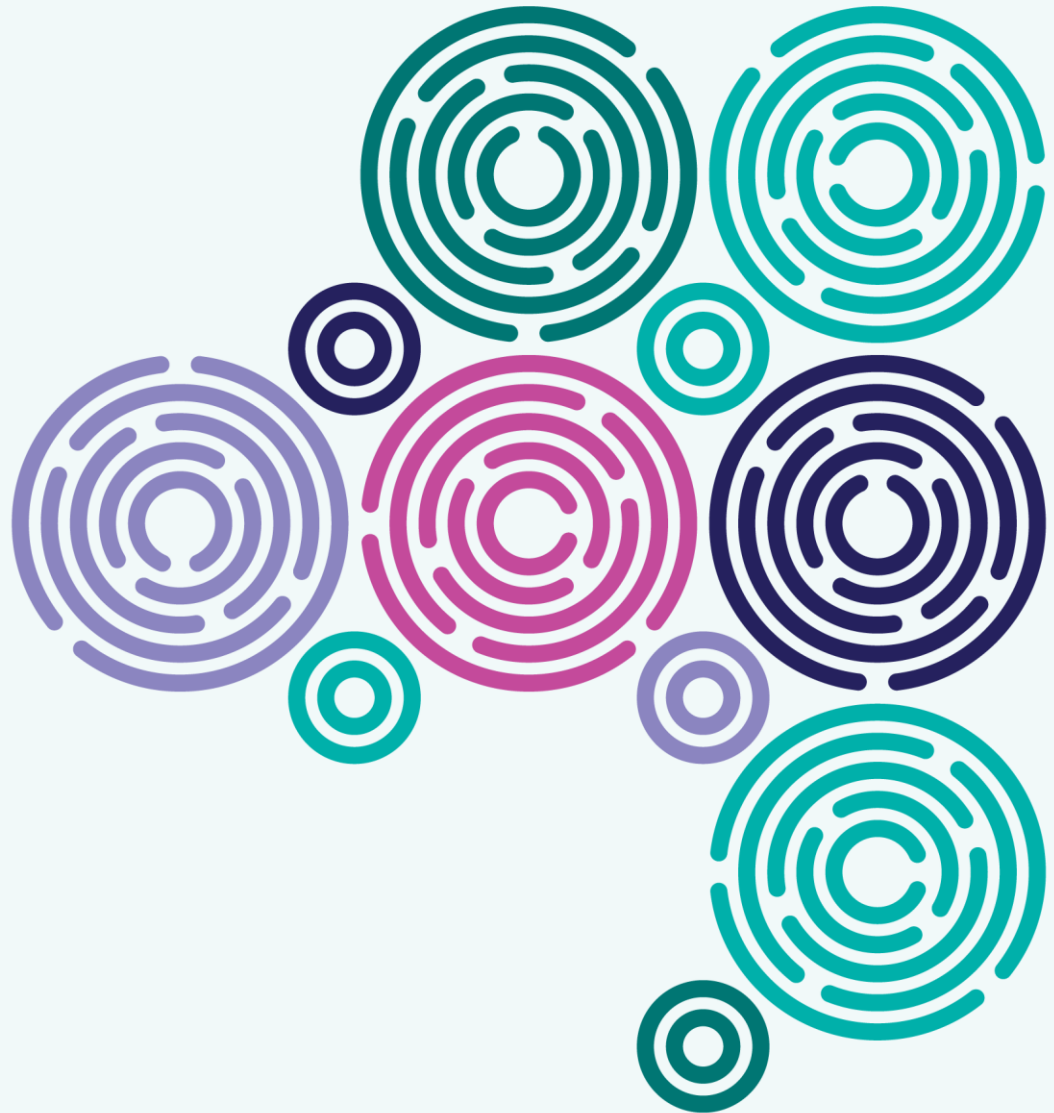


ENVIRONMENTAL SUSTAINABILITY

Classroom Content Maturity Checklist (v1.0)



EngineeringUK
INSPIRING FUTURES TOGETHER

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Purpose

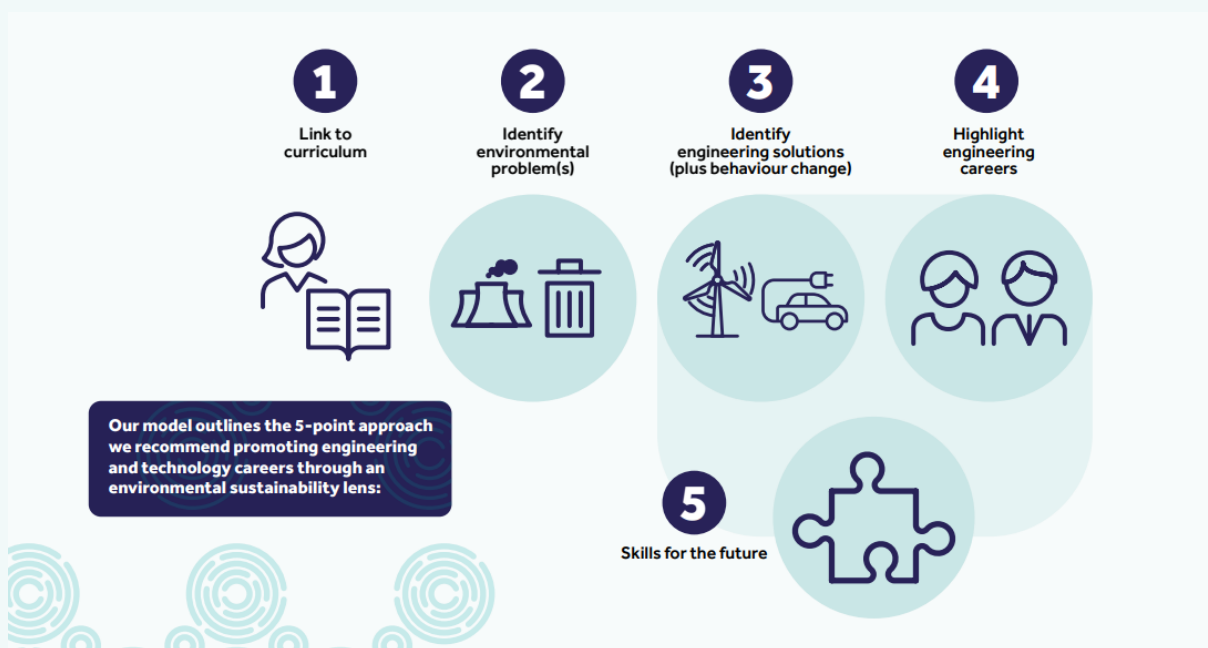
For those developing student-facing environmental STEM resources, this checklist provides a quick and easy tool to help **assess to what degree the content leverages the various opportunities to encourage students to consider a career in green engineering and technology that is designed to help address an environmental problem.** It supports EngineeringUK’s ‘Promoting Engineering and Technology Careers through Environmental Sustainability’ resource, which should be read first to provide an overview.

This checklist draws on several areas for research, particularly the ‘Science Education Tracker 2023’ (Verian et al, April 2024) as well as the findings of two research papers^{1 2}. It does not attempt to provide complete pedagogical or content development guidance; it focusses on those aspects which are relevant to a) environmental sustainability problems, and b) engineering and technology solutions.

The checklist can be used with an existing resource to identify opportunities which may have been missed, or areas which could be improved. Alternatively, it could be used to help with planning of a new resource.

Introduction

This maturity checklist is based upon EUK’s recommended approach for promoting engineering and technology careers through environmental sustainability, which includes the following five key points:



¹ Martha C. Monroe, Richard R. Plate, Annie Oxarart, Alison Bowers & Willandia A. Chaves (2019) Identifying effective climate change education strategies: a systematic review of the research, *Environmental Education Research*, 25:6, 791-812

² Wilder, R. & Soysal, N. (2023) Advancing climate action, justice and equity goals through environmental education: lessons for policy and practice from the JustEd study. Bath, JustEd.

The Checklist

The checklist of questions is meant to provide a series of prompts. Users should:

1. Indicate to what extent the content meets the criteria (by ticking 'none', 'limited' etc.). For some criteria it may be perfectly valid to score 'none'.
2. Providing evidence to support the rating in the relevant 'Evidence:' section, including any justifications for 'none'.

To what degree does the content clearly...		None	Limited	Largely	Fully
1	<p>link to the curriculum?</p> <p>Does it identify the subject(s) and the module(s) within each subject that it supports?</p> <p>Notes:</p>				
2.1	<p>describe (or encourage young people to describe) the ES problem?</p> <p>Clearly identify the ES problem (e.g. climate change, biodiversity loss, waste) and the impacts of the problem</p> <p>Notes:</p>				
2.2	<p>cover a range of ES problems, some of which will be more/less engaging to different audiences?</p> <p>For example, plastic waste, climate change and biodiversity loss might appeal to a different audience to a greater or lesser extent. Also, frame the problem differently to appeal to different motivations (e.g. housing retrofit could also be framed as a fuel poverty / social issue)</p> <p>Notes:</p>				
3.1	<p>investigate (or encourage young people to investigate) an eng/tech solution to the ES problem?</p> <p>Clearly identify the eng/tech solution and explain how it addresses the ES problem, together with any additional benefits and/or drawbacks</p> <p>Notes:</p>				

To what degree does the content clearly...		None	Limited	Largely	Fully
3.2	<p>investigate (or encourage young people to investigate) a range of eng/tech solutions to the problem, some of which will be more/less engaging to different audiences?</p> <p>For example, battery-powered aircraft may appeal to those interested in electronics, while hydrogen- powered aircraft may appeal to those interested in chemistry. This will also support wider curriculum links.</p> <p>Notes:</p>				
3.3	<p>evaluate (or encourage young people to evaluate) behaviour change(s) which would also help address the problem?</p> <p>Some eng/tech solutions (e.g. e-buses) require no behaviour change, while others (e.g. EV cars) do. Finally, some ES problems can be helped by behaviour change (e.g. eating less meat, flying less, turning down the thermostat) which should be acknowledged</p> <p>Notes:</p>				
4.1	<p>explore (or encourage young people to explore) careers that are associated with the eng/tech solutions?</p> <p>Which jobs/careers are likely to decline/change/grow?</p> <p>Notes:</p>				
4.2	<p>provide a representative range of real, young people in real green eng/tech jobs?</p> <p>Lots of examples are available in neon case studies.</p> <p>Notes:</p>				
4.3	<p>highlight the multiple routes into engineering and technology careers (e.g. T-levels, apprenticeships, university degrees)?</p> <p>Further information is available here.</p> <p>Notes:</p>				
5	<p>help young people to identify the skills associated with the eng/tech jobs and which of these they have already used?</p>				

To what degree does the content clearly...		None	Limited	Largely	Fully
	What skills do engineers need (<i>see list below table</i>)? Which of these skills have students already begun to develop?				
	Notes:				
6.1	focus on personally relevant and meaningful information and solutions? Is the content likely to resonate with the experiences of young people, and/or their local geographies? Does it highlight the social equity of different solutions (e.g. financial access)?				
	Notes:				
6.2	use active and engaging teaching methods? Do students engage in deliberative discussions? Experiential learning? Critical thinking?				
	Notes:				
6.3	address misconceptions? For example: conflating climate change and the ozone hole; the relative impacts of different responses to the climate crisis (think switching off IT monitors vs. not flying)				
	Notes:				
6.4	use simple, non-technical language? If using technical words, include an 11-year-old-friendly alternative too, e.g. "agriculture (farming)" or "aviation (flying)"		Do not use	Do not use	
	Notes:				
6.5	avoid the term "more sustainable"? If it's on the sustainable side of breakeven, simply say "sustainable". If it's on the unsustainable side of breakeven, state (e.g.) "less damaging to the environment".		Do not use	Do not use	
	Notes:				

Finally, have you undertaken a simple environmental impact assessment covering the **delivery** of the programme? This should cover:

- **Travel:** Have distances been minimised? Will any necessary travel use low-emission modes, such as public transport?
- **Materials:** Are materials low-impact / renewable where possible? Is waste eliminated or minimised?

Notes:

Skills needed by engineers

Communicating ideas	Sharing ideas and information effectively
Creativity	Using your imagination to create things
Determination	Not giving up
Innovation	Doing things differently for a better outcome
Open-mindedness	Being willing to try new things
Problem solving	Working out the best solution
Social conscience	Caring about the impact of your actions
Teamworking	Working well with other people

Glossary

Air pollution: The presence of contaminant or pollutant substances in the air at a concentration that interferes with human health or welfare, or produces other harmful environmental effects³

Biodiversity: The variety and variability of nature⁴

Circular economy: A system where materials never become waste and nature is regenerated. In a circular economy, products and materials are kept in circulation through processes like maintenance, reuse, refurbishment, remanufacture, recycling, and composting⁵.

Climate change: Long-term shifts in temperatures and weather patterns. Such shifts can be natural, due to changes in the sun's activity or large volcanic eruptions. But since the 1800s, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels like coal, oil and gas⁶.

Fossil fuels: Coal, natural gas and petroleum products (such as oil) formed from the decayed bodies of animals and plants that died millions of years ago⁷.

Global warming: Changes in the surface-air temperature, referred to as the global temperature, brought about by the [enhanced] greenhouse effect which is induced by emission of greenhouse gases into the air⁸.

Greenhouse gas (GHG): Any atmospheric gas (either natural or anthropogenic in origin) which absorbs thermal radiation emitted by the Earth's surface. This traps heat in the atmosphere and keeps the surface at a warmer temperature than would otherwise be possible⁹.

³ Source: [air pollution — European Environment Agency \(europa.eu\)](#)

⁴ Source: [biodiversity — European Environment Agency \(europa.eu\)](#)

⁵ Source: [What is a circular economy? | Ellen MacArthur Foundation](#)

⁶ Source: [What Is Climate Change? | United Nations](#)

⁷ Source: [fossil fuel — European Environment Agency \(europa.eu\)](#)

⁸ Source: [global warming — European Environment Agency \(europa.eu\)](#)

⁹ Source: [CCC-4th-Budget-Book_plain_singles.pdf \(theccc.org.uk\)](#)