Activity 9: Achieving sustainable energy use. What will it take?

Learning intentions

Students will think critically about how society uses energy, the problems we face in trying to achieve sustainable energy use and construct logical arguments to support what they perceive are acceptable means to achieve it.

Materials

- Logic
- Passion
- Imagination (thinking outside the box)

Teacher Notes	Teaching Notes: Running the activity
The idea is for students to think about how much of what we interact with on a daily basis is digital and that the number of digital technologies is growing all the time. This has implications for our energy consumption and the on-going problem with climate change. When students are considering what might happen should energy demand exceed our ability to generate the necessary energy, there is no right or wrong answer. Students need to support their arguments using logic and evidence (as much as their knowledge/skill allows). Get student groups to critique the arguments of other groups. There is an opportunity for role playing here where groups could play different societal roles, such as scientists, government, member of the public, UN, Nintendo/Xbox rep (gaming uses large amounts of energy), energy producer (coal, renewable), etc. Each group would need to present logic- and evidence-based arguments to support a position on how society should prioritize energy use. They would also need to understand the arguments of other groups and develop counter arguments. Other ways to reduce energy. There are three broad (technical) ways to approach the unsustainable energy consumption of digital technologies:	**Method** Get students into small groups and get them to brainstorm and consider the following questions: What things do they use that are considered digital technologies (ie anything with a computer chip in it)? How many of these technologies were analog (not digital) when their parents were children? Share the answers of each group with the class – compile the lists Based on the above, what can student say about our use and reliance on digital technologies? What might be the implications of this? Other questions for students to consider in small groups What should we prioritize if we reach that unsustainable point where we can't generate enough energy to meet the energy demand from digital technologies? Should there be restrictions on what devices we are allowed to use and when?

1. Renewable energy – increasing the efficiency of existing technologies such as wind, water and solar. There might also be new technologies out there being explored 2. Algorithms: finding algorithms that enable devices to use energy more efficiently. The simple version is sensors that switch the lights off when you leave the room or put the computer to sleep after a certain period of time. Other algorithms enable computations to be conducted in a more energy efficient way. 3. Reducing the energy consumption of the digital devices themselves. FLEET, for example, is developing novel 2D materials (materials that are just one atom thick) that will conduct electricity without any energy loss). You can read more about FLEET's research here. Another way of course, is changing human behaviour. How do our values impact on our perception of the problem and potential solutions? For instance, do the students even perceive how we consume energy from our digital devices as a problem? What are the student values, motivations behind these perceptions? How do they differ. Often this is a good exercise in how we all differ, but there is not necessarily a wrong or right answer. If this sort of discussion is facilitated in the above role play, it will often highlight the difficulty the decision makers have in finding ways to solve a social problem. That is, our values, biases affect how we perceive a problem and the acceptable means to solve it.	What are some of the other ways we can reduce or more efficiently use energy? How acceptable might these solutions be? Test your ideas out on other groups. Develop arguments to support your ways to reduce energy use and develop logical arguments against the ideas of other groups.