Embedding career education in the Victorian Curriculum F–10

Science, Levels 5 and 6

An existing learning activity linked to a particular learning area or capability in the Victorian Curriculum F–10 can be easily adapted to incorporate career education, enriching students’ career-related learning and skill development.

1. Identify an existing learning activity

**Curriculum area and levels:** Science, Levels 5 and 6

**Relevant content description:** Energy from a variety of sources can be used to generate electricity; electric circuits enable this energy to be transferred to another place and then to be transformed into another form of energy. ([VCSSU081](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCSSU081))

Scientific understandings, discoveries and inventions are used to inform personal and community decisions and to solve problems that directly affect people’s lives. ([VCSSU073](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCSSU073))

**Existing activity:** Learning about energy transfers and transformations and completing experiments exploring different energy transfers and transformations.

**Summary of adaptation, change, addition:** Exploring careers related to energy production using the example of a wind farm.

2. Adapt the learning activity to include a career education focus

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| Existing learning activity | Adaptations, changes or extensions that can be made |
| Teacher explains how energy is transferred and transformed between parts of a system, using examples that students see in everyday life.  Teacher demonstrates how flow diagrams are used to show energy transfers and transformations. | As an extension, teacher leads a discussion about the types of jobs involved in developing technology to convert renewable resources into energy, and the importance of this for society. As a class, students brainstorm what kinds of tasks might be involved in producing energy for society, and how this might be done. Teacher highlights the importance of all these people working together to ensure the goal (i.e. energy transfer and transformation) is achieved. Teacher explains that people involved in these jobs have an understanding of how energy is transferred and transformed so they are always asking, ‘How can I use this knowledge to generate electricity using renewable resources?’ |
| Teacher works through several experiments demonstrating energy transfer and transformation. Before each experiment, students should make predictions about the energy flow. During each experiment, students identify how energy moves between parts of each system.  For each experiment, teacher can provide questions to scaffold students’ thinking. For example, if demonstrating a wind-up toy, where does the energy come from? What parts of the toy does the energy move through? Where does the energy end up? | Students are introduced to wind turbines and explore how they work. They discuss the roles required for designing and developing a wind farm, the tasks performed by people in these roles, and what skills and strengths would be required by the people in these roles.  In groups, students take on the role of a team tasked with designing a wind farm and communicating to the community about the design, the benefits of wind farms and the different energy transfers and transformations that occur. Students in each group should assess their own and each other’s strengths and skills to determine which group member should be assigned which role. For example, a student who is good at drawing can work on sketching the design of the wind farm.  Teacher should facilitate a discussion around the importance of identifying strengths within a group and how assigning individuals’ different roles is often important in completing tasks well. |
| Students summarise their observations by constructing flow charts showing where the energy entered each of the objects in the experiments, what the energy moved through and where the energy ended up. | Students develop a presentation aimed at educating a community about how wind turbines work and the benefits of their use. They should describe the design of their wind farm and draw a flow diagram to demonstrate energy transfers and transformations. Their presentation should include a model of a wind turbine and an explanation of their design choices, such as why they have used a certain number of blades, or why the blades are shaped the way they are. |
| Students compare their predictions with their observations (data) and explain any discrepancies. They reflect on the usefulness and importance of qualitative (non-numerical) data in providing evidence for scientific understanding of a phenomenon. | Students reflect on their contribution to their group and if they believe working as a group positively impacted their finished product. They may also reflect on how well the group might have achieved the desired outcome if roles had been swapped. They consider the skills they used during the activity and identify ways they can develop their skills further, as well as how they can develop skills that are not yet strengths. |

Considerations when adapting the learning activity

* This activity could be done with another renewable energy source. Teacher may wish to consider which renewable energy source is being used in their community and use this to guide the activity. It may also be appropriate to give different groups different renewable energy sources.
* Teacher may wish to map out the task in manageable sections. This will give students smaller goals to work towards and help to break down the task.
* Inviting an engineer to discuss their job and how they work with other professions will assist students in understanding the broader role of engineers. Having several different engineers would be powerful in highlighting how varied the profession is.

Benefits for students

Know yourself – self-development:

* Students learn to work with others, listen to other people’s opinions, work cooperatively and make a contribution that moves the group towards their common goal.
* Students consider their strengths and skills, and identify characteristics that are not yet strengths.
* Students develop formal presentation skills.

Know your world – career exploration:

* Students learn about engineers, the work they do, and the skills and knowledge they require.
* Students understand how the work engineers do impacts society and is dependent on societal needs.

Manage your future – be proactive:

* Students learn to plan and manage their time effectively, which is required in work across various industries.