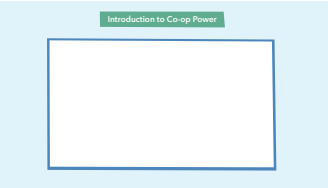
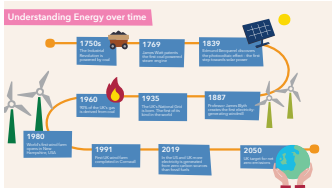
Introduction to Energy & Co-op Power

Title: Y7 Introduction to Energy and Co-op Power	
Curriculum objective(s)	To recognise and understand the importance of energy use in the home
Career objective(s)	To have an understanding of a variety of roles within the energy industry
Context	Stand alone project that we developed throughout KS3. Build an understanding of the world around us and our impact on sustainability
Resources needed	Slide deck, task brief, video links
Work related tasks	**1.** Home energy audit **2.** Reducing your carbon footprint **3.** Design an energy efficient home

Lesson 1: Energy

Sequence linked to slides	Main activities	Key questions	Teacher notes	Links to resources
	**Introduction** **Introductory video about Co-op Power and input form 2-3 colleagues on: -** Their role / job title. What they do on a day to day basis. How they got the job i.e qualifications. If possible, how their roles impacts on energy usage. Have you got an overview of all the jobs people do at Co-op Power.		For students to **listen to video** - recap key points to check understanding. Ask if they have heard of the different jobs explained to them.	Co-op Power video.
	**Exploring the topic** **Understanding energy over time.**		Teacher to explain that energy has been around since the dawn of time. The first source of energy was the sun, as it provided heat and light during the day. People rose and slept with the light, relied on wood and dung burning for heat and water power to generate.	Timeline of energy slide in slide deck.

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What are the different sources of electrical energy and how is it manufactured?	Understanding of **how energy is manufactured** and the different types of power supplies - Solar, wind, hydro, geothermal, tidal and biomass.	**What does energy efficiency mean?**	Ask the class for their initial thoughts. **Energy efficiency** simply means using less energy to perform the same task. Give 1 example i.e energy saving light bulbs and then ask the group to work in pairs, for 2 minutes, to think of other options. (smart thermostat, double glazing, insulation, timers on lamps)	Link to Co-op Power jobs from initial video and how they strive for energy efficiency.
	**Understanding of how energy gets into their homes.**	**What are the different sources of electrical energy and how is it manufactured?**	Go through images on the slide deck of each source of each source.	Slide deck - Visual - Solar, wind, geothermal, tidal, nuclear, fossil fuel.
	Start to understand their accountability on energy consumption.	**Which source of electrical energy is the most used in 2020?**	**Ask the class which source they think contributes the most in the UK?** Share handout on 'Electrical energy statistics' with the following questions to answer:- **Which source of energy has changed the most over time?** (Coal) **Which source of energy has grown the most overtime?** (Gas - although now starting to reduce) **Which renewable source of energy has grown the most over time?** (Wind & solar)	Handout on energy statistics.

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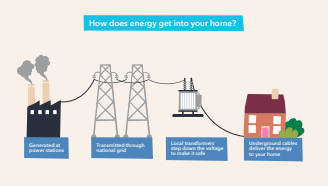
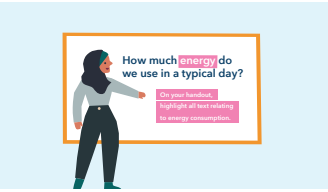
 		**How does energy actually get into the home?**	**Show you youtube link** Explain in 4 stages - students to make notes in writing or via drawings. 1. Generated at power stations. 2. Transmitted through national grid. 3. Local transformers step down the voltage to make it safe. 4. Underground cables deliver the energy to your home. Story of a typical day in the life of a student. Teacher to firstly read through **"A day in the life"** and the allow students time to read through handout highlighting all text relating to energy consumption.	https://www.youtube.com/watchv39DHRaluzM. Energy usage - A day in the life of a typical student. Slide plus handout.
	**Work related task** **A member of Co-op Power is visiting your house to complete an Energy Audit.**	**How do we work out the approximate cost of energy usage in the home?**	Go through a worked example as a class. i.e shower cost 5p per minute. They shower for 10 minutes every day therefore 0.5 x 10 = 0.5p per day Each week this is 35p (approx £18 per year) Students to individually fill in their sheet. If they want to change any of the appliances that is fine i.e hair curler!	Table within slide deck and as a handout. Homework.

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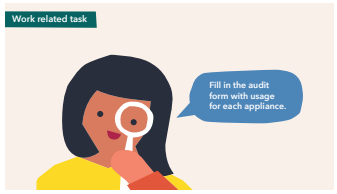		**Complete an audit of usage.**	Students need to work independently to fill in the table, not every item will be included. Once the students have entered the approx minute usage for each appliance they can then work out total cost. Share answers and look for appliances with most expenditure, appliances with least etc.	Students to complete this as a family.
Review outcomes and feedback	**What does energy efficient mean?** **What is the difference between power supplies?** **How is energy manufactured?**			

Lesson 2: Carbon Footprin

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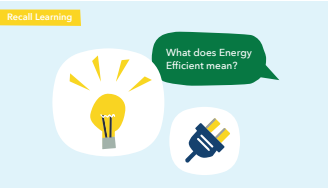
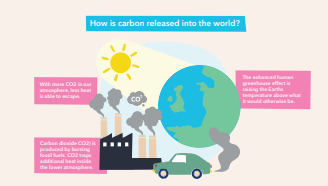
	**Knowledge recall** To recall learning undertaken in lesson 1.	**What does energy efficient mean?** **How is energy manufactured?**		
	**Introduction** **What is sustainability and carbon footprint?**	**What is sustainability?** **What is sustainable energy?**	Sustainable means ability to maintain itself overtime. Sustainable energy is energy that we will never use up or deplete.	Slide deck.
	**Exploring the topic**	**How carbon is released into our world?**	**How carbon is released into our world?** Carbon dioxide is released from many places, the main one is from burning fossil fuels (coal, oil and natural gas). Carbon dioxide (CO2) is a greenhouse gases as well, they get trapped in the atmosphere. Sun's rays that reflect off the earth can't escape back out of the atmosphere from the earth. This causes a warming effect and heats the earth up. This is called the enhanced greenhouse effect. Lots of activities contribute to this effect, the main one is burning fossil fuels, deforestation also releases lots of carbon and climate change causing ice caps to melt also releases lots of carbon.	Infographic embedded into slides. https://footprint.wwf.org.uk/#/

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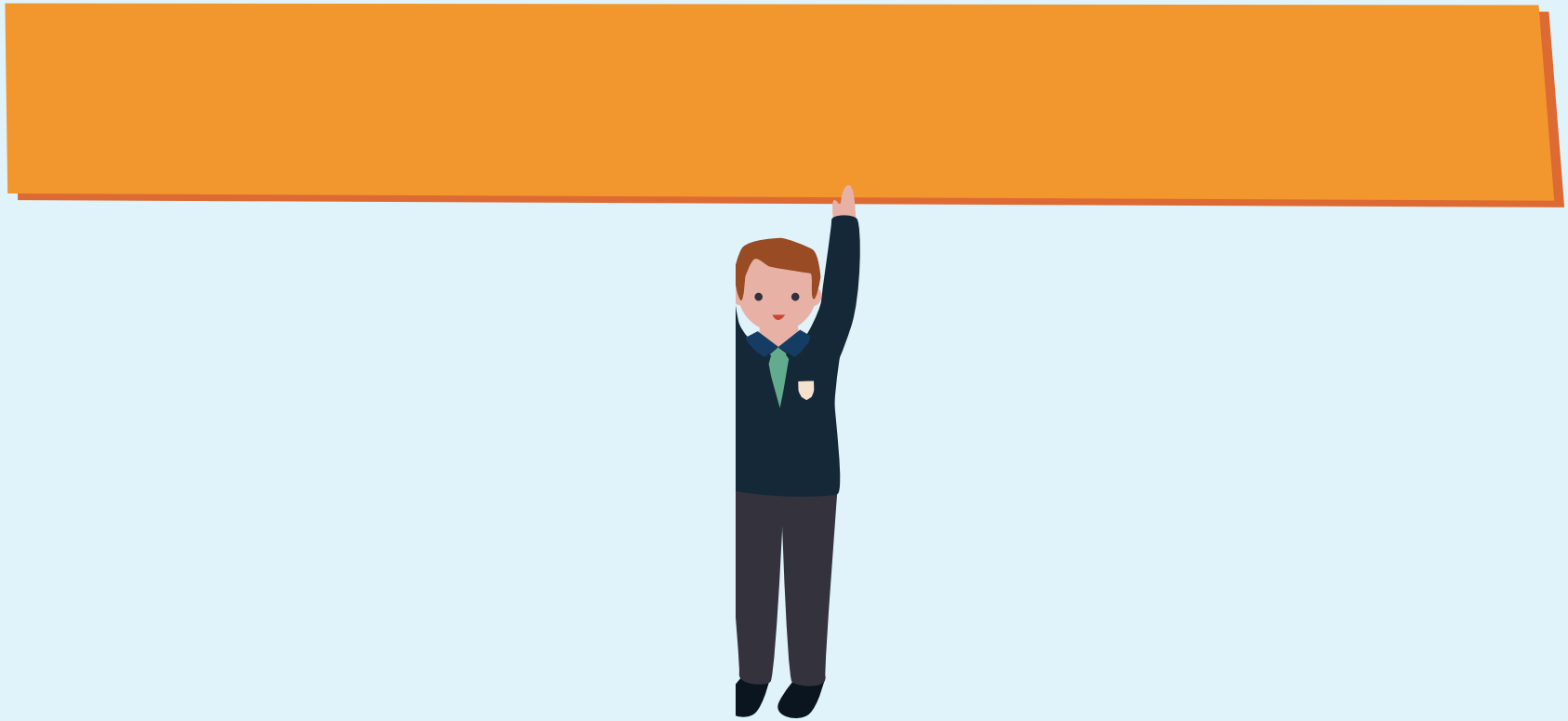
		**What is a carbon footprint?**	A carbon footprint is the total amount of greenhouse gases (including carbon dioxide) that are generated by our actions. The major contributors to carbon footprints are: food, consumption, transportation, and household energy. We are focusing on household energy. We produce greenhouse gas emissions by using electricity generated from coal, natural gas, and oil. In the home we can reduce our carbon footprint by turning d walking or cycling to school instead of driving is an eco-friendly way to travel. Another good way to reduce your footprint is by planting trees as they absorb carbon and release oxygen. Class activity - teacher led WWF Footprint Calculator producing a class carbon footprint.	You can print off the result and stick it into books.
	**Work related task** **Task - Action plan related to Energy audit**	**5 key actions that would make a difference**	Now review your previous home energy audit and from the learning that took place try to reduce your energy/carbon footprint. Students to complete action plan.	Slide deck and handout to complete. Hwk for students to complete independently/with family WWF Footprint.
Review outcomes and feedback	**What is sustainability?** **What is a carbon footprint?** **Personal reflection**			



Lesson 3: Energy Efficiency in the home

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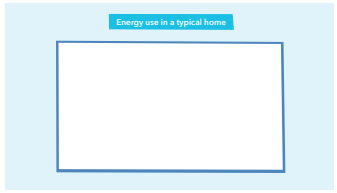
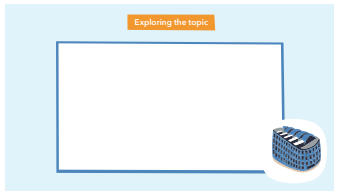
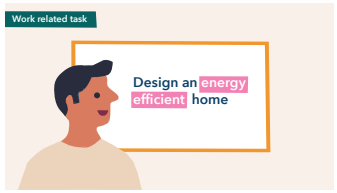
		What is sustainability? What is a carbon footprint? What 3 ways could you reduce your carbon foot in the home?		
	**Introduction** Video - demonstrating energy usage in the home	How many appliances can you spot in the home that use energy?	Students to watch video and then watch again making a list of all the appliances that used energy.	Video needed for thermal imaging.
	**Exploring the topic** Students to start to look at energy efficiency on a bigger scale - Angel Square building.		Show video of 1 Angel Square	Video to be embedded into slide deck. Specification worksheet? https://drive.google.com/drive/u/0/search?q=writing%20a%2 specification.
 	**Work related task** Design an energy efficient home	What are the key requirements we can focus on from the design brief	Launch assignment brief and as a class identify requirements from the customer. Mike Green lives in Manchester and works for Co-op Power. He does not have an energy efficient home. He is 27 years old and needs to reduce his outgoings, having a more energy efficient home will help to do this. Also, as he works for Co-op Power he understands the importance of reducing his carbon footprint.	I pads needed. Slide deck to include design brief – also available as a handout in more detail Students can use ipads to carry out research.

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			He has a hybrid model of working which means he spends half the time working from home and the other half in the office. His current home has lots of appliances that need electricity and gas to run. The home needs to generate some of its own energy and have energy efficient appliances. Students complete tasks on handout - they need to consider the information above and provide Mike with a minimum of 10 suggestions to make his home more energy efficient. Up to 6 suggestions can be related to appliances. Opportunity for students to share their suggestion as a class.	
Review outcomes and feedback	**What understanding do you now have of the importance of energy efficiency and the energy industry?**			HWK- Competition - Produce an isometric greener home design/ sketch which is annotated.