Science</p> <ul style="list-style-type: none"> • Developing a sense of responsibility for taking care of and improving the environment. • Using a variety of materials 	<p>Scottish NC</p> <p>Science</p> <ul style="list-style-type: none"> • Being fascinated by new discoveries and technologies and become increasingly aware of, and passionate about, the impact of science on their own health and wellbeing, the health of society and the health of the environment. • Exploring different materials and sharing reasoning for selecting materials for different purposes. • Caring for the environment by starting to reduce, re-use and recycle resources. • Exploring ways to design and construct models. • Ensuring conservation of materials and resources, considering the impact of actions on the environment. 	<p>Welsh Foundation phase:</p> <p>Climate change:</p> <ul style="list-style-type: none"> • Recognising the importance of saving energy. • Pupils believing that they can make a difference through their actions and behaviour. <p>Northern Ireland Foundation phase:</p> <p>Sustainable development:</p> <ul style="list-style-type: none"> • Understanding how actions can affect the environment. • Appreciating the environment and the individuals role in maintaining and improving it. <p>Contributors to society:</p> <ul style="list-style-type: none"> • Becoming aware of some of their rights and responsibilities. • Becoming aware of some of the issues and problems in society. • Contributing to creating a better world for those around them.
<p>Big Picture:</p> <p>'Net-positive city' is the third and final lesson in the sequence. Pupils previously learnt about the impacts of consumption on the planet and the different forms in which this consumption takes place. They learnt that people can consume fuel, water, electricity, gas, plastics and fashion. The pupils then reflected on the areas of consumption in their everyday lives. Following this reflection, pupils pledged to reduce an area of their consumption and explained the alternatives they would use. They have made individual and class pledges. This lesson builds on the alternative, greener choices that pupils were introduced to in the prior lesson. The pupils will be learning about net-positive impact, which means putting more back into the environment than taking. They will be learning about net-positive strategies and the lesson culminates in an activity that involves designing a net-positive city (one that progressively becomes greener).</p>		
<p>Lesson Objective:</p> <p>To design a net-positive city.</p>	<p>Assessment:</p> <p>Pupils will be working in groups or individually to design a net-positive city. They will be considering greener alternatives and integrating this in their city designs.</p>	<p>Resources:</p> <p>Educators will need to have an interactive whiteboard to present the slide deck</p> <p>Pre-printed city outline worksheets</p> <p>Colouring and writing pencils</p> <p>Knowledge organiser</p> <p>Optional creative approach:</p> <ul style="list-style-type: none"> - Sugar paper / large paper - Marker pens - Junk modelling materials (recycled plastics) - Scrap coloured paper - Scissors - Glue

Lesson Plan

Key vocabulary for the lesson:

Wind farms, solar panels, hydro-dams, net-positive, green jobs, biodiversity

Additional Adult Role:

An additional adult can be deployed to support team dynamics with the children working together. They can support children to come up with net-positive strategies to include within their city. An additional adult can assist pupils with understanding technical vocabulary used throughout the lesson, for example those with English as an additional language, special educational needs or a disability.

Timing	Facilitator	Pupil
5 mins	<p>Do Now:</p> <p>Pupils to recap their pledge and review any barriers that they have faced.</p> <p>Facilitator is encouraged to ask the following questions through a hands up technique:</p> <ul style="list-style-type: none"> - What did you pledge to reduce? - Have you reduced it? Has it been easy or difficult? - Have you helped anybody else to reduce their consumption? 	<p>Pupils will be reflecting on the pledge they made in the previous lesson. They will be considering how much progress they made and any barriers they have faced.</p> <p>Pupils may talk through these questions with their talking partners and then share with the facilitator.</p>
Check	<p>The facilitator may ask the following questions:</p> <p>What did you pledge to reduce? What does it mean to reduce something? Was it easy or difficult? Why was it difficult?</p>	
6 mins	<p>Introduction:</p> <p>Introduce purpose of lesson - to design a net-positive city. Introduce this concept as being a reversal of the consumption explored earlier.</p> <p>"We can reduce using cars, single use plastics and fast fashion to work towards a greener future."</p> <p>Net-positive city- Facilitator will introduce this concept as a place that gives more than it takes. It creates energy in a greener and cleaner way.</p> <p>Example: You cut down 1 tree, and plant 2 trees.</p> <p>Explain that there are lots of different strategies to achieving a net-positive city. Showcase SSE'S net-positive aims through integrated video.</p>	<p>Pupils will be introduced to the concept of net-positivity. This is when more is put back into the environment than what is taken.</p> <p>Pupils will be watching a video that showcases SSE'S net-positive impact targets.</p> <p>They will have the opportunity to feedback what they saw in the video.</p>
Check	<p>Facilitator to question pupils following video of SSE's work.</p> <p>"What did you see in the video?"</p> <p>"How are SSE making greener choices?"</p>	
7 mins	<p>Provide Model:</p> <p>Elaborate on SSE initiatives, which are an example of how businesses are attempting to reduce the impact of over-consumption:</p>	

Wind farms: On-land and off-shore farms. Explain these to take power from the wind and turn it into electricity for houses. These are net-positive as we won't run out of wind.

Pupils will be sharing what they can see on each of the Net-Positive city examples. They will be drawing on their own experience of seeing or knowing about these.

Solar panels: Explain these as panels on building rooves. They take power from the sun and turn it into electricity for homes.

Recap other green choices that can work towards a net-positive society. Facilitator can use cold calling or quick questions to recap different choices.

Pupils will be recapping green choices from prior lesson. These may include:

Model how to design a net-positive city:

Bring together ideas of small, individual changes and large corporate initiatives such as SSE'S targets.

Small, individual changes:

- Reducing plastics
- Reducing fast fashion
- Taking public transport
- Reducing energy usage in the house

Small, individual changes:

- Reducing plastics
- Reducing fast fashion
- Taking public transport
- Reducing energy usage in the house

Large, corporate initiatives:

- Wind energy
- Hydro-dams
- Bee farm projects
- Solar energy
- Education

Large, corporate initiatives:

- Wind energy
- Hydro-dams
- Bee farm projects
- Solar energy
- Education

Show examples of net-positive city designs, both 3D and 2D and explore different elements.

Check Check for understanding on the elements of the net-positive cities.
 "Can you remember what a wind turbine creates?"
 "Why is it important to have cycle paths / less cars on the road?"

25 mins Pupil Practise:

Activity will be pre-modelled to ensure understanding of task.

Pupils will be working either individually on worksheets or in teams to create a 3D net-positive city. They will be considering both small, individual changes and larger corporate changes.

Facilitator is encouraged to circulate classroom to prompt ideas.

They will be either drawing this city on the varied worksheet templates or making 3D models.

If pupils are making 3D net-positive cities using materials, encourage pupils to bring in recycled materials.

Check Suggested questions for the facilitator whilst circulating:

- What did you put in your net-positive city?
- How are you creating electricity in your city?
- What transport will you have in your city?

10 mins Review of Learning:

Facilitator is encouraged to bring pupils back to the carpet individually and in teams to share their net-positive cities with their peers.

The pupils have an opportunity to share their net-positive city with their peers.

Check Ask pupils to compare consumption city from the story and their own net-positive cities.

Recommended questions:

“Are consumption city and net-positive city the same? Why are they different? Which is better for the environment?”

“What does net-positive mean?”

Considerations for inclusive and adaptive teaching:

Pupils with additional learning needs or learning English as an additional language may benefit from a pre-teach before the lesson using the knowledge organiser to help understand technical vocabulary and key concepts.

This activity offers a range of depth; there are pre-designed templates for children who may prefer a more structured and independent drawing approach.

For mixed-age teaching, the facilitator may want to consider groupings of children to include a range of abilities, ages and personalities to optimise teamwork.

There is also a visual checklist to remain on the PowerPoint whilst the children are creating their Net-Positive cities.

KS2 ENERGY

AGE 7 – 9 YEARS

Title	Length	Subject Links
Power to the People	1 hour	Science / Geography / English
Taking Charge	1 hour	Science / Geography / PSHE / English
The Future of Energy	1 hour	Science / Geography / PSHE

OVERVIEW OF LESSON SET

The 'Energy' lesson set contains three lessons that firstly introduce pupils to the importance of energy in our daily lives and, in particular, how it enhances and shapes our experiences. Pupils will consider their own energy consumption before understanding more about where energy comes from and the different types of energy, such as renewables and non-renewables. They'll learn more about the challenges facing the energy sector, going into detail about the impact energy has on climate change and global warming and what we can do about it.

OVERVIEW OF RESOURCES REQUIRED

Power to the People	<ul style="list-style-type: none"> - Interactive whiteboard - Worksheet or familiar daily timetable - Knowledge organiser
Taking Charge	<ul style="list-style-type: none"> - Interactive whiteboard - Scrap paper or interactive whiteboard - Knowledge organiser
The Future of Energy	<ul style="list-style-type: none"> - Interactive whiteboard - Worksheet - Knowledge organiser

Delivery materials can be found in the appendix.

Remember to share your pupils' work with SSE and schools across the country on social media!

 **@SSE**
 **@SSEplc**
#STEMatSSE

Would you like a volunteer at SSE to facilitate these lessons? Contact stem@sse.com to request delivery support. More information about SSE's Just Transition programme can be found at <https://careers.sse.com/homepage>.

POWER TO THE PEOPLE

Power to the People

Key Stage 2 (Lower, Years 3-4)

Science, Geography, English

Curriculum Links

English NC

Science

- Understanding how science has changed our lives
- Identifying common appliances that run on electricity
- Analysing scientific developments and their causes and effects
- Exploring a variety of living things in their local environment

Geography

- Building a fascination about the world and those we share it with
- Understanding the interactions between physical and human processes
- Human geography including land use and the distribution of natural resources including energy

English

- Building competence in speaking and listening
- Making formal presentations

Scottish NC

Sciences

- Understanding that we use energy in our everyday lives
- Recognising the role of creativity and inventiveness in the sciences
- Understanding how science impacts our everyday lives e.g. our wellbeing
- Exploring energy sources

Technologies

- Understanding how technology can extend human capabilities and help satisfy human needs
- Exploring the impact of technology on society
- Embracing the use of technology in all aspects of life
- Being aware of technological developments

Literacy

- Enhancing skills in talking and listening

Welsh Curriculum

- Science
- Geography
- Education for Sustainable Development
- English

Northern Irish Foundation Phase

- The World Around Us
- Language and Literacy

Republic of Ireland

- Social Environmental and Scientific Education
- Primary Language Curriculum: English

Big Picture:

The first lesson of 'Energy' will introduce the class to the importance of energy in our daily lives. Pupils will begin to understand what energy is and learn about scientific developments including electricity and fuel. The lesson will focus on the role technology plays in extending human capabilities and satisfying our needs. Children will explore how energy enhances our everyday experiences and recognise its consumption in a range of contexts, including at home, school and the wider world. For example, pupils will need to be able to identify common appliances that run on electricity and modes of transport which are powered by fuel. This will enable children to embrace the consumption of energy in all aspects of life and appreciate what it allows us to achieve. Children will be encouraged to consider their own energy usage and be invited to present their daily consumption routine to the class.

Lesson Objective:

'To understand why energy is so important in our daily lives.'

Pupils will think about all the ways in which we consume energy in our everyday lives.

Assessment:

Pupils' existing knowledge can be assessed in the starter activity where they will discuss what they already know about energy. Facilitators can also assess their understanding through listening to children present their daily energy consumption.

Resources:

Educators will need to have an interactive whiteboard to present the slide deck.

Pupils may use the provided worksheet or a familiar daily timetable to support them.

Knowledge Organiser

Lesson Plan

Key vocabulary for the lesson:

Energy, electricity, electrical energy, appliances, fuel energy, consumption, food energy, solar energy, solar panels, wind turbines, power stations, transmission towers, wood poles

Child friendly definitions can be located in the glossary towards the end of the slide deck

Additional Adult Role:

An additional adult can assist pupils with understanding technical vocabulary used throughout the lesson, for example those with English as an additional language, special educational needs or a disability. They can also use their knowledge of the pupils' contexts to further support them in identifying their daily energy consumption.

Timing	Facilitator	Pupil
5 mins	<p>Do Now:</p> <p>Leave the following question on the board for pupils to engage with:</p> <p><i>'What do you know about energy?'</i></p>	<p>Pupils will reflect on what they already know about energy – discuss in talk partners before sharing aloud</p>
Check	<p>Ask pupils to share their ideas aloud – the facilitator may refer them to familiar appliances, devices and vehicles that consume energy</p>	
15 mins	<p>Introduction:</p> <p>Explain key words used in the lesson</p> <p>Introduce pupils to the concept of energy – describe different types e.g. electrical, fuel, food and solar</p> <p>Explore how energy is generated (e.g. by burning things, spinning turbines or solar panels)</p> <p>Explain how electricity is passed onto us via wires suspended by transmission towers and wood poles – ask pupils to think of places which receive electricity</p> <p>Present a range of familiar contexts including home, school and the wider world for pupils to identify where the energy consumption is – reveal the arrows to show the answers</p>	<p>Pupils should reflect on what energy is and the different types</p> <p>They should think of different places where electricity is transferred to with a partner before sharing aloud</p> <p>They should look at the different contexts and identify the energy consumption with a talk partner before sharing aloud</p> <p>(see notes in slide deck for more details on when to involve talk partner opportunities)</p>
Check	<ul style="list-style-type: none"> • What are the different types of energy? • How is energy provided to our homes? • How is energy consumed? 	
10 mins	<p>Provide Model:</p> <p>Explain that pupils will be recording their daily energy consumption</p> <p>Show the example timetable and discuss the different events in which we consume energy in chronological order e.g. making toast, traveling on the bus to school and using the iPads in the classroom</p> <p>Model drawing out a daily routine using ideas from the class on when <i>they</i> consume energy</p>	<p>Pupils will look at the example timetable to look at scenarios where energy is consumed in a day to day life – they will identify different types of energy e.g. electrical to use the toaster and fuel to power the bus – discuss in talk partners first</p> <p>They will then reflect on their own daily routines to identify when they consume energy and contribute ideas as the facilitator draws a new timetable – discuss in talk partners first</p>
Check	<ul style="list-style-type: none"> • When do we consume energy in our day to day lives? • What types of energy are being consumed? • Does your daily routine differ to the example shown? If so, how? 	
15 mins	<p>Pupil Practise:</p> <p>Explain that pupils will need to illustrate their own timetable demonstrating their daily energy consumption</p> <p>Go through the instructions:</p> <ol style="list-style-type: none"> 1. Think about all the things you do in your daily routine 	<p>Pupils should recall the different things they do throughout the day and identify when energy is consumed</p> <p>They should illustrate the different events in order and then label what type of energy is being consumed e.g. electrical and fuel</p> <p>Some pupils e.g. those with additional learning needs may want to refer to a familiar timetable to identify their energy consumption e.g. food energy at snack time</p>

2. Think about how you are consuming energy
3. Draw a picture of each action and label the energy consumption

Check The facilitator can circulate the class while making their timetables and promote reflection on all different types of energy including energy from food and the Sun

15 mins **Review of Learning:**

Ask pupils to present their daily energy consumption to the class by referring to their timetables

Refer them to the example sentence stems to promote the use of time connectives

Pupils should present their posters or timetables to the class and use them to explain their daily energy consumption by referring to the illustrations and labels

They should use the sentence stems and time connectives to recite their daily energy consumption with fluency

Pupils should be active members of the audience and think critically to check if their peers have missed out any cases of energy consumption

Check The facilitator can assess each child's understanding as they recite their daily energy consumption in their own presentations and challenge their peers' deliveries

Considerations for inclusive and adaptive teaching:

Pupils with additional learning needs or learning English as an additional language may benefit from a pre-teach before the lesson using the knowledge organiser to help understand technical vocabulary and key concepts.

This activity allows for a range of depth when creating their timetable – children's posters may vary from a few simple drawings to sequencing many different examples of energy consumption and labelling them with the different types of energy

Children who do not wish to present their timetables can still participate in the audience of their peers' and think about whether they have missed anything out

Future recommendations – children could choose a more adventurous day e.g. going to the cinema and think about the different cases of energy consumption chronologically.

Pupils could ask friends and family members to complete a similar review of their own consumption for home learning.

TAKING CHARGE

Taking Charge

Key Stage 2 (Lower, Years 3-4)

Science, Geography, PSHE, English

Curriculum Links

English NC

Science

- Understanding how science has changed our lives and is vital to the world's future prosperity
- Analysing scientific developments and their similarities and differences
- Recognising that environments change and can pose dangers to living things
- Exploring a variety of living things in their local environment

Geography

- Building a fascination about the world and those we share it with
- Understanding the interactions between physical and human processes
- Human geography including uses of different environments and the distribution of natural resources including energy

PSHE

- Contributing to the community and understanding shared responsibilities
- Exercising personal strengths, skills and interests to problem solve

English

- Building competence in speaking and listening and using discussion as a tool to learn

Scottish NC

Sciences

- Understanding that we use energy in our everyday lives
- Understanding how science impacts our economic future, health and wellbeing
- Exploring energy sources and their sustainability, risks and benefits
- Learning about natural and built environments and how this affects the environment and biodiversity
- Expressing opinions on social, ethical, economic and environmental issues

Technologies

- Understanding how technology can extend human capabilities and help satisfy human needs
- Understanding the impact of technology on society and the environment
- Learning about Scotland's innovation in engineering and the impact of technological developments

Literacy

- Enhancing skills in listening and talking
- Explaining thoughts and debating ideas

Welsh Curriculum

- Science
- Geography
- Education for Sustainable Development

Northern Ireland Foundation Phase

- The World Around Us

Republic of Ireland

- Social Environmental and Scientific Education

Big Picture:

The second lesson of 'Energy' will contextualise our energy consumption and explore how energy is generated. Pupils will first revise the ways in which we consume different types of energy e.g. electricity and fuel, and then explore how this energy is generated. Children will be required to analyse the similarities and differences of different energy sources and identify whether they are renewable or non-renewable. Pupils will also explore the impact of these energy sources on the world and assess their sustainability. The lesson will draw on how most of the world's energy is currently generated via non-renewable sources and how companies like SSE plan to change this. Children will also learn about the challenges faced by renewable energy sources and how new technology including artificial intelligence and drones are enabling us to overcome these barriers. The lesson will culminate in a delivering a persuasive speech convincing the local council against the idea of building more non-renewable power stations.

Lesson Objective:

'To evaluate different energy sources.'

Pupils will think about the advantages and disadvantages of using different energy sources to generate power. They will also learn about how technology is being developed to address a range of these problems.

Assessment:

Pupils' existing knowledge can be assessed in the starter activity where they will recall different ways that we consume energy in our daily lives. Facilitators can also assess their understanding through listening to children deliver their persuasive speeches.

Resources:

Educators will need to have an interactive whiteboard to present the slide deck.

The main activity is verbal however pupils may use a scrap piece of paper or a whiteboard for preparation.

Knowledge Organiser

Lesson Plan

Key vocabulary for the lesson:

Energy source, renewable, non-renewable, generate, carbon emissions, finite resources, fossil fuels, power station, air pollution, toxic waste, solar panels, wind farm, off-shore, on-shore, wildlife, puffin colonies, habitat, consumption, electric vehicles, drone

Child friendly definitions can be located in the glossary towards the end of the slide deck

Additional Adult Role:

An additional adult can assist pupils with understanding technical vocabulary used throughout the lesson, for example those with English as an additional language, special educational needs or a disability. They can also support children with developing their ideas verbally and preparing for formal debate using the provided sentence stems.

Timing	Facilitator	Pupil
5 mins	Do Now: Leave the following question on the board for pupils to engage with: <i>'How do we consume energy?'</i>	Pupils will reflect on the different ways we consume energy in our day-to-day lives – they should discuss in talk partners first before sharing aloud with the class
Check	Ask pupils to share their ideas aloud – the facilitator may refer them to common energy consumption at home or school to prompt them e.g. requiring electricity and fuel	
15 mins	Introduction: Explain key words used in the lesson Discuss how our energy consumption requires us to generate energy and how this can be achieved in different ways – go through <i>some</i> of the most common methods e.g. solar, wind, hydropower, coal, gas and oil Explain that these energy sources can be sorted into renewable and non-renewable and explain what these mean – discuss their advantages and disadvantages Discuss how developments in renewables require us to think about the effects on the environment e.g. puffin colonies and their habitats on small island Introduce SSE projects: <ul style="list-style-type: none"> • 'Flying Squad' initiative where cameras can count puffins and monitor their wellbeing • 'iHawk' software which allows engineers to inspect wind turbines virtually using camera drones 	Pupils should think about how their energy consumption requires the generation of energy and learn about the different ways this is achieved They should recall the name of each energy source using the visuals to guide them – discuss in talk partners first Pupils should then learn about how energy sources can be sorted into renewable and non-renewable and use this information to decide which group each energy source belongs to – discuss in talk partners first They should then think critically about their advantages and disadvantages and consider the impact they have on the world e.g. the environment, including wildlife and their habitats Pupils should discover how developments in technology can help problem-solve in the field of energy generation and extend human capabilities e.g. the 'Flying Squad' initiative for protecting wildlife and the 'iHawk' software which prevents engineers from working in dangerous conditions (see notes in slide deck for more details on when to involve talk partner opportunities)
Check	<ul style="list-style-type: none"> • How is energy generated? • What are the advantages and disadvantages of renewables and non-renewables? • How can new technology help problem-solve in the field of energy? 	
15 mins	Provide Model: Explain to the class that they will be persuading a member from the local council against building more power stations for non-renewable energy	Pupils should consider the talking point and evaluate the advantages and disadvantages of using different energy sources

Present the quote as the talking point: "We plan to build more power stations for non-renewables because it doesn't rely on the wind always blowing and the sun always shining!"

Model how to verbalise ideas and deliver a persuasive speech using the provided sentence stems

They should start thinking about reasons why it would be a bad idea to build more power stations for non-renewable energy and what other options the local council could explore

Pupils should then start thinking about how they can express their opinions ideas in their persuasive speech using the provided sentence stems e.g.

- 'I do not believe in non-renewable power stations because...'
- 'I don't think you should build more power stations because...'

Check

- Do you agree with the person from the local council?
- Why should we not build more non-renewable power stations?
- What other options could he explore?

15 mins

Pupil Practise:

Assign the whole class with the task of arguing against the talking point (what the person from the local council is saying)

Encourage them to use the sentence stems to build strong arguments and consider a range of reasons

Pupils should either work individually or in small groups to think of arguments 'against' the talking point

They should practise conveying their opinions and ideas to their peers using the sentence stems

SEND pupils can use the simpler sentence stems while higher attaining pupils can use more complex sentence stems and discuss how technology can solve some of the problems faced by renewable energy e.g. SSE's 'Flying Squad' and 'iHawk' initiatives

Check

Circulate the classroom to ensure that children are preparing relevant and plausible arguments for their argument

Check pupils can reframe their ideas into arguments using the sentence stems correctly

Question pupils' statements and ask them to expand e.g. if a pupil says 'non-renewable energy sources are bad for the environment', ask them to explain why

10 mins

Review of Learning:

The facilitator can either refer to the person on the slides or 'hot seat' in role of the local council member and ask pupils to deliver their speeches arguing against building more non-renewable power stations

The facilitator can choose when pupils deliver their speeches – specific children may need more encouragement to participate

The facilitator can also prompt pupils mid-speech with useful sentence stems to promote stronger arguments

Pupils should take it in turns to deliver their persuasive speeches and use the sentence stems to build convincing arguments

Pupils should be actively listening to their peers' speeches and magpie different arguments which support their own speech

Higher attaining pupils should aspire to raise points which have not been raised by their peers

Check

The facilitator can assess each child's understanding as they express their arguments in their own speeches and participate in the audience of their peers' presentations

Considerations for inclusive and adaptive teaching:

Pupils with additional learning needs or learning English as an additional language may benefit from a pre-teach before the lesson using the knowledge organiser to help understand technical vocabulary and key concepts.

This activity allows for a range of depth in pupils' expression of ideas – their arguments may vary from simply stating whether they agree or disagree to justifying their perspectives in detail

Those who are unable or unwilling to participate individually can still practise building an argument and verbalising their ideas with their peers in the pupil practise part of lesson

Future recommendations – children could write a simple opinion piece expressing their point of view in light of the speeches using sentence stems and technical vocabulary

THE FUTURE OF ENERGY

The Future of Energy

Key Stage 2 (Lower, Years 3-4)

Science, Geography, PSHE

Curriculum Links

English NC

Science

- Understanding how science has changed our lives and is vital to the world's future prosperity
- Analysing scientific developments and their causes and effects
- Exploring a variety of living things in their local and wider environment
- Recognising that environments change which can pose dangers to living things

Geography

- Building a fascination about the world and those we share it with
- Understanding the interactions between physical and human processes
- Human geography including uses of different environments and the distribution of natural resources including energy

PSHE

- Contributing to the community and understanding shared responsibilities
- Exercising personal strengths, skills and interests to problem solve

Scottish NC

Sciences

- Understanding that we use energy every day in our lives and need to be responsible users to maintain the Earth's resources and carbon cycle
- Understanding how science impacts our economic future, health and wellbeing
- Exploring energy sources and their sustainability, risks and benefits
- Learning about natural and built environments and how this affects the environment and biodiversity
- Expressing opinions on environmental issues

Welsh Curriculum

- Science
- Geography
- Education for Sustainable Development

Technologies

- Understanding how technology can extend human capabilities and help satisfy human needs
- Understanding the impact of technology on society and the environment, now and in the future
- Learning how to build a better future by taking responsible ethical actions to improve the lives of others
- Learning about the impact and sustainability of technological developments

Northern Ireland Foundation Phase

- The World Around Us

Republic of Ireland

- Social Environmental and Scientific Education

Big Picture:

The final lesson of 'Energy' will encourage pupils to understand the impact of carbon emissions on the planet and what we can do to decarbonise the environment collectively. The lesson will begin with showcasing some of the effects of climate change and global warming and children will express how this makes them feel. Pupils will then explore how the generation and consumption of energy contribute towards these examples of climate change through causing carbon emissions. The lesson will revise some of the ways in which energy is generated how some are more sustainable than others. Children will then learn about what climate change is and how it affects all living beings, from animals including humans to plants. The lesson will draw on what we can do as a society to combat climate change, from changing the way we live to implementing ground-breaking developments including carbon capture plants and smart technology. Pupils will be tasked to demonstrate how we can achieve Net Zero through balancing the scales with things that produce carbon emissions and things which help decarbonise the environment.

Lesson Objective:

'To understand how to achieve Net Zero together.'

Pupils will think about the ways in which we cause carbon emissions and the effect this has on the planet. They will then learn about how we can decarbonise the environment together.

Assessment:

Pupils' existing knowledge can be assessed in the starter activity where they will look at examples of climate change and global warming and express how this makes them feel and why.

Resources:

Educators will need to have an interactive whiteboard to present the slide deck.

Pupils should use the provided worksheet to complete the independent activity.

Knowledge Organiser

Lesson Plan

Key vocabulary for the lesson:

Energy, consumption, carbon footprint, non-renewable, fossil fuels, finite resources, carbon emissions, air pollution, climate change, global warming, Net Zero, renewable, decarbonisation, carbon capture plant

Child friendly definitions can be located in the glossary towards the end of the slide deck

Additional Adult Role:

An additional adult can assist pupils with understanding technical vocabulary used throughout the lesson, for example those with English as an additional language, special educational needs or a disability. They can also support children using the additional resource to prompt their ideas on which things release carbon emissions and which things decarbonise the environment.

Timing	Facilitator	Pupil
5 mins	Do Now: Leave the following question on the board for pupils to engage with: <i>'How does this make you feel and why?'</i>	Pupils will look at the examples of climate change and reflect on how this makes them feel and why
Check	Ask pupils to share their ideas aloud – the facilitator may ask them how they would feel if they experienced flooding, a fire or drought themselves	
20 mins	Introduction: Explain key words used in the lesson Revise how we consume energy e.g. electricity and fuel in our daily lives and how this causes carbon emissions (carbon footprint) Explain that the more energy we consume, the more energy needs to be generated – this can be achieved using renewable and non-renewable sources Discuss the impact of carbon emissions on the world and how we can remove carbon from the environment (decarbonisation) to achieve Net Zero Explain the different ways we can decarbonise the environment collectively e.g. changing the way we live, planting trees and developing new technology including carbon capture plants and devices to help monitor energy use in the home	Pupils should begin to understand the concept of 'carbon footprint' and think about how their energy consumption releases carbon emissions into the environment They should understand how the more energy we consume, the more energy needs to be generate, which also contributes towards carbon emissions Pupils should understand how we mostly rely on fossil fuels currently and recall which sources are used most commonly to provide energy to the world – discuss in talk partners first They should then learn about different effects of climate change and global warming – discuss in talk partners first Pupils should understand how the environment is removed naturally and what we can do as a society to further decarbonise the environment and minimise the risks of climate change (see notes in slide deck for more details on when to involve talk partner opportunities)
Check	<ul style="list-style-type: none"> • What causes carbon emissions? • What are the effects of global warming and climate change? • How can we decarbonise the environment? 	
10 mins	Provide Model: Explain to the class that the process of carbon emissions being released and removed from the environment is called the carbon cycle and that we need to keep it balanced to prevent climate change and global warming	Pupils should learn what the carbon cycle is the reasons why it needs to be balanced They should think of things that cause carbon emissions from their own actions e.g. using electricity to the generation of energy – discuss in talk partners first They should then think of things that remove carbon emissions from changing the way they live to new technologies e.g.,

Discuss what things cause carbon emissions and how these need to be counteracted with things which remove carbon from the environment

walking to school and monitoring energy use in the home – discuss in talk partners first

Model filling in the balancing scales yourself using ideas from the class: placing things which cause increased carbon emissions in one side and things which remove or minimise emissions on the other.

Optional: Create flashcards out of the additional resource and show how real-life balancing scales can be balanced by putting things that release and remove carbon emissions on either side

Check

- How can we change our everyday lives to cause less carbon emissions?
- What new technology has been developed to help decarbonise the environment?
- Why do we need to balance the carbon cycle?

15 mins

Pupil Practise:

Explain the following steps:

1. Draw things which cause carbon emissions on the left
2. Draw things we can do to decarbonise the environment on the right

Pupils should use their ideas to fill in the balancing scales themselves

They should start off by drawing and labelling things which cause carbon emissions on the left

Then they can draw and label things which decarbonise the environment on the right

They should try to ensure that each side is the same to balance the carbon cycle so that Net Zero can be achieved

SEND pupils can use the additional resource to cut and stick the pictures onto the correct side of the balancing scales depending on whether they think carbon is being released or removed

Check

The facilitator can refer pupils to their ideas from the shared balancing scales or the pictures on the slide for additional ideas

10 mins

Review of Learning:

Ask pupils to present their carbon cycles to the class by referring to their balancing scales

Refer them to the example sentence stems so children can share how we can help decarbonise the environment as a community

Pupils should present their carbon cycles to the class and explain the different things they thought of which release and remove carbon emissions

They should use the sentence stems to help share how we can decarbonise the environment together

Higher attaining pupils should think about how some things will make more of an impact e.g. implementing carbon capture plants is likely to make a bigger difference than planting one tree

Check

The facilitator can assess each child's understanding as they present their carbon cycles to the class

Considerations for inclusive and adaptive teaching:

Pupils with additional learning needs or learning English as an additional language may benefit from a pre-teach before the lesson using the knowledge organiser to help understand technical vocabulary and key concepts.

This activity allows for a range of depth when filling in the balancing scales – children may use their own ideas or cut and stick the example pictures from the additional resource onto the correct side

Children who do not wish to present their carbon cycles can participate in the audience of their peers' presentations and challenge them on specific things if they believe they are on the wrong side

Future recommendations – children could create a persuasive poster featuring their top tips on how to save energy and help decarbonise the planet

KS2 FUTURE SKILLS

AGE 7 – 9 YEARS

Title	Length	Subject Links
Rise of the Robots	1 hour	DT / Computing / Science / PSHE / English
Futuristic Fiction	1 hour	DT / Computing / Science / PSHE / English
A Robot Revolution	1 hour	DT / Computing / Science / PSHE / English

OVERVIEW OF LESSON SET

The 'Future Skills' lesson set contains three lessons that firstly introduce pupils to the diverse world of technology. Pupils will learn about robots and how they've been developed to solve real-world problems. Pupils will consider how technology impacts society and the environment, in particularly how robots can contribute to a more efficient future using their own designs. They'll learn about the bridge between humans and robots and how they collaborate. Pupils will evaluate some of the latest technologies, considering the benefits and threats to the future world.

OVERVIEW OF RESOURCES REQUIRED

Rise of the Robots	- Interactive whiteboard - Plain paper or worksheet provided
Futuristic Fiction	- Interactive whiteboard - Worksheet provided
A Robot Revolution	- Interactive whiteboard - Plain paper or worksheet provided

Delivery materials can be found in the appendix.

Remember to share your pupils' work with SSE and schools across the country on social media!



@SSE



@SSEplc

#STEMatSSE

Would you like a volunteer at SSE to facilitate these lessons? Contact stem@sse.com to request delivery support. More information about SSE's Just Transition programme can be found at <https://careers.sse.com/homepage>.

RISE OF THE ROBOTS

Rise of the Robots	Key Stage 2 (Lower, Years 3-4)	Computing, DT, Science, PSHE, English	
<p>Curriculum Links</p> <p>English NC</p> <p>Computing</p> <ul style="list-style-type: none"> Recognising common uses of information technology beyond school Understanding how computer programs are implemented on digital devices Learning about new and unfamiliar technologies <p>DT</p> <ul style="list-style-type: none"> Evaluating past and present technologies <p>Science</p> <ul style="list-style-type: none"> Understanding how science affects our everyday lives and is vital to future prosperity <p>PSHE</p> <ul style="list-style-type: none"> Contributing to the community and understanding shared responsibilities Exercising personal strengths, skills and interests to problem solve <p>English</p> <ul style="list-style-type: none"> Building competence in speaking and listening and using discussion as a tool to learn Participating in formal debate 	<p>Scottish NC</p> <p>Technologies</p> <ul style="list-style-type: none"> Knowing the impact of technologies on society and the environment and how they can extend human capabilities for a better world Researching new and unfamiliar concepts and designing products with real applications Preparing for technology-related careers to participate in a global economy while maintaining sustainable development <p>Sciences</p> <ul style="list-style-type: none"> Understanding that science is used in our everyday lives and contributes towards our economic future, health and wellbeing Building fascination for new technologies and recognising the role of creativity and inventiveness in the sciences <p>Expressive Arts</p> <ul style="list-style-type: none"> Meeting challenges positively by thinking innovatively and finding imaginative solutions Exploring ethical questions and responding to personal and social issues, drawing on their own feelings and experiences in their design work Presenting their own ideas and being part of an audience for others <p>Literacy</p> <ul style="list-style-type: none"> Enhancing skills in talking and listening Explaining thoughts and debating ideas Developing critical and creative thinking 	<p>Welsh Curriculum</p> <ul style="list-style-type: none"> Design and Technology Information and Communication Technology Art and Design Education for Sustainable Development and Global Citizenship Personal and Social Education Science English <p>Northern Ireland Foundation Phase</p> <ul style="list-style-type: none"> The World Around Us Personal Development and Mutual Understanding The Arts Language and Literacy <p>Republic of Ireland</p> <ul style="list-style-type: none"> Social Environmental and Scientific Education The Arts Education Social, Personal & Health Education Primary Language Curriculum: English 	
<p>Big Picture:</p> <p>The first lesson of 'Future Skills' will introduce the class to the diverse technological world around us. Pupils will learn about ground-breaking robots which have been developed to solve real-world problems and address others' needs. The lesson will draw on a range of ethical questions surrounding the use of robots to extend human capabilities, and pupils will think about how technology impacts on society and the environment. After exploring a variety of exciting past and present inventions, children will be invited to identify an existing problem and think creatively to design a suitable robot for this. Pupils will need to demonstrate innovative and critical thinking as they put their ideas on paper and present them to the class. Through designing their own robot, children will exercise some of the necessary skills to participate in a technologically driven, yet environmentally conscious workforce.</p>	<p>Lesson Objective:</p> <p><i>'To design a robot to solve a real-world problem.'</i></p> <p>Pupils will be asked to identify a problem that they are passionate about, and design a robot that addresses this need. They will need to be imaginative and able to present their ideas to the class.</p>	<p>Assessment:</p> <p>Pupils' existing knowledge can be assessed in the starter activity where they will discuss what they already know about robots. Facilitators can also ask children to justify their robots' features during the design stage or in their final presentations.</p>	<p>Resources:</p> <p>Educators will need to have an interactive whiteboard to present the slide deck.</p> <p>Pupils may use the provided worksheet or a plain piece of paper to complete the independent activity.</p> <p>Knowledge Organiser</p>

Lesson Plan

Key vocabulary for the lesson:

Robot, technology, drone, engineer, computer scientist, design, problem-solve, biodiversity, humanoid, artificial intelligence

Child friendly definitions can be located in the glossary towards the end of the slide deck

Additional Adult Role:

An additional adult can assist pupils with understanding technical vocabulary used throughout the lesson, for example those with English as an additional language, special educational needs or a disability. They can also support children with developing their ideas verbally and demonstrate drawing complex designs on paper.

Timing	Facilitator	Pupil
5 mins	Do Now: Leave the following question on the board for pupils to engage with: <i>'What do you know about robots?'</i>	Pupils will reflect on what they already know about robots – discuss in talk partners before sharing aloud
Check	Ask pupils to share their ideas aloud – the facilitator may refer them to familiar popular culture including well-known literature, films and toys	
15 mins	Introduction: Explain key words used in the lesson Introduce pupils to the concept of a robot – clarify the idea that not <i>all</i> robots look humanoid like the cartoons we see on screen Explore a range of robots that have been developed to serve different purposes - use side-by-side pictures to compare the problem to the robotic solution Explain SSE's ongoing projects: 'Flying Squad' and Cyberhawk drones to discuss how cameras, Artificial Intelligence and drones can protect the environment	Pupils should reflect on how roboticists have helped shape the world through their work They should evaluate different robots by thinking about their impact on society and the environment They can guess what the problems are and how they are solved with a talk partner before sharing aloud (see notes in slide deck for more details on when to involve talk partner opportunities) Pupils should then think how they can contribute to their community and identify a problem important to them which could be solved through designing a robot (especially environmental concerns)
Check	<ul style="list-style-type: none"> • What problems were there and how were they solved? • What are the advantages and disadvantages of the robots invented? • Can you think of a problem and how could it be solved by a robot? 	
15 mins	Provide Model: Explain that as responsible citizens, pupils will become roboticists themselves to solve a real-world problem Show the example robot design and discuss the different features, for example the name, type, materials, parts, function, technology involved, advantages and disadvantages e.g. can it be powered by renewable energy?	Pupils will listen to the facilitator go through the necessary steps to identify a problem and design an appropriate robot They will begin to think about their chosen issue and visualise what their robot will look like, how it will perform and how it will impact the world All pupils should think about the name of their robot, what type of robot it is and what its different parts are made from, while higher attaining pupils should think about which specific technologies from the lesson could be incorporated into their designs (e.g. artificial intelligence)

- Check**
- What problem have you identified and why is it important?
 - What will you design your robot to do?
 - What will your robot look like?
 - Who or what will your robot make a positive impact on?
 - Could there be any disadvantages of your robot?

15 mins	<p>Pupil Practise:</p> <p>Explain the following steps:</p> <ol style="list-style-type: none"> 1. Identify a problem that matters to you – encourage pupils to consider environmental issues (show examples) 2. Draw a diagram of a robot which could solve this problem 3. Annotate your robot with a name, labels and descriptions 	<p>Pupils should select a problem they are passionate about – this might be something that affects themselves or other people</p> <p>They may want to refer to the 'additional resource' which features a range of human and environmental problems</p> <p>Pupils should then draw and colour in a robot which could address these specific needs</p> <p>They may want to add a name, labels and descriptions explain the different features of their robot</p>
----------------	---	---

Check The facilitator can guide children towards a pragmatic solution to a problem that they have identified

They may also model drawing children's ideas to enable them to create scientific diagrams of their own robots

10 mins	<p>Review of Learning:</p> <p>Ask pupils to present their design proposals to the class and promote a discussion on the appearance, purpose, functionality, impact and ethicality of their robots – encourage use of stem sentences to support presentations</p>	<p>Pupils should present their ideas to the class and explain the different features of their designs</p> <p>They should explain why the problem they have identified is important to them and how their robot can address the issue</p> <p>Pupils should be prepared to answer questions regarding their robots and think about the advantages and disadvantages of their design work</p> <p>They should be active members of the audience and think critically to challenge others on their reasons and decisions – they may also suggest potential improvements</p>
----------------	---	--

Check The facilitator can assess each child's understanding as they express their ideas in their own presentations and participate in the audience of their peers' presentations

Considerations for inclusive and adaptive teaching:

Pupils with additional learning needs or learning English as an additional language may benefit from a pre-teach before the lesson using the knowledge organiser to help understand technical vocabulary and key concepts.

Pupils with additional learning needs may benefit from a pre-teach before the lesson using the knowledge organiser to help understand technical vocabulary and key concepts

The main activity allows for a range of depth when designing a robot – children's designs may vary from a simple picture to a detailed picture which is annotated with a name, labels and descriptions to help explain ideas

Children who do not wish to present their designs can participate in the audience of their peers' presentations and ask questions or suggest improvements

Future recommendations – children could make their robot design out of junk modelling or Lego Mindstorms

FUTURISTIC FICTION

Futuristic Fiction

Key Stage 2 (Lower, Years 3-4)

DT, Computing, Science, PSHE, English

Curriculum Links

English NC

DT

- Designing products that solve real world problems
- Being resourceful, innovative and enterprising citizens

Computing

- Using computational thinking and creativity to understand and change the world
- Preparing for the future workplace in a digital world
- Using computational processes including sequencing and decomposition

Science

- Understanding how science affects our everyday lives and is vital to future prosperity

PSHE

- Contributing to the community and understanding shared responsibilities
- Exercising personal strengths, skills and interests to problem solve

English

- Building competence in speaking and listening and using discussion as a tool to learn
- Writing for a range of purposes, contexts and audiences
- Making formal presentations

Scottish NC

Technologies

- Knowing the impact of technologies on society and the environment and how they can extend human capabilities for a better world
- Researching new and unfamiliar concepts and designing products with real applications
- Preparing for technology-related careers to participate in a global economy while maintaining sustainable development

Sciences

- Understanding that science is used in our everyday lives and contributes towards our economic future, health and wellbeing
- Building fascination for new technologies and recognising the role of creativity and inventiveness in the sciences

Expressive Arts

- Meeting challenges positively by thinking innovatively and finding imaginative solutions
- Exploring ethical questions and responding to personal and social issues, drawing on their own feelings and experiences

Literacy

- Enhancing skills in listening and talking
- Developing critical and creative thinking

Welsh Curriculum

- Design and Technology
- Information and Communication Technology
- Art and Design
- Education for Sustainable Development and Global Citizenship
- Personal and Social Education
- Science
- English

Northern Ireland Foundation Phase

- The World Around Us
- Personal Development and Mutual Understanding
- The Arts
- Language and Literacy

Republic of Ireland

- Social Environmental and Scientific Education
- The Arts Education
- Social, Personal & Health Education
- Primary Language Curriculum: English

Big Picture:

The second lesson of 'Future Skills' will encourage pupils to contextualise their ideas and imagine their robots in a real-world setting. Pupils will have already learned about a range of technologies which have been developed to problem-solve. This next opportunity allows children to write their own futuristic fiction on how robots could contribute towards a more efficient future. They will envisage themselves as roboticists who have invented something pioneering to address a specific need. This activity will require a range of computational skills including abstraction, decomposition and algorithmic thinking as they simplify and sequence their narratives into a storyboard. These skills are at the core of programming and essential for the plethora of technology-related careers. Pupils will begin to understand the concept of 'meta learning' as they become aware of their learning processes.

Lesson Objective:

'To create a storyboard about the invention of a robot'

Pupils will be asked to imagine a scenario where they invent a new piece of technology that solves a specific problem. They will need to break down their narrative into a storyboard via computational processes of abstraction, decomposition and algorithmic thinking.

Assessment:

Pupils' understanding of robotics can be assessed in the starter activity where they will be asked to recall why computer scientists develop new technologies. Facilitators can also use pupils' storyboards to gauge children's understanding the potential impact of their robots.

Resources:

Educators will need to have an interactive whiteboard to present the slide deck.

Pupils may use the provided worksheet or a basic storyboard template

Knowledge Organiser

Lesson Plan

Key vocabulary for the lesson:

Problem-solve, computer scientist, roboticist, community, robot, drone, fiction, storyboard, decomposition, algorithmic thinking, abstraction, artificial intelligence, wind turbine, transmission towers

Child friendly definitions can be located in the glossary towards the end of the slide deck

Additional Adult Role:

An additional adult can assist pupils with understanding and using technical vocabulary, for example those with English as an additional language, special educational needs or a disability. They can pre-teach using the provided knowledge organiser and support throughout the lesson. They can also support children with developing their ideas verbally and decomposing their narratives into simple stages for the storyboard.

Timing	Facilitator	Pupil
5 mins	Do Now: Leave the following question on the board for pupils to engage with: <i>'Why do computer scientists develop robots?'</i>	Pupils will recall what they can remember about the purposes of robots – discuss in talk partners before sharing aloud
Check	Ask pupils to share their ideas aloud – the facilitator may refer them to examples of robots and the problems they have solved Answers may include to problem-solve, to help others, to protect the environment and to save time	
15 mins	Introduction: Explain key words used in the lesson Review another selection of robots which have made a significant impact on the world and compare the problem to the robot developed – optional slide to remind pupils of the 'Flying Squad' initiative and use of artificial intelligence to monitor puffin population Explain that pupils will need to imagine themselves as roboticists and think of a fictional story where they invent a piece of technology to help others Introduce the main activity of creating a storyboard to represent their futuristic narrative	Pupils should continue to learn how robots can enhance human capabilities and contribute towards a better future They should then envisage themselves as active members of community and identify a problem which they can address via the invention of a robot – they should exchange ideas with a talk partner first before sharing aloud (see notes in slide deck for more details on when to involve talk partner opportunities) They should begin to build a narrative around these ideas to devise their futuristic fiction and think about how they could represent this in a storyboard
Check	<ul style="list-style-type: none"> • What problem are you going to address? • What robot are you going to develop? • How will the robot contribute towards a better future? 	
15 mins	Provide Model: Explain the concept of a storyboard and explain why we use them. Teach the five stages of a basic fiction story: Beginning, build-up, problem, solution and ending Introduce the three computational skills and discuss how they should be applied when assembling a storyboard <ul style="list-style-type: none"> • Decomposition – breaking things down • Algorithmic thinking – sequencing • Abstraction – summarising ideas 	Pupils should understand the features of a storyboard and how to demonstrate the three computational skills when making one <ul style="list-style-type: none"> • Decomposition – breaking the narrative down into the five stages of a fiction story • Algorithmic thinking – sequencing the ideas in the correct order • Abstraction – representing these parts with illustrations and descriptions They should begin to think about how their ideas can be summarised into the five stages of a basic fiction story e.g. using illustrations and short descriptions

	Model completing the storyboard using illustrations and short descriptions	All pupils should think about how they could build a story around their robot performing a specific function, while higher attaining pupils should think about how a robot could realistically help those disadvantaged e.g. wheelchair users and the elderly
Check	<ul style="list-style-type: none"> • What are the five stages of a fiction story? • Which computational skills are required to create a storyboard? • What does each computational skill involve doing? 	
15 mins	<p>Pupil Practise:</p> <p>Assign pupils the task of creating their own storyboard based on their own robot design using the three computational skills</p>	<p>Pupils should choose the problem they are passionate about and decide on a robot they could develop to solve the problem – this could focus on the robot design from the previous lesson or be a new idea</p> <p>They may want to refer to the ‘additional resource’ which features a range of human and environmental problems</p> <p>Pupils should use the computational processes to simplify and represent their narrative it into the five stages of a fiction story using illustrations and descriptions</p>
Check	<p>The facilitator should circulate the class and discuss pupils’ ideas for narratives, ensuring they are coherent and adhere to the theme of problem-solving</p> <p>Some children may require additional support with decomposing their ideas into the five stages of the storyboard</p>	
10 mins	<p>Review of Learning:</p> <p>Ask pupils to present their storyboards to the class and orally retell their narratives</p>	<p>Pupils should present their futuristic fiction to the class by referring to their storyboards</p> <p>They should also actively participate in the audience of their peers’ presentations and ask relevant questions e.g. ‘Why did you choose that specific problem?’</p>
Check	<p>The facilitator can look at pupils’ storyboards and listen to their oral narrations to assess their understanding of the development of robots</p>	

Considerations for inclusive and adaptive teaching:

Pupils with additional learning needs may benefit from a pre-teach before the lesson using the knowledge organiser to help understand technical vocabulary and key concepts

The main activity allows for a range of depth when creating a storyboard – their work may vary from drawing simple pictures to detailed illustrations and descriptions

Those with additional needs may want to choose a starter picture from the ‘additional resource’ featuring a range of human and environmental problems to prompt ideas for a robotic solution – these can be cut out and stuck in the first box as the ‘beginning’ stage

Children who do not wish to narrate their stories to the class can participate in the audience of their peers’ presentations and ask questions

Future recommendations – children could write an in-depth narration of their futuristic fiction using full sentences and a range of technical vocabulary

A ROBOT REVOLUTION

A Robot Revolution

Key Stage 2 (Lower, Years 3-4)

DT, Computing, Science, PSHE, English

Curriculum Links

English NC

Computing

- Recognising common uses of information technology beyond school
- Understanding how computer programs are implemented on digital devices
- Learning about new and unfamiliar technologies

DT

- Evaluating past and present technologies

Science

- Understanding how science affects our everyday lives and is vital to future prosperity

PSHE

- Contributing to the community and understanding shared responsibilities
- Exercising personal strengths, skills and interests to problem solve

English

- Building competence in speaking and listening and using discussion as a tool to learn
- Participating in formal debate

Scottish NC

Technologies

- Knowing the impact of technologies on society and the environment and how they can extend human capabilities for a better world
- Researching new and unfamiliar concepts
- Preparing for technology-related careers to participate in a global economy

Sciences

- Understanding that science is used in our everyday lives and contributes towards our economic future, health and wellbeing
- Building fascination for new technologies and recognising the role of creativity and inventiveness in the sciences

Expressive Arts

- Exploring ethical questions and responding to personal and social issues, drawing on their own feelings and experiences

Literacy

- Enhancing skills in listening and talking
- Explaining thoughts and debating ideas
- Developing critical and creative thinking

Welsh descriptors

- Design and Technology
- Information and Communication Technology
- Education for Sustainable Development and Global Citizenship
- Personal and Social Education
- Science
- English

Northern Ireland Foundation Phase

- The World Around Us
- Personal Development and Mutual Understanding
- Language and Literacy

Republic of Ireland

- Social Environmental and Scientific Education
- Social, Personal & Health Education
- Primary Language Curriculum: English

Big Picture:

The final lesson of 'Future Skills' will introduce the bridge between humans and robots. Pupils will gain an insight into the way we collaborate with technology and how robots require precise instruction. They will be exposed to a range of machines which require the use of computer programs. The next challenge will be to evaluate some of the latest technologies, artificial intelligence and blockchain. As two of the most exciting drivers behind robotic innovation, pupils will explore the potential impact of synergising these technologies to enable multi-robot systems'. They will participate in a formal debate over the ethicality of autonomous technology and robots working together, including swarm robots. Children will think critically to assess whether this could benefit or threaten the future world. By the end, pupils will have built a fascination for new technologies and thought about how we can use these developments in the best way possible.

Lesson Objective:

'To evaluate new and unfamiliar technologies'

Pupils will learn about the latest technologies in robotics and think about how the future could be impacted by artificial intelligence and blockchain. They will debate the ethicality of robots being autonomous and working together.

Assessment:

Facilitators can also assess children's understanding of the new technologies through observing their contributions in formal debate.

Resources:

Educators will need to have an interactive whiteboard to present the slide deck. This activity is verbal – pupils may use the provided worksheet or scrap piece of paper to record their ideas.

Lesson Plan

Key vocabulary for the lesson:

Robot, drone, roboticist, swarm robots, multi-robots, device, programming, artificial intelligence, autonomous, Thorvald, blockchain, collaborate, problem-solve, hack, sustainable, renewable energy

Child friendly definitions can be located in the glossary towards the end of the slide deck

Additional Adult Role:

An additional adult can assist pupils with understanding and using technical vocabulary, for example those with English as an additional language, special educational needs or a disability. They can pre-teach using the provided knowledge organiser and support throughout the lesson. They can also help children within mixed attaining groups to develop their ideas verbally and prepare for formal debate.

Timing	Facilitator	Pupil
5 mins	<p>Do Now:</p> <p>Leave the following question on the board for pupils to engage with</p> <p><i>'How do humans communicate with robots?'</i></p>	<p>Pupils will reflect on what they already know about how humans develop and use robots – discuss in talk partners before sharing aloud</p>
Check	<p>Ask pupils to share their ideas aloud – the facilitator may refer them to familiar programming and coding languages</p>	
15 mins	<p>Introduction:</p> <p>Explain key words used in the lesson</p> <p>Explain the concept of programming and how devices and machines require precise instruction, often in code</p> <p>Explain the technology of artificial intelligence (AI) and how some robots can 'think' for themselves using a range of sensors e.g. cameras and microphones</p> <p>Introduce idea of blockchain which allows multiple robots to connect – this means robots can collaborate without human control (swarm robots or multi-robot systems)</p> <p>Ask pupils what robots could achieve if they could work together – go through a few examples</p>	<p>Pupils should think about which types of programming they are familiar with how these are used to control technology</p> <p>They should then think about what if it would be like if robots could make their own decisions and understand how artificial intelligence enables this e.g. using sensors and microphones</p> <p>Pupils will imagine a world where robots are autonomous and can instruct each other on what to do – they should begin to understand how blockchain allows multiple robots to collaborate with each other</p> <p>Pupils should think about how swarm robots could impact on society and the environment and consider the ethics of implementing them in the real world - they should exchange ideas with a talk partner first before sharing aloud (see notes in slide deck for more details on when to involve talk partner opportunities)</p>
Check	<ul style="list-style-type: none"> • How do we communicate with robots? • What is artificial intelligence? • What is blockchain? • What are swarm robots or multi-robot systems? • What could swarm robots achieve and how would this affect our future? 	
15 mins	<p>Provide Model:</p> <p>Explain to the class that they will be debating the ethicality of using artificial intelligence and blockchain in robotics</p> <p>Talking point: <i>'Computer scientists should stop using artificial intelligence and blockchain in robotics to develop swarm robots'</i></p>	<p>Pupils should consider the talking point and think about the advantages and disadvantages of using multi-robot systems which can collaborate with each other</p> <p>They should understand how to participate effectively in a formal debate</p> <p>Pupils should then start thinking about how they can express their ideas using the provided sentence stems</p>

	<p>The facilitator should explain a set of guidelines for debate to promote valuable discussion</p> <p>Model verbalising ideas and building an argument using provided stem sentences</p>	<ul style="list-style-type: none"> • 'I think...' • 'Linking to...' • 'I disagree with...' • 'Building on ___'s point, I...'
<p>Check</p>	<p>Ask pupils to repeat the class guidelines for participating in formal debate – can they think of any other rules to follow in formal debate?</p> <p>Listen to volunteers announce their immediate opinions on the talking point using the sentence stems</p>	
<p>10 mins</p>	<p>Pupil Practise:</p> <p>Split the class in half and assign each team with the task of arguing 'for' or 'against' the talking point to rehearse for formal debate</p>	<p>Pupils should work in mixed ability groups to think of arguments 'for' or 'against' the talking point</p> <p>They should practise conveying their opinions and ideas to their peers using the sentence stems</p> <p>All pupils should think about how to use simple sentence stems, while higher attaining pupils should try to build and explain their opinions using their own phrases/words</p>
<p>Check</p>	<p>Circulate the classroom to ensure that children are preparing relevant and plausible arguments for their argument</p> <p>Check pupils can reframe their ideas into arguments using the sentence stems correctly</p> <p>Question pupils' statements and ask them to expand e.g. if a pupil says 'swarm robots are bad for farmers', ask them to explain why</p>	
<p>15 mins</p>	<p>Review of Learning:</p> <p>Conduct a formal debate around the talking point: <i>'Computer scientists should stop using artificial intelligence and blockchain in robotics to develop swarm robots'</i></p> <p>The facilitator can scaffold the debate by indicating when it is each team's turn to participate – specific children may need more encouragement and opportunities to participate</p>	<p>Pupils should take it in turns to participate in a formal debate over the development of swarm robots e.g. each child should share their point of view following a sentence stem</p> <p>Pupils should gradually be thinking about which argument is more compelling and whether they themselves think that swarm robots could make a positive or negative impact on the future world</p> <p>Pupils may want to complete the other half of their worksheet with points raised by their peers in the debate</p>
<p>Check</p>	<p>The facilitator can observe pupils speak in the formal debate and assess their ability to deliver their ideas clearly and coherently – this will inform them of how well they understand the potential impact of using artificial intelligence and blockchain in robotics</p> <p>The facilitator can ask pupils at the end what their points of view are in light of the debate – some children may want to express if their opinion has changed and discuss why</p>	

Considerations for inclusive and adaptive teaching:

Pupils with additional learning needs may benefit from a pre-teach before the lesson using the knowledge organiser to help understand technical vocabulary and key concepts

The main activity allows for a range of depth in pupils' expression of ideas – their opinions may vary from simply stating whether they agree or disagree to justifying their perspectives in detail

Those who are unable or unwilling to participate individually can still be active team members in the preparation stage by sharing their opinion with peers in a small group

Future recommendations – children could write a simple opinion piece expressing their point of view in light of the debate using sentence stems and technical vocabulary

KS2 GREENHOUSE GASES AND NET ZERO

AGE 9 – 12 YEARS

Title	Length	Subject Links
Growing Gases	1 hour	English / Maths / Science / History / Geography
What Can We Do?	1 hour	English / Maths / Science / History / Geography
Imagine A World...	1 hour	English / Maths / Science / History / Geography

OVERVIEW OF LESSON SET

The 'Greenhouse Gases and Net Zero' lesson set contains three lessons that firstly help pupils understand the impact humans are having on the environment, especially around the creation of greenhouse gases. Pupils will learn what greenhouse gases are and where they come from and understand what net zero means. Pupils will then develop arguments to persuade others to consider how they can incorporate net zero into their daily lives and the consequences if action is not taken.

OVERVIEW OF RESOURCES REQUIRED

Growing Gases	<ul style="list-style-type: none"> - Interactive whiteboard - Knowledge organiser - Scrap paper and pens - Worksheet provided
What Can We Do?	<ul style="list-style-type: none"> - Interactive whiteboard - Knowledge organiser - Worksheet provided
Imagine A World...	<ul style="list-style-type: none"> - Interactive whiteboard - Knowledge organiser - Scrap paper and pens - Worksheet provided

Delivery materials can be found in the appendix.

Remember to share your pupils' work with SSE and schools across the country on social media!

 **@SSE**
 **@SSEplc**
#STEMatSSE

Would you like a volunteer at SSE to facilitate these lessons? Contact stem@sse.com to request delivery support. More information about SSE's Just Transition programme can be found at <https://careers.sse.com/homepage>.

GROWING GASES

Growing Gases

Key Stage 2 (Upper, Year 5-6)

English, Maths, Science, History, Geography

Curriculum Links

English NC

English

- Composing and rehearsing sentences orally (including dialogue).
- Asking questions to improve their understanding
- Opportunities to write for a range of real purposes and audiences
- Noting and developing initial ideas, drawing on reading and research where necessary

Maths

- Solve comparison, sum and difference problems using information presented in a line graph
- Interpret pie charts and line graphs and use these to solve problems

Science

- Identifying scientific evidence that has been used to support or refute ideas or arguments

History

- Note connections, contrasts and trends over time and develop the appropriate use of historical terms
- Address and devise historically valid questions about change, cause, similarity and difference, and significance

Geography

- Human geography including ... distribution of natural resources including energy

Scottish NC

Expressive arts

- Work co-operatively and communicate with other, and show initiative, dependability, leadership and enterprise.

Languages

- Develop their ability to communicate their thoughts and feelings and respond to those of other people
- Exercise their intellectual curiosity
- Participate in discussions and share their perspective with others
- Develop an awareness of audience and register, communicating successfully in ways that are appropriate to different situations

Mathematics

- Have an understanding of mathematics and its uses in society
- Gain motivation for action through their understanding of mathematics
- Engage with more abstract mathematical concepts
- Apply mathematics to develop their knowledge and understanding of issues of sustainability
- Explore, understand and develop secure skills in using data and analysis

Sciences

- Recognise the impact science makes on their lives, on the lives of others, on the environment and on culture

Social studies

- Develop the capacity for critical thinking, through assessing, analysing and using information

Welsh Curriculum

- Humanities
- Mathematics and numeracy
- Science and technology
- Languages, literacy and communication
- Learning about local, national and international contexts

Northern Irish Curriculum

- Languages and literacy
- Mathematics and numeracy
- The world around us
- Personal development and mutual understanding

Republic of Ireland Curriculum

- Mathematics
- Social environment and scientific education
- Primary language
- Social, personal and health education

Big Picture:

This is the first lesson of a three-lesson learning sequence where the children will understand the impact humans are having on the increase in Greenhouse Gases as well as what can be done to help the planet and achieve net zero in the future. In this lesson, children will gain an understanding of what greenhouse gases are and where they come from. Children will explore images displayed to identify the causes of GHG and the impact they have now and potentially in the future to our planet. Children will understand the commitment of SSE to getting to net zero by the end of the lesson and will think critically about why net zero is such an important target for everyone to work towards. This will then be built upon in the next two lessons so children begin to develop arguments to convince others to work towards net zero and then they will write a poem to show their awareness of what will happen if we take the right actions, or the consequences if we do not.

Lesson Objective:

'To understand what Greenhouse Gases are.'

'To understand the environmental impact of Greenhouse Gases to our planet.'

Assessment:

Children will show their initial understanding of GHGs using cloze procedure where they will be responding in pairs or small groups. Throughout the unit, reference to the big question will demonstrate their awareness of net zero and the role they can play in achieving this.

Resources:

Facilitators will need to display 'lesson 1' PowerPoint on a large display screen. They will need to print off the resource pack so that each group (4-6 children approx.) are able to access them at all times during pupil practice.

In pupil practise, children will use the information given in the resources to use statistics to understand the causes and impact of GHGs.

Children will show their understanding in the 3,2,1 discussion-based task in the review of learning.

All children should be able to see the knowledge organiser provided for the lesson and copies should be provided for specific children who would benefit from their own copy.

To support recording in the group work, a selection of paper and pens / pencils should be provided for each group.

Whiteboard or scrap paper and pens for the Do Now task.

*in the lesson resources, the 3, 2, 1 activity to review learning is also provided. This is an optional resource dependent on whether the facilitator chooses to do this part of the lesson verbally or written.

Lesson Plan

Key vocabulary for the lesson:

Greenhouse gases, oxygen, carbon dioxide, atmosphere, ozone, emissions, heat, radiation, fossil fuels, reflecting, escape / escaping, trapped, pollution, climate change, global warming

Additional Adult Role:

This is a lesson that relies on small group work. The facilitator and / or an additional adult should focus their attention based on a group / pairing who may need support in initially accessing the activities.

Timing	Facilitator	Pupil
10 mins	<p>Do Now:</p> <p>Slide 3</p> <p>Show images showing GHGs and some of the effects GHGs are having without stating what the images are showing.</p> <p>Explain to the children that they are going to discuss with a partner what the images are showing us using the prompt words SEE, FEEL, PROBLEMS, QUESTIONS.</p>	<p>Children to create mind map on a whiteboard or scrap paper of what they can see using the prompts shown</p> <ul style="list-style-type: none"> - What I see - What I feel - Problems I can identify - Questions I'd like to ask
Check	<p>At the end of the time given, take ideas from the children based on the images, recording some of the key concepts and observations. Consider what children know already about GHGs and / or what might be causing some of the effects shown in the given images. The facilitator does not need to correct any misconceptions at this stage as these should be explored at the appropriate time later on in the session.</p>	
10 mins	<p>Introduction:</p> <p>Slide 4:</p> <p>Show the initials GHGs. What does this stand for?</p> <p>Ask: What are Greenhouse Gases? What impact are the GHGs having on the planet now and what might their impact be in the future?</p>	<p>Give children the opportunity to share their ideas and then click on the slide to reveal its meaning.</p>

Slide 5:

Show the three key words: atmosphere, radiation and fossil fuels. Explore their meanings with the children.

Slide 6:

Show the images of the natural greenhouse effect and the greenhouse effect intensified by humans.

Children to work with partner to devise an explanation of the two greenhouse effects. What is the same and what is different between the two images? Why are they different?

Slide 7:

Show the cloze procedure (missing words text) with key words covered up. Explain to the children that all of the words they need are shown on the diagrams given to them and they need to work out what is underneath each part.

Give children time to verbally complete the statements to best describe what the images are showing.

(NOTE: If children appear to be finding this difficult, take the time to explore and talk about the 'natural greenhouse effect' and the 'greenhouse effect intensified by humans' diagrams to support the children with the task).

Review the responses and reveal the statements by clicking on the slide each time to reveal an answer.

Slide 8

Introduce the big question: what is net zero and why should it bother us?

(Pupils not expected to answer this at this point- facilitator to simply introduce at this point).

Explain that throughout the next three lessons, the children will be forming teams to research the impact of GHGs and also what changes can and are being made to achieve net zero.

Check What are Greenhouse Gases? Are Greenhouse Gases something that are always harmful to the planet? What impact are humans having on the impact of Greenhouse Gases? Do you think humans have always had a harmful impact on GHGs? Why / why not?

10 mins **Provide Model:**

Slide 9:

Tell the children that they are going to work in teams in order to explain the impact of GHGs on our planet. Organise the children into mixed ability teams (size of group should be between 2 and 6. Choose group size most appropriate to class).

Set initial task for children to come up with 1 / 2 / 3 effects of the greenhouse effect intensified by humans using the image displayed.

Groups write down ideas onto mini whiteboards / rough paper. This will be used later in their final pieces.

Slide 10:

Take ideas from the children and model presentation of ideas onto the mind map. This may need to be recorded separately, e.g. on a flipchart, or annotated on screen, depending on capability of the display screen.

Show the graph 'global average temperature difference 1850 – 2019'. Guide the children in picking key facts that can be added to the mind map and discuss with them where the best place would be to place the ideas. Record in note form in the relevant place.

Children to then suggest additional facts that can be added to the mind map e.g. nearly 75% of GHGs are produced due to energy use.

Check What is the graph showing us? The line is getting steeper – what does this show us? Can you predict what will happen in 5, 10, 20 years in the future? What makes you think this?

20 mins **Pupil Practise:**

Slide 11:

Explain that the children will need to work together in teams over the next 3 lessons. The facilitator may wish to organise this based on the existing seating plan.

Share the mind map that the children will be using to record their responses.

Slide 12:

Explain to the children that they will be using different data sources- graphs and charts to reflect on some key questions. They'll also have prompts to go deeper with their thinking. Show the example on the slide, showing the questions and the 'going deeper' prompt.

Give children the group resource with three additional graphs / charts. Explain to the children that they need to analyse the data and identify key facts to add to their mind maps.

The resources scaffold the activity through questioning but children to extend further by looking for additional information which shows the negative and growing impact of the increase in GHGs.

The questions are divided into relevant sections so the facilitator can adapt in a way that is most appropriate.

Children form teams to tackle the problem with greenhouse gases and think about the solution. Will have considered the impact if they do get to net zero together.

As a whole class, share responses to the example on the slide. Ensure they are able to use the graph as a data resource to answer the question and to help consider the 'going deeper' prompt.

Example question of going deeper in the task gives children the opportunity to involve wider knowledge i.e. China has largest population and therefore their emissions are likely to be greater

Children add responses to the questions and further detail to their mind maps, identifying the key causes and effects of GHGs.

Going deeper task frames questions so children can consider their own observations across several charts / graphs. They may also go further with this and undertake further lines of enquiry e.g. energy use is 75% of global GHG emissions. Children could use safe online searches / further reading to give greater context to this.

Check Throughout this time, the facilitator should go to different groups and ensure they are responding to the questions provided and recording these on their mind maps. Any children who are responding quickly to the questions may need prompting to 'go deeper' so discuss with them how they can use the statistics given to extend their awareness of the impact of GHGs. Are they able to predict how the graphs may change over time or any potential advancements which may cause them to change.

10 mins **Review of Learning:**

Slide 13:

Introduce the task 3:2:1 to review the children's learning.

Take ideas from the children, asking them to refer to the information given and the vocabulary shown on the slide.

Slide 14:

Children then complete the table (orally or written) giving 3 facts that show GHGs are causing damage to our planet, 2 reasons

Finally, show the video For a better world of energy - <https://vimeo.com/458879568> -This gives basic background on what SSE does. Explain that the children are going to be looking in more detail at the work of SSE in the next session.

humans are having a negative impact on GHGs and 1 thing that could be done to help the planet.

Check The facilitator can assess a group's understanding through their responses to the questions and how these relate to the prompts from the mind map. It is important to keep the mind map for future sessions.

The 3, 2, 1 task at the end of the session will also show individual understanding and whether each child is able to see the most relevant facts. This is important as it will be a skill needed in the next session. It will particularly assess children's new knowledge of the environmental impact of Greenhouse Gases to our planet.

Considerations for inclusive and adaptive teaching:

The questioning in the resources is aimed to increase with complexity and children should be encouraged to attempt the questions in the order they are given. Scope is also provided for children to go deeper with their own interpretations and prompts are given to encourage children to see if they can use more than one graph / chart to infer a single statement e.g. the increasing need in transportation will undoubtedly have had an impact of...

For EAL learners, the facilitator and / or classroom support need to consider the language which is vital for reading and interpreting data e.g. largest, smallest, less, more, increase, decrease. Children may require pre-teaching of this vocabulary prior to the session. The knowledge organiser should be utilised for this.

The tasks in this session are largely aimed at small group work and, as mentioned in the additional support section, the facilitator and / or classroom support should be mindful of pairings / groups who would benefit most from additional support.

WHAT CAN WE DO?

What can we do?

Key Stage 2 (Upper, Year 5-6)

English, Maths, Science, History, Geography

Curriculum Links

English NC

English

- Composing and rehearsing sentences orally (including dialogue).
- Asking questions to improve their understanding
- Opportunities to write for a range of real purposes and audiences
- Noting and developing initial ideas, drawing on reading and research where necessary

Maths

- Solve comparison, sum and difference problems using information presented in a line graph
- Interpret pie charts and line graphs and use these to solve problems

Science

- Identifying scientific evidence that has been used to support or refute ideas or arguments

History

- Note connections, contrasts and trends over time and develop the appropriate use of historical terms
- Address and devise historically valid questions about change, cause, similarity and difference, and significance

Geography

- Human geography including... distribution of natural resources including energy

Scottish NC

Expressive arts

- Work co-operatively and communicate with other, and show initiative, dependability, leadership and enterprise.

Languages

- Develop their ability to communicate their thoughts and feelings and respond to those of other people
- Exercise their intellectual curiosity
- Participate in discussions and share their perspective with others
- Develop an awareness of audience and register, communicating successfully in ways that are appropriate to different situations

Mathematics

- Have an understanding of mathematics and its uses in society
- Gain motivation for action through their understanding of mathematics
- Engage with more abstract mathematical concepts
- Apply mathematics to develop their knowledge and understanding of issues of sustainability
- Explore, understand and develop secure skills in using data and analysis

Sciences

- Recognise the impact science makes on their lives, on the lives of others, on the environment and on culture

Social studies

- Develop the capacity for critical thinking, through assessing, analysing and using information

Welsh Curriculum

- Humanities
- Mathematics and numeracy
- Science and technology
- Languages, literacy and communication
- Learning about local, national and international contexts

Northern Irish Curriculum

- Languages and literacy
- Mathematics and numeracy
- The world around us
- Personal development and mutual understanding

Republic of Ireland Curriculum

- Mathematics
- Social environment and scientific education
- Primary language
- Social, personal and health education

Big Picture:

This is the second of three lessons in the learning sequence. After lesson 1, children will now have an awareness of the causes and effects of greenhouse gases and how the effect of these have been accelerated by humans. In this lesson, they will recap some of the key information and then start to form arguments to form have an impact on others. Through using the information gained in the first lesson, they will revise some of the key information and gain a deeper understanding of net zero and why this is such an important target for companies such as SSE. Children will begin to consider what actions need to be taken to reduce greenhouse gases and achieve net zero, including their own actions and that actions that are needed on a wider scale. This understanding will be applied in the final lesson where the children will be writing emotive poems about the importance of acting now.

Lesson Objective:

'To form arguments on the importance of achieving net zero.'

'To understand that there are a number of ways GHGs can be reduced.'

Assessment:

Children will demonstrate retained knowledge in the 'do now' task. This is a good opportunity for the facilitator to correct any misconceptions.

Children rephrasing the definition of net zero will show their understanding.

The completed table in pupil practice will show the children's ability to interpret the

Resources:

Facilitators will need to display 'lesson 2' PowerPoint on a large display screen. They will also need the mind maps created by each group from the previous lesson.

All children should be able to see the knowledge organiser provided for the lesson and copies should be provided for specific children who would benefit from their own copy.

data and take it a step further to consider solutions.

The agreement line in 'review of learning' will show both children's awareness of SSE's work and also that GHG reduction must be the responsibility of everyone.

Each child needs a copy of the table resource. Some children who need the task adapting should be given the modified version which requires less.

Lesson Plan

Key vocabulary for the lesson:

Greenhouse gases, net zero, oxygen, carbon dioxide, atmosphere, ozone, emissions, heat, radiation, fossil fuels, reflecting, escape / escaping, trapped, pollution, climate change, global warming, pie chart, graph

Additional Adult Role:

Additional adults should support children who may be more passive in group tasks, ensuring they are actively involved and building their awareness of the issues. Similarly, children who may have poor understanding of the wider world may need additional support with vocabulary or ideas for the pupil practise task.

Timing	Facilitator	Pupil
5 mins	<p>Do Now:</p> <p>Slide 3:</p> <p>Introduce the true / false, prove it activity. Explain to the children that they are going to think back to what they have learnt so far about Greenhouse Gases.</p>	<p>Children to take one statement at a time and discuss with their partner whether they think the statement is true or false and to give information to support their idea.</p> <p>Show a number of statements on the slideshow and children to talk to a partner and agree an answer.</p> <ul style="list-style-type: none"> - GHGs are having a negative impact on the planet - GHGs have always had a negative impact on the planet - Emissions from cars are the main cause of greenhouse gases - There is nothing we can do about Greenhouse Gases
Check	<p>Take ideas from the children after each response to see the level of their understanding. Children may disagree with each other and encourage debate if this is the case. Extend children by asking if there is any other detail anyone wishes to add to see if children can go beyond a single statement / fact.</p>	
10 mins	<p>Introduction:</p> <p>Slide 4:</p> <p>Introduce the key words for the session: greenhouse gases, renewable and non-renewable. Ensure pupils understand each of these. Use the lesson knowledge organiser to model finding the definitions if children are unsure.</p> <p>Slide 5:</p> <p>Show our big question and take ideas from the children about why they think this is an important issue. Children may have an awareness of what net zero is at this stage.</p> <p>Slide 6:</p>	

Read the definition of what net zero is. Explain that this is the government definition however it would be useful if we could change it into language that could be understood by everyone in our school. Tell the children that they are going to work with a partner to redefine the term 'net zero' in their own words.

Slide 7:

Explain that in this lesson, the children are going to gain an understanding of the solution to the issue of GHGs.

Tell the children that they are going to look into the work of SSE, an organisation who are aiming to achieve net zero.

Show the video SSE: Powering future change - <https://vimeo.com/554723629> - The facts and figures about SSE (e.g. investment figures and renewable output targets) are a little out of date but this video will give a nice background to what SSE is doing to power net zero.

Ask the children to explain net zero in another way that could be understood by all. The facilitator can extend this further by adapting the number of words children can use (less than 20, less than 10, exactly 5...) to increase the level of challenge.

Children to work with a partner to generate definitions.

Use the questioning below to see if children understand the work of SSE and some of the ways they are working to achieve net zero.

Check

- What are some of the ways SSE are working to make our planet healthier?
- What is meant by sustainable energy?
- Why is the work of large organisations like SSE so important to our planet?

10 mins

Provide Model:

Slide 8:

Show the graph showing the increase in GHGs and the rise in temperatures – discuss with the children where there are most significant increases. What will happen if this continues? What might the increase be in 10, 20, 30 years' time be if this is not slowed down?

Slide 9:

Share the pie chart 'Where do GHG emissions come from?'

Explain that there are things we can do individually and also actions that larger companies and governments must do to try and achieve net zero. Tell the children that SSE are a company working to support the work to achieve net zero.

Slide 10:

Share the 'we power change' video. - <https://www.youtube.com/watch?v=6l9lEmXg2zM> – This was put together in the run up to COP26 and details SSE's vision and strategy.

After watching the 'we power change' video, ask the children for ideas of the sorts of things larger companies can do to help us achieve net zero.

Children to give suggestions to the questions from the facilitator, hypothesising what would happen if nothing was done to reduce Greenhouse Gases and why aiming for net zero is so important.

Children to examine the part of the pie chart that focuses on energy use. Use the prompts on the slide to discuss with partner what the issues are and what might be a sensible way for this to be reduced.

- Which are the areas which are impacting most on gas emissions?
- Are there any parts of this that we can help with?
- Are there any areas that you cannot personally help with?
- Are there any parts that surprise you?

Children to suggest how larger companies can help us achieve net zero.

Children to suggest how they can help us achieve net zero.

Ask the children if they can think of any ways they can help achieve net zero?

Slide 11:

Show [Tips to save energy and money in the home from SSE - YouTube](#) to give further ideas.

NB – on both slides, a simple table is shown which can either be used to record the ideas children suggest on or just referred to as a prompt by the facilitator.

- Check**
- What can be done to reduce Greenhouse Gases?
 - Who is responsible for achieving net zero?
 - How else can reducing our energy use help us?

15 Pupil Practise:

**mins +
10
mins**

Slide 12 (slide 13 optional with completed example):
Model completion of the table based on the pie chart. Model with the example of energy use must create less GHG emissions. The example the facilitator could use is to rely on road transport less (what we can do) and make electric cars more affordable (what else must be done)

Children then given a table format to complete with columns showing 'issue', 'what can we do' an 'what else must be done' in the column headings.

There are three levels of difficulty, with decreasing scaffolding, available in the lesson resources, so these can therefore be given to children as appropriate based on their understanding and levels of confidence.

Children then to use their ideas to complete the table.

Slide 14:

After 15 mins, stop the children and show the framework on the board, using the information from the example.

Then as a group, construct arguments to explain what must be done and why – referring to the facts researched in the first lesson and the information gained in this lesson.

Each pair to use the structure given to construct their argument and to make sure they do a different argument to others in their group. This should mean that groups have 3 or 4 different arguments / reasons.

- Check** Check that children are forming arguments based on a problem and a range of realistic solutions. This is particularly important for lesson 3 as children will be using these arguments to support their writing in this lesson.

Review of Learning:

Ask children to share examples of their arguments. Facilitator to only select 2 or 3 different ones to get a range of ideas.

Slide 15:

Introduce agreement line. Facilitator to decide whether children stand on a giant invisible agreement line in the teaching space or if children simply state where they would position their opinion.

Agreement line: companies like SSE will have the biggest impact on GHGs. Children to discuss this with a partner and then decide where they would position themselves and why.

At the end of the session, make sure each groups' work is collected and kept for the third session.

- Check** Review written statements and the views shared in the agreement line to see if the children can think of actions that can be taken by individuals as well as the larger companies such as SSE.

Considerations for inclusive and adaptive teaching:

It may be appropriate for some children to give their ideas for the written task in a verbal form instead. IT could be used to record ideas based on the materials provided.

Worksheets are provided in three difficulty levels and should be given as appropriate.

Pupils with SEND or those learning EAL may benefit from pre-teaching key terminology using the knowledge organiser for this lesson.

IMAGINE A WORLD...

Imagine A World...

Key Stage 2 (Upper, Year 5-6)

English, Maths, Science, History

Curriculum Links

English NC

English

- Composing and rehearsing sentences orally (including dialogue).
- Asking questions to improve their understanding
- Opportunities to write for a range of real purposes and audiences
- Noting and developing initial ideas, drawing on reading and research where necessary

Maths

- Solve comparison, sum and difference problems using information presented in a line graph
- Interpret pie charts and line graphs and use these to solve problems

Science

- Identifying scientific evidence that has been used to support or refute ideas or arguments

History

- Note connections, contrasts and trends over time and develop the appropriate use of historical terms
- Address and devise historically valid questions about change, cause, similarity and difference, and significance

Geography

- Human geography including... distribution of natural resources including energy

Scottish NC

Expressive arts

- Work co-operatively and communicate with other, and show initiative, dependability, leadership and enterprise.

Languages

- Develop their ability to communicate their thoughts and feelings and respond to those of other people
- Exercise their intellectual curiosity
- Participate in discussions and share their perspective with others
- Develop an awareness of audience and register, communicating successfully in ways that are appropriate to different situations

Mathematics

- Have an understanding of mathematics and its uses in society
- Gain motivation for action through their understanding of mathematics
- Engage with more abstract mathematical concepts
- Apply mathematics to develop their knowledge and understanding of issues of sustainability
- Explore, understand and develop secure skills in using data and analysis

Sciences

- Recognise the impact science makes on their lives, on the lives of others, on the environment and on culture

Welsh curriculum

- Humanities
- Mathematics and numeracy
- Science and technology
- Languages, literacy and communication
- Learning about local, national and international contexts

Northern Irish curriculum

- Languages and literacy
- Mathematics and numeracy
- The world around us
- Personal development and mutual understanding

Republic of Ireland curriculum

- Mathematics
- Social environment and scientific education
- Primary language
- Social, personal and health education

Big Picture:

This is the final lesson in the learning sequence and builds on the knowledge gained in the first two sessions about greenhouse gases. Children will have previously looked at data linked to GHGs and will have developed a range of arguments to help reduce GHGs. In this lesson, children will develop an awareness of what they and their classmates / family can do to support the reduction in greenhouse gases. They will then apply this through writing a poem to show their awareness of what would happen if the right action was / was not taken to reduce greenhouse gases and achieve net zero.

Lesson Objective:

'To write an emotive poem.'

Assessment:

The initial 'do now' task will give the facilitator the opportunity to identify if the children are able to retain prior knowledge and if they can speak emotively about the images.

The poem's two verses will give a clear demonstration of the level of understanding gained by the children with verse 1 showing their knowledge of GHGs and verse 2 focusing on net zero and its importance.

Resources:

Facilitators will need to display 'lesson 2' PowerPoint on a large display screen. They will also need the mind maps and written statements created by each group from the previous lessons.

Pupils will need mini-whiteboards or scrap paper and pens.

All children should be able to see the knowledge organiser provided for the lesson and copies should be provided for specific children who would benefit from their own copy.

Each child needs a copy of the lesson resource showing the poem writing frame.

Lesson Plan

Key vocabulary for the lesson:

Greenhouse gases, renewable, non-renewable, energy, net zero, oxygen, carbon dioxide, atmosphere, ozone, emissions, heat, radiation, fossil fuels, reflecting, escape / escaping, trapped, pollution, climate change, global warming

Additional Adult Role:

Additional adults could be used to support children who may find recording difficult and can instead lead them with a shared write with the adult recording their ideas or through guiding them and prompting to support them in maintaining an effective structure and drawing upon their existing knowledge.

Timing	Facilitator	Pupil
5 mins	Do Now: Slide 3: Show range of images showing the impact of GHGs. Quickly model 'If... then...' statement using an example (shown on the slide) e.g. If we don't stop burning fossil fuels like coal then there will be more damage caused to the polar ice caps.	Children then to speak with their partners completing as many 'If... then...' statements as they can using the images and their existing knowledge of GHGs and net zero.
Check	Children to offer suggestions of their 'If... then...' statements. Facilitator to consider whether there is an appropriate balance between negative statements (GHGs) and positive statements (net zero). If not, ask the children for additional suggestions.	
15 mins	Introduction: Slide 4: Discuss key words for this session- climate change, sustainability and net zero. Model using the knowledge organiser resource to find definitions if the children are unsure. Slide 5: Return to the discussion prompt from the previous lesson. Ask the children where they would position themselves on the agreement line. Take ideas from the children ensuring they understand that companies like SSE must take action and are doing so. They also need to show clearly that these companies need our help. Slide 6: Explain that SSE are doing a lot in their commitment for net zero. Show image of Ferrybridge power station when it was in use. Ask the children: based on what we know about SSE, what could they do to improve how energy is created?	Children talk with partner or in small groups and then decide where they would position themselves on the agreement line: companies like SSE will have the biggest impact on GHGs Focus around what we can do ourselves. Comparison between huge company like SSE pledging £12.5 billion and what we can do individually.

Slide 7:

Then show Ferrybridge Power Station demolition - <https://vimeo.com/590566694> - Short clip showing the demolition of Ferrybridge coal-fired power station. This demonstrates that SSE has decommissioned all of its coal-fired power plants. Discuss with the children what the film is showing and ask them why they think they are doing this.

Ask the children to consider vocabulary that could be used to describe what SSE are doing here. Examples could be demolish, reduce, fossil fuel. Record on shared display so pupils can refer back to this later in the lesson.

Slide 8:

SSE Thermal - where does hydrogen come from? - <https://www.youtube.com/watch?v=plqEgnS8vfU> This video explains the concept of blue and green hydrogen and how hydrogen could fuel power stations in a net zero world.

Tell the children that SSE are doing a number of other innovations to try and achieve net zero. Show the video and ask children to note down any vocabulary that describes what SSE are doing here.

Slide 9:

Repeat this with the video How does carbon capture and storage (CCS) work? - <https://www.youtube.com/watch?v=9a7oyhsnGCM> – Detailed video of how carbon capture and storage works and how it could decarbonise existing power stations.

With these videos, the main learning for children is to see that SSE are showing innovation in reducing waste and using what is produced.

Children make notes on mini-whiteboards / rough paper showing what words / phrases can be used to describe what SSE are doing to try and achieve net zero.

Examples may include:

- Storage
- Capture
- Decarbonise
- Future

Check

- How are SSE trying to help reduce the impact of creating energy?
- Why is this so important?
- What would the impact be if this action was not taken?

10 mins

Provide Model:

Slide 10:

Review the big question and explain that today, the children will be creating a poem to show the importance of caring about making changes to achieve net zero.

Slide 11:

Examine the poem 'Save our Earth' as a good example/model and identify the features (two verses, emotive language, speaking to the reader).

NB: facilitator to ensure there is reference to current news events where appropriate as conflict, economic difficulties etc can impact on these issues.

Slide 12

Start off poem with 'Imagine a world where...'

Do a shared write with the children of the opening few lines using some of the ideas from the images showing the impact of increasing GHGs (shown on slide)

Make sure children are clear that this is not the full poem and is just a starting point for each verse.

- Check**
- Can you give an example of the impact of letting our Greenhouse Gases increase even more?
 - What alternatives are there to help us achieve net zero?
 - What have you learned in the previous lessons which can be used in our poems? (refer to previous group work)

20 mins **Pupil Practise:**

Children will be provided with the opening of both verses 'Imagine a world where...' and 'Wouldn't it be better if...'. If confident, children can innovate these to be different however it is important that the structure is consistent. Images to be shown on display in order to support their ideas.

Children to write a poem showing what the world would be in their eyes if we do nothing to reduce the human impact on GHGs and (in verse 2) what the world would be like if the right actions were taken today.

Important that they have their information from the previous lesson to support their writing.

- Check** Ensure frequent opportunities are taken to discuss ideas with children. Facilitators need to also make sure that children are using their time wisely so both verses end up of equal length. Support children in referring to their previous research to add ideas to their poems.

10 mins **Review of Learning:**

Facilitator to either:

- Ask a number of children to give a line of their poem building on verse 1 and then repeat for verse 2
- Select volunteers to read a full verse / poem

Finally, return to the big question and take ideas from the children.

Exit ticket: Children make a pledge and write down what they will do to make a difference to achieving net zero.

Ask the children what the pledges should be from other stakeholders: governments, large companies.

- Check** The performance of poems will show the children's awareness of the impact of GHGs and the importance of net zero. The pledges made in the review of learning will show what they understand to be our priorities.

Considerations for inclusive and adaptive teaching:

The length of the poem is not as important as the key content within this. It may be appropriate for some pupils to verbalise their poem and record this on an electronic device, or to contribute to a shared poem rather than creating a written outcome individually.

Children should utilise the knowledge organisers to help them with key concepts as well as the group notes.

Pupils learning EAL or those with SEND may benefit from a pre-teach of key vocabulary using the knowledge organiser.

KS2 JOBS FOR THE FUTURE

AGE 9 – 12 YEARS

Title	Length	Subject Links
Moving with the Times	1 hour	English / History / PSHE
Changing Careers for Changing Times	1 hour	English / History / PSHE
Celebrating Ourselves	1 hour	English / History / PSHE

OVERVIEW OF LESSON SET

The 'Jobs for the Future' lesson set contains three lessons that firstly help pupils understand the term 'career' and how the range of careers that are available today are different to those in the past and those they might be doing in the future. They will understand how jobs have changed over time and will develop an awareness of career pathways. They'll consider their own skills and how these can be applied to real-world jobs.

OVERVIEW OF RESOURCES REQUIRED

Moving with the Times	<ul style="list-style-type: none"> - Interactive whiteboard - Knowledge organiser - Worksheet provided
Changing Careers for Changing Times	<ul style="list-style-type: none"> - Interactive whiteboard - Knowledge organiser - Scrap paper and pens - Worksheet provided
Celebrating Ourselves	<ul style="list-style-type: none"> - Interactive whiteboard - Knowledge organiser - Scrap paper and pens - Worksheet provided - Electronic tablet/iPad (optional)

Delivery materials can be found in the appendix.

Remember to share your pupils' work with SSE and schools across the country on social media!

 @SSE
 @SSEplc
 #STEMatSSE

Would you like a volunteer at SSE to facilitate these lessons? Contact stem@sse.com to request delivery support. More information about SSE's Just Transition programme can be found at <https://careers.sse.com/homepage>.

MOVING WITH THE TIMES

Moving with the Times

Key Stage 2 (Year 5-6)

English, History, PSHE

Curriculum Links

English NC

English

- Composing and rehearsing sentences orally (including dialogue).
- Asking questions to improve their understanding
- Opportunities to write for a range of real purposes and audiences
- Noting and developing initial ideas, drawing on reading and research where necessary
- Selecting appropriate grammar and vocabulary, understanding how such choices can change and enhance meaning
- Prepare readings, with appropriate intonation
- Provide reasoned justifications for their views
- Assessing the effectiveness of their own and others' writing

History

- Note connections, contrasts and trends over time and develop the appropriate use of historical terms
- Address and devise historically valid questions about change, cause, similarity and difference, and significance
- Gain historical perspective by placing their growing knowledge into different contexts, understanding the connections between...cultural, economic...and social history; and short- and long-term timescales

Scottish NC

Expressive arts

- Express themselves in different ways and be creative
- Prepare the advanced learning and future careers by building foundations for excellence in the expressive arts
- Work co-operatively and communicate with other, and show initiative, dependability, leadership and enterprise

Health and wellbeing

- Identify when they need additional support
- Be equipped to explore different options for life beyond school and be supported so that they can make successful transitions into work, education or training

Languages

- Develop their ability to communicate their thoughts and feelings and respond to those of other people
- Develop the high level of skills in listening, talking, reading, and writing which are essential for learning, work and life
- Use different media effectively for learning and communication
- Exercise their intellectual curiosity
- Develop an awareness of audience and register, communicating successfully in ways that are appropriate to different situations

Sciences

- Recognise the impact science makes on their lives, on the lives of others, on the environment and on culture

Social studies

- Establish firm foundations for lifelong learning and, for some, for further specialised study and careers

Technologies

- Develop an understanding of technologies and their impact on society – in the past, present and future
- Experience work-related learning
- Promote enterprising behaviour and ways of learning that prepare young people for their future lives and careers

Welsh Curriculum

- Humanities
- Science and technology
- Languages, literacy and communication
- Learning about local, national and international contexts

Northern Irish Curriculum

- Languages and literacy
- The world around us
- Personal development and mutual understanding

Republic of Ireland Curriculum

- Social environment and scientific education
- Primary language
- Social, personal and health education

Big Picture:

This is the opening lesson in the Jobs for the Future learning sequence. This lesson sets the scene for the rest of the unit, focusing on prior knowledge of changes in the past and how these link to careers. Pupils will gain an understanding of the term 'career' and how the range of careers that are available today are different to those in the past and those they might be doing in the future. They will understand how jobs have changed over time and will develop an awareness of career pathways. They will be introduced to the work of SSE and some of the careers they include. In the lessons that follow, pupils will become aware of the roles in SSE and how these are developed to meet changes to needs and changing technologies. Pupils will then produce a mock job application, celebrating their existing skills and interests.

Lesson Objective:	Assessment:	Resources:
'To understand how careers change over time.'	Pupils' existing knowledge of the terms career and job can be explored in the initial talk thread and then the introduction. It is important to explore children's awareness of why people might have a particular career. Facilitators can then identify how well children understand careers in the past, present and future and if they are able to understand how knowledge and skills link to what is required in a particular career.	Facilitators will need to display 'lesson 1' PowerPoint on a large display screen. Pupils should also be provided with the Venn diagram resource (one per group or pair, as preferred) and each individual child should receive a print out of the table resource. All children should be able to see the knowledge organiser provided for the lesson and copies should be provided for specific children who would benefit from their own copy.

Lesson Plan

Key vocabulary for the lesson:
Job, career, career pathway, skills, knowledge, qualification, change, modernisation, innovation, technology, past, present, future

Additional Adult Role:
 Additional adults should support children with lower prior knowledge of careers and who may have less awareness of careers today.

Timing	Facilitator	Pupil
--------	-------------	-------

5 mins	<p>Do Now:</p> <p>Slide 3:</p> <p>Introduce the talk thread/discussion starter: 'a career is a job' Ask pupils to discuss their responses to this.</p> <p>Explain to the children that at this stage, you want to gauge their understanding of the two words career and job- as they are important in the lessons on jobs for the future.</p>	<p>Children to discuss in pairs and then share ideas with the facilitator. Take ideas from the children and identify if children can see the key differences. Ensure this information is recorded onto a shared display so it can be referred to later in the session.</p>
---------------	--	--

Check	<p>Take ideas from the children about the similarities and differences between a career and a job. Are children able to give examples of a career and / or a job?</p>
--------------	---

20 mins	<p>Introduction:</p> <p>Slide 4:</p> <p>Introduce the key words for today: Job and career.</p> <p>Facilitator to make it clear that a job is a single role and tends to be shorter term whereas a career is longer term and is something you do because it's your purpose.</p> <p>Can children give an example of a career that someone may have?</p> <p>Slide 5:</p>
----------------	--

Show slide focusing on careers vs jobs. It is important that children do not confuse a career with a job. Spend some time focusing on the differences between the two terms and build in discussion about what children think a career pathway is.

Slide 6:

Show the task to the children and ask them to complete the statements to review their understanding.

You might have a career in _____ and your role could be as a trainee nurse, a nurse, a doctor, a surgeon or a consultant. You could have a career in education and have the position of... You might have a career in sport and your role could be...

Explain that in this unit. Children will be considering what jobs in the future might look like. In order to do this, we need to consider jobs from the past and how jobs have developed over time.

Slide 7:

Show 3-part Venn diagram with headings of past, present, future. Use two examples to discuss where they might go – teacher is something that is from the past, present and future so would go in the middle. Youtuber would go in present and future. Facilitator may wish to add their own examples or children's.

Children then to add the remaining ideas to their own Venn diagrams (this could be on whiteboards / rough paper or the facilitator could print a copy of the slide).

Important to give clarity on the term 'past' and ensure children are aware that for this task, we are considering 50+ years ago.

If any children complete this task, they are able then to add their own ideas to the Venn diagram.

Check What is a career? How is it different to a job? (Give example of how someone could have a career in teaching but teaching at a particular school is a job).

What is the purpose of a career? Why do they exist? Why might someone choose a career?

15 mins Provide Model:

Slide 8:

Reflect on the previous task – why is it so difficult to come up with careers that belong in the 'future only' section of the Venn diagram? Explain that this is why the big question is so important: how do we prepare for careers that may not even exist yet?

Take ideas from the children from the Venn diagram task and display this. Ask if the roles that are two or all three of past, present, future have remained the same. Discuss the example of teaching and how this might have changed over time e.g. using technology, changing behaviour management etc.

Slide 9:

Show example of past career and career from modern-day. Discuss with the children what is changing in each image (mechanic shown with an old-fashioned engine, a modern, petrol engine and an electric car with laptop). Discussion should also be extended to what will be the same (e.g. all require training, skill, patience...)

Children to share their ideas with the facilitator about what is changing in each image.

Children will understand that the careers available to them in 10 years' time may not even exist yet however there are trends that we can see. They will see how the development of technology and important issues lead to new careers.

Slide 10

Show table for the pupil practise session – model using a familiar example of how a career in this area might

have changed (use car mechanic as example – past focusing on older, less reliable cars; present developing understanding of electronics and fuel efficiency; future may focus on electric cars, solar powered etc.). Take ideas from the children. Clicking on the slide reveals suggested responses.

Children to suggest ideas of other professions and how they might have changed during this stage of the input. Important that they giving rationale behind their ideas for how things might have changed in the future.

Check Through discussion on the ‘do together’ modelling, are children able to consider how the changes shown in the images link to the knowledge / skills needed to do that particular role. Facilitator will also check whether children could apply the same process to other example(s).

15 mins Pupil Practise:

Slide 11:

Show pupil practise sheet on the interactive whiteboard showing the mechanic example and two others. Show the ideas suggested so children are able to see that on the social media influencer, ‘did not exist’ is recorded in the ‘past’ section as this was not a career until recently.

(Click to reveal the answers in the second two examples: social media influencer and engineer on the slide, as these are covered to allow discussion)

Children to examine examples of careers available and how they have changed over time as well as predicting how they might change over time.

Children are able to select the careers they have come up with on their Venn diagram task or can use the pre-written options.

In some boxes, they will write ‘did not exist’ or ‘will not exist’ if they think this is appropriate.

GD: children to consider any roles that may not exist yet but will do in the future.

Check Facilitator to ensure children are making sensible decisions about the careers they are choosing to include in their tables, focusing on whether they have the existing knowledge to add their ideas. Consider whether children are starting to see patterns with the changes to the careers and the skills needed to do that role.

5 mins Review of Learning:

Slide 12:

Explain to the children that careers will continue to change however there are many things that all careers need – even ones that don’t exist yet – which we all have. Ask the children to consider the questions shown.

Slide 13:

Finally, show video of SSE apprenticeship. Explain to the children that one person’s career pathway can be very different to another’s. The best thing about being an SSE apprentice? – YouTube <https://youtu.be/QgRW1kzNG9w>

Tell the children that they are going to be looking in more detail about SSE.

How have careers changed?

How do you predict they will change in the coming years?

Will career pathways be very different because of these changes?

Slide 14:

Give each child a post-it and ask them to write what their key take away is from today’s lesson. There are some suggestions of sentence starters shown on the slide but children can also choose their own.

Check Pupils’ completed work will show how well children have understood how careers have changed over time including some of the roles that may have been added e.g. forensic scientist for police. The exit tickets show if children have been able to understand key difference between a job and a career and if they can see trends in how careers have developed over time.

Considerations for inclusive and adaptive teaching:

Pupil practise table given in two forms so facilitators can give children more guidance on the careers they choose. More able children may be given the blank version for greater choice. Extension task also provided so children can consider examples of careers that they think will be created in the future but are not available today.

Pre-teach of career-related vocabulary vital for new to English children. An adapted format of resource is available for these children where they focus on three careers available in the present and with discussion prompt to consider if they were available in the past and how they were the same / different.

Children learning EAL or with SEND may benefit from pre-teaching using the knowledge organiser for this lesson too.

CHANGING CAREERS FOR CHANGING TIMES

Changing Careers for Changing Times

Key Stage 2 (Year 5-6)

English, History, PSHE

Curriculum Links

English NC

English

- Composing and rehearsing sentences orally (including dialogue).
- Asking questions to improve their understanding
- Opportunities to write for a range of real purposes and audiences
- Noting and developing initial ideas, drawing on reading and research where necessary
- Selecting appropriate grammar and vocabulary, understanding how such choices can change and enhance meaning
- Prepare readings, with appropriate intonation
- Provide reasoned justifications for their views
- Assessing the effectiveness of their own and others' writing

History

- Note connections, contrasts and trends over time and develop the appropriate use of historical terms
- Address and devise historically valid questions about change, cause, similarity and difference, and significance
- Gain historical perspective by placing their growing knowledge into different contexts, understanding the connections between...cultural, economic...and social history; and short- and long-term timescales

Scottish NC

Expressive arts

- Express themselves in different ways and be creative
- Prepare the advanced learning and future careers by building foundations for excellence in the expressive arts
- Work co-operatively and communicate with other, and show initiative, dependability, leadership and enterprise

Health and wellbeing

- Identify when they need additional support
- Be equipped to explore different options for life beyond school and be supported so that they can make successful transitions into work, education or training

Languages

- Develop their ability to communicate their thoughts and feelings and respond to those of other people
- Develop the high level of skills in listening, talking, reading, and writing which are essential for learning, work and life
- Use different media effectively for learning and communication
- Exercise their intellectual curiosity
- Develop an awareness of audience and register, communicating successfully in ways that are appropriate to different situations

Sciences

- Recognise the impact science makes on their lives, on the lives of others, on the environment and on culture

Social studies

- Establish firm foundations for lifelong learning and, for some, for further specialised study and careers

Technologies

- Develop an understanding of technologies and their impact on society – in the past, present and future
- Experience work-related learning
- Promote enterprising behaviour and ways of learning that prepare young people for their future lives and careers

Welsh Curriculum

- Humanities
- Science and technology
- Languages, literacy and communication
- Learning about local, national and international contexts

Northern Irish Curriculum

- Languages and literacy
- The world around us
- Personal development and mutual understanding

Republic of Ireland Curriculum

- Social environment and scientific education
- Primary language
- Social, personal and health education

Big Picture:

This lesson builds upon lesson 1, in which children explored jobs, careers and how these have changed from the past and continue to do so. Children will develop an understanding of a range of careers, particularly focused on some of the current roles within SSE. They will know what SSE do and how they are an example of an organisation that offers a number of careers. They will know that different roles and these careers are changing and will be different when they are looking at potential careers in the future.

In this lesson, children will examine how the need for these careers are created, looking at different types of technology. They will build on prior knowledge in LKS2 and KS1 on how things change over time and will examine some of the key technologies / resources at work at SSE e.g. wind turbine. They will then learn about some of the people responsible for developing and maintaining these. Pupils will be examining the technology used in SSE renewables and considering the roles required to develop, maintain and improve these. They will understand that the technology – and the predicted developments of this and future technology – are major driving forces in the roles required. This will link to the final lesson where the children will start to consider their own strengths and why they might want to consider a particular career pathway.

Lesson Objective:	Assessment:	Resources:
'To identify a range of roles needed to develop or maintain vital technology'	<p>Prior knowledge will be demonstrated through the 5,4,3,2,1 starter activity.</p> <p>The mind map developed in the pupil practise part of the lesson will show the children's understanding of the roles needed to maintain difference technologies.</p>	<p>Facilitators will need to display 'lesson 2' PowerPoint on a large display screen.</p> <p>The do together resource will need to be printed off so that each pair has a copy.</p> <p>Access to mini whiteboards or rough paper is required for every child.</p> <p>All children should be able to see the knowledge organiser provided for the lesson and copies should be provided for specific children who would benefit from their own copy.</p>

Lesson Plan

Key vocabulary for the lesson:

Technology, resources, wind turbine, hydro-electric, career, career pathway, maintain, develop, skills, knowledge

Additional Adult Role:

Additional adults should support children through aiding their discussion and help them consider the work needed to develop, maintain and improve technologies.

Timing	Facilitator	Pupil
5 mins	<p>Do Now:</p> <p>Slide 3:</p> <p>Explain the 5, 4, 3, 2, 1 task to the children where they will be recapping the previous lesson- recalling their learning as prompted on the slide.</p>	<p>5,4,3,2,1</p> <p>Children talk in pairs / small groups with:</p> <ul style="list-style-type: none"> 5 examples of careers available today 4 examples of careers which were available in the past 3 things you remember about the work of SSE 2 types of technology which is important for this work 1 key difference between a job and a career <p>Through this, children will be accessing their prior learning.</p>
Check	<p>Through taking the children's ideas from this task, the facilitator will be able to identify any misconceptions and also if they have the vital knowledge for this session which is understanding that technology has a major impact on what careers are available and that there are a number of careers that do not yet exist.</p>	
10 mins	<p>Introduction:</p> <p>Slide 4:</p> <p>Discuss key words for the session: solar power, hydroelectricity and renewable.</p> <p>Slide 5:</p> <p>Explain that today, we are going to be looking at an organisation called SSE to help us better understand Jobs for the Future.</p> <p>Share the video We Power Change - YouTube</p>	<p>Children given a structure to help take in the key details about SSE:</p> <ul style="list-style-type: none"> • Who are they? • What are they trying to achieve? • What do they do? • What are their aims for the future? • What makes SSE special / unique?

Take ideas from the children and record this on a shared display.

Explain to the children that SSE have a vision for the future but in order to achieve this, they need to have people doing the roles.

Slide 6:

Share the big question and ask the children to consider this in relation to the development of technology at SSE.

Check

- What is SSE's vision? Why is this important?
- What roles do you think are important to SSE?
- Can you think of any skills or attributes people need to have a career with SSE?

15 mins

Provide Model:

Slide 7:

Show example of technology developed or maintained by SSE through showing the children the video up to 2m30seconds [Hydro: Power a Net Zero Future \(SSE COP26 Exhibition\) - YouTube](#)

Slide 8:

Show mind map structure on the slide with image of hydro-electric plant in the middle. Ask the children to give ideas of the roles needed to create, maintain and improve this.

Take ideas from the children and add this to the mind map. Complete the mind map with as much detail as possible. Important that children are questioned to go further with thinking. e.g. is it working as efficiently as it can? How do we protect habitats in the surrounding areas?

Children to devise ideas for the careers, skills, questions, technology needed for SSE to consider running a hydroelectric plant. Work in pairs or small groups for this.

Check

Through questioning, facilitator to dig deeper with the children to help them suggest further ideas and ensure they are aware of the depth they can go to with task. Example questions are:

- How was it built initially?
- What could go wrong if it isn't maintained / repaired / improved?
- Could technology be used to make maintaining this safer?

20 mins

Pupil Practise:

Slide 9:

Show the video on wind turbines and hydro [SSE Renewables | For a better world of energy - YouTube](#)

Explain that children have already looked at hydro and they will now consider the jobs, skills, questions and technology needed to develop, maintain and improve the wind turbines.

Slide 10:

Children will create a graphic organiser to form a basic structure around SSE wind turbines They will have made decisions on the roles of people key to developing and maintaining this. Children to work in pairs to record their ideas.

Going deeper task: children to consider how the roles and skills needed would change as wind turbines are initially built, maintained and then improved.

Check In a way similar to the pupil practise part of the lesson, facilitator to dig deeper with the children to help them suggest further ideas and ensure they are aware of the depth they can go to with task.

10 mins

Review of Learning:

Finish the session with a discussion-focused activity: would you rather. The facilitator can use four parts of the teaching space with each part being A, B, C or D. Alternatively, they could ask children to show their selection in another way (e.g. whiteboards, hands up). Show the statement and options on the slide and then take ideas from the children for why they have chosen that option.

Children to respond and feedback to the facilitator on:

Would you rather...?

A: choose a career now and stick to your plan

B: concentrate on building up lots of different skills

C: think about how careers are changing and work towards that

D: something else

Check Throughout this lesson, children will have shown on their worksheet whether they can see the connection between the development of technology and careers.

The final discussion task will also show the facilitator if the children can see the connection between the changes to careers and the skills they will need in the future.

Considerations for inclusive and adaptive teaching:

The do together task is recommended to be done in mixed ability pairings. Where this isn't possible, additional adult support should be given to support children with the key terms.

A vocabulary help sheet is provided for children who will need additional support for the 'do together' task. This could also be used to support pre-teaching for children who may lack the background knowledge of this vocabulary.

Children learning EAL or with SEND may benefit from pre-teaching using the knowledge organiser for this lesson too.

CELEBRATING OURSELVES

Celebrating Ourselves

Key Stage 2 (Year 5-6)

English, History, PSHE

Curriculum Links

English NC

English

- Composing and rehearsing sentences orally (including dialogue).
- Asking questions to improve their understanding
- Opportunities to write for a range of real purposes and audiences
- Noting and developing initial ideas, drawing on reading and research where necessary
- Selecting appropriate grammar and vocabulary, understanding how such choices can change and enhance meaning
- Prepare readings, with appropriate intonation
- Provide reasoned justifications for their views
- Assessing the effectiveness of their own and others' writing

History

- Note connections, contrasts and trends over time and develop the appropriate use of historical terms
- Address and devise historically valid questions about change, cause, similarity and difference, and significance

Gain historical perspective by placing their growing knowledge into different contexts, understanding the connections between...cultural, economic...and social history; and short- and long-term timescales

Scottish NC

Expressive arts

- Express themselves in different ways and be creative
- Prepare the advanced learning and future careers by building foundations for excellence in the expressive arts
- Work co-operatively and communicate with other, and show initiative, dependability, leadership and enterprise

Health and wellbeing

- Identify when they need additional support
- Be equipped to explore different options for life beyond school and be supported so that they can make successful transitions into work, education or training

Languages

- Develop their ability to communicate their thoughts and feelings and respond to those of other people
- Develop the high level of skills in listening, talking, reading, and writing which are essential for learning, work and life
- Use different media effectively for learning and communication
- Exercise their intellectual curiosity
- Develop an awareness of audience and register, communicating successfully in ways that are appropriate to different situations

Sciences

- Recognise the impact science makes on their lives, on the lives of others, on the environment and on culture

Social studies

- Establish firm foundations for lifelong learning and, for some, for further specialised study and careers

Technologies

- Develop an understanding of technologies and their impact on society – in the past, present and future
- Experience work-related learning
- Promote enterprising behaviour and ways of learning that prepare young people for their future lives and careers

Welsh Curriculum

- Humanities
- Science and technology
- Languages, literacy and communication
- Learning about local, national and international contexts

Northern Irish Curriculum

- Languages and literacy
- The world around us
- Personal development and mutual understanding

Republic of Ireland Curriculum

- Social environment and scientific education
- Primary language
- Social, personal and health education

Big Picture:

This lesson builds on the knowledge gained from the first two lessons on what is meant by a career pathway and how careers are formed by the needs of an organisation or society as a whole, including some of the work of SSE. They will understand the link between need and supply in terms of labour. This final lesson of the unit takes a closer look at the connection between skills and career pathways. It examines the idea of soft skills and hard skills and how some of these are present at the start of someone's career whereas others develop over time. Children will think about how important school is in preparing them for their future career pathway and how they will already have skills that will help them in their future career. Pupils will view a number of short videos showing employees of SSE explaining their roles and their career pathways. From this, children will identify the skills shown by these people. They will then create a piece of work showing why they would want to work for SSE and why SSE would want them. This will give the children an opportunity to celebrate their many strengths and gives a good opportunity to showcase the understanding they have gained.

Lesson Objective:

'To understand that career pathways are dependent on a wide range of skills.'

Assessment:

Children will show their understanding of the skills needed to succeed in a career through their applications.

The questioning and verbal responses at the end of the session reviews the children's understanding of the key concepts explored in the learning sequence.

Resources:

Facilitators will need to display 'lesson 3' PowerPoint on a large display screen.

All children should be able to see the knowledge organiser provided for the lesson and copies should be provided for specific children who would benefit from their own copy.

Small whiteboards or rough paper.

Small groups to have one resource sheet per pair AND three additional resource sheets for the full group.

1x application resource per child

One iPad or alternative, per pair (if choosing to make video application).

Lesson Plan

Key vocabulary for the lesson:

Application, career, career pathway, qualifications, soft skills, characteristics, strengths, personality, preferences, interests,

Additional Adult Role:

Support children in recording the key details focused on working for SSE. Where possible, work with groups to ensure they are picking out the details relevant to each part of the worksheet.

Timing

Facilitator

Pupil

5 mins Do Now

Slide 3:

Show images of hydroelectricity and wind turbines. Ask the children to think about the roles of the people who are essential to developing, maintaining and improving these assets.

Children to work in pairs or small groups to discuss prior knowledge and access the learning from the last lesson.

Check

When they have had sufficient discussion time, feedback some suggestions to the facilitator. The facilitator can then follow up their suggestions with further questions.

15 mins

Introduction:

Slide 4:

Introduce the key words for this lesson: career pathway, attributes, essential/desirable.

Slide 5:

Share the big question and ask the children to share their ideas based on their previous learning.

Slide 6:

Tell children that they are going to have the opportunity to listen to a range of people who have different roles at SSE. Explain to the children that they are going to watch the first video and they need to make notes about the person speaking about working for SSE on their whiteboards.

Show the first video (Mark, project manager)

Children to record notes based on the video using the prompts of who, what, when, where, why, how.

It is important to say to the children that they might not get information for every detail.

Once they have done this, the children should then be given time to share what they noted with their partner or group.

Check

- What did you find out about their career pathway?
- What do they do in their role?
- Did the images show you anything about their role?

20 mins

Provide Model:

Slide 7:

Show writing / notes structure. Shared write as example to reflect the SSE colleague shown in the first video. Important that none of this includes personal information e.g. gender, ethnicity – good teaching opportunity about equality and diversity in the workplace.

Using the Mark Beaman video (top left) as an example, complete the shared structure based on their role, background, what their role entails, vital skills, why this role is important, any other information.

Groups then need to watch the videos in turn and work together to complete the statements for each of the SSE employees.

Slide 8, 9, 10:

- Claire Russell, digital improvement lead
- Steph Walker, energy transition
- James Archer, business change manager

Check

The resource created in the last task is aimed at showing that there are a range of skills and a number of different roles available. Ask the children:

- What did these videos show you about career pathways?
- Did it make you think differently about your own future career?
- Are there skills needed for these roles that you know you have? Are these skills only important in these roles?

15 mins

Pupil Practise:

Slide 11:

Explain to the children that they are going to think about what they would need to do / have in order to get a role in the future with SSE. They are going to make a video application for one of the roles.

Say that when you are looking for a job / career, it is vital to think why the employer would want to work with you but it is just as important to think about why you would want to work for the employer.

Show the two questions: why would you want to work for SSE? Why would SSE want to work with you?

This would be a good opportunity to point out positives within the class such as them being hard working, being caring, communicating calmly etc.

Children then to work independently to form notes for why SSE would want to employ them and also why they would want to work for SSE. This can then be filmed in pairs using iPads or another alternative based on what is available.

Other options for the written task (would need a longer session) are:

- Could also write a cover letter
- Another option is a NCR of the roles that are available at SSE / persuasive piece 'Are you thinking...?'

Check

Throughout this time, children can write notes or write their ideas in full if they prefer. It is important that facilitators discuss children's ideas with them and encourage them to be positive about each other too. This activity is a good opportunity for positive reinforcement and celebration of individual and shared strengths. It is also important to help them understand that a job application is best possible time to show confidence in themselves and point out what they are most proud of.

5 mins Review of Learning:

Slide 12:

Use the end of this session to review the previous 3 sessions with key questioning.

NB after the session, children should be given the opportunity to watch their video applications back.

Slide 13:

Reflect on the big question as a group.

- 1) What is a job, career and career pathway?
- 2) How have jobs changed over time?
- 3) What do all employers look for in people they recruit?
- 4) How can you prepare today for the jobs you will be doing in the future?
- 5) Is there anything else you will take away from these lessons?

Check Through their applications, children need to demonstrate their understanding that there are some skills that are relevant to any position and also some that are unique to particular roles. Evidence of this in children's applications and discussion throughout will show a good understanding of the unit. This will be reinforced by the understanding shown in the verbal responses to the questions in the final task.

Considerations for inclusive and adaptive teaching:

Whether children are recording notes in preparation for a video application or completing a full written task, it is important that the writing expectations are adapted based on what is a realistic outcome for children. It may be appropriate for children to write key words only (possibly with support) and use these as their notes. Alternatively, pictures could be used as an alternative.

Children learning EAL or with SEND may benefit from pre-teaching using the knowledge organiser for this lesson too.

APPENDIX

LESSON MATERIALS

You can access all lesson materials, including PowerPoint presentations, worksheets, and knowledge organisers at SSE's careers website below or by scanning the QR code.

<https://careers.sse.com/sse-stem-primary>

