Science

WHAT THEY'LL LEARN

- The difference between fossil fuels and renewable energy sources, with different examples for each
- Why renewable energy sources including biomass are so important for the future
- What renewable energies look like
- That small changes to the way we live can help reduce how much energy we consume

Shine a light on renewable energy generation

In teaching about sustainable ways of life, we could be making the biggest difference of all, suggests **Dr Thomas Bernard**

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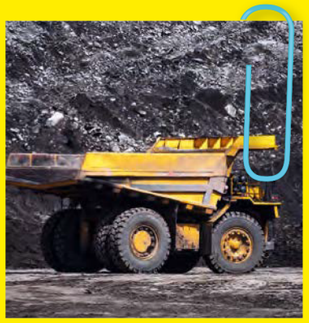
The things young children are already aware of are eye-opening, and their understanding of climate change problems is no exception. Due to its nature, shielding children from this issue can seem like the best option. However, talking and teaching about it could be a much better choice to make. Our children have a vital role to play in the planet's future, and they can bring learning to life and apply it in innovative ways. With a mixture of discussions, and hands-on fun, we can introduce children in KS1 to the wonderful world of renewable energy, and watch as they come up with their own magical ideas.

START HERE



Begin by introducing the terms *fossil fuels* and *renewable energy*. Discussion is key here to draw out the children's prior knowledge, which will inform how much time they spend on this part of lesson. Ask the children to chat with their talk partner about what they already know, and then encourage the class to share their ideas. Encourage them to give suggestions on what each heading means, and any examples of that fuel type. Make notes on a flip chart or board to make the difference clear. At this point, also address any misconceptions. Then, highlight 'renewable energy' to underline that this is the focus of the lesson; that they will learn about renewable energy sources, and why they're so important to us and our planet.

MAIN LESSON

1 | RENEWABLE ENERGY MATCHING

Begin by providing the children with a set of image cards to sort and match. These cards should include a range of renewable energy sources: the sun, wind, waves and biomass (e.g. sunflowers, algae, animal waste), along with energy collecting devices (solar panels, wind turbines, etc) and items or devices that can be powered by renewable energy. Many children will be new to the idea of plants and animal waste being a source of energy, so it's a perfect way to help them visualise the vocabulary and concepts.

Allow the children time to sort and match their cards, encouraging discussions and asking questions such as "Where have you seen solar-powered items?", "Where have you seen wind turbines to collect energy?" and "Could this energy source power that device?". Once the children have sorted and matched their cards, ask them to share their learning, and where they may have seen the renewable energy sources in real life.

2 | WHY RENEWABLE ENERGY?

Knowing why renewable energy is a better option than fossil fuels is key, because, let's face it, otherwise what is the point in switching? Where possible, support this with a storybook or a teaching video. Explore the differences between the two types of fuel and make sure the children understand that renewable sources of energy are much cleaner. Then highlight the question "What does renewable mean?" and explain the benefit of an energy source never running out.

3 | DEMONSTRATE, EXPERIMENT AND PLAY!

Now that the children understand what renewable energies are and why they're more beneficial, it's a great idea to go outside and have some fun. Set up hands-on investigation stations for children to delve into and try after you've demonstrated. While demonstrating, make it clear that if we can make heat or movement, we can generate electricity, and the more movement or heat, the more electricity we can make.

Windmills
Simple pinwheels can demonstrate wind power. Encourage children to experiment by holding a pinwheel up in different areas of the playground to see how it affects the movement. They can simulate more wind by blowing. Who can generate the most electricity by making it spin the fastest?

Solar-powered lights
Let children observe how the sun can power an item such as a garden light, or fountain. What happens if they move the light and solar cell to a shadier spot, or cover it altogether?

Water power
With a large tub of water, allow the children to make waves and tides with their hands. Add a small paddle wheel, and set the challenge of making it move or rotate. Does the paddle wheel rotate more with larger waves? And does the paddle wheel move or rotate more with a bigger tide? What causes the most paddle wheel movement?

Alternatively, you could use a spatula or similar utensil and watch its movement with the simulated waves and tides. Testing utensils of various shapes and sizes can become an investigation into which would be the most effective in producing energy.

Biofuel
The skin of citrus fruit contains the biofuel limonene. Light a candle and prepare a selection of 3cm x 3cm sections of orange, lemon, and lime skin. Hold the skin close to the flame, but not touching it, then squeeze the skin towards the flame and watch how it ignites. Encourage the children to observe and comment. Which skin contains the most limonene? Does the limonene ignite more when squeezed with more force? What might we be able to power with limonene?

Throughout the demonstration, and when children are exploring, ask questions such as, how many times can this form of energy be used? Can this source be renewed? Is it polluting? Why is this form of energy good?

4 | WHAT CAN WE DO?

As a class, make a plan of how you can reduce the amount of energy you use. Ask, "What can we do in our class to make a difference and save energy?" or "How can we introduce renewable energy into our classroom?" This could include turning off electrical items such as computers when you have finished with them, keeping windows and doors closed so the room stays warm, taking advantage of natural sunlight and turning off lights on sunny days, and making sure to reuse or recycle anything they can. Once you have made a list, assign class monitors for each area.

Dr Thomas Bernard is co-founder of STEM publishing company QuestFriendz, and co-author of the SuperQuesters *series.* **SuperQuesters: The Case of the Great Energy Robbery** *is out now.*

EXTENDING THE LESSON

- Encourage the children to keep a diary of the small changes they make at home, and when outside or in their neighbourhood. Ask them to bring it back to school to share with the class.
- Share an age-appropriate newspaper article or video about the effects of climate change. What else can the children tell you about how fossil fuels are harming the environment for us and wildlife?
- Introduce the word 'sustainability'. What does that mean and what does it look like? What would the world look like if everybody lived sustainably?
- Explore possible emotions related to climate change. How does it make them feel? Reflect and use talk as a means to share worries, but also talk about hope. Share age-appropriate stories relating to climate change succes – take a look at **positive.news/category/environment** for some examples.

USEFUL QUESTIONS

- What is the difference between fossil fuels and renewable energy?
- What are the benefits of renewable energy sources?
- Why do we need to switch to renewable energy?
- What will you do to reduce the amount of energy you use (at home and at school)?