Designing for a sustainable future

Unit 1 · New and emerging technologies · matches the "Designing for a sustainable future" lesson slides (about 60 minutes)

Teacher notes for someone teaching this lesson without a Design and Technology background, including a cover or supply teacher standing in for the usual class teacher.

IF YOU ONLY DO ONE THING (RUSHED COVER LESSON)

If you only do one thing: make sure every pupil can say what "Finite resource" means in their own words before the lesson ends. A resource used faster than natural processes can replace it, such as crude oil or metal ores. Ask two or three pupils to explain it back to you - do not just ask "does that make sense?".

Key facts in plain language

These are the facts this lesson depends on. They are written in plain English, not subject jargon, so you can say them in your own words while you teach.

Finite resource:
A resource used faster than natural processes can replace it, such as crude oil or metal ores.

Renewable resource:
A resource that can be replenished when it is managed responsibly, such as timber from replanted forests.

Life cycle assessment:
Considering environmental impact across raw material, manufacture, distribution, use and end of life.

Product miles:
The distance materials, components and products travel.

Kaizen:
Continuous improvement through many small changes.

Common misconceptions

Drawn from the wrong answers pupils pick in this lesson's own question bank, paired with the explanation that is already written for the right answer.

Pupils may think: "Crude oil" is correct.
Why it is wrong: the correct answer is "Timber". Timber can be replenished by responsible forestry. Oil and metal ores are finite on human timescales.

Pupils may think: "Distribution" is correct.
Why it is wrong: the correct answer is "Use". A refrigerator consumes electricity continuously throughout its life, so the use stage usually dominates.

Pupils may think: "Switch from sea freight to air freight" is correct.
Why it is wrong: the correct answer is "Source materials closer to the factory". Shorter supply chains reduce the distance materials and products travel.

Pupils may think: "It is always made from crude oil" is correct.
Why it is wrong: the correct answer is "It may need industrial composting to break down". Many compostable materials only break down in industrial facilities, and making them still uses resources and energy.

Pupils may think: "One major redesign every few years" is correct.
Why it is wrong: the correct answer is "Continuous improvement through small changes". Kaizen is a culture of ongoing, incremental improvement.

Talking points to follow the slide deck

The slide deck for this lesson follows the usual DT Classroom shape: a retrieval starter, then each key term below in turn, worked examples, exam-style practice, then an exit ticket. Use these lines as you reach each part - they are the same facts as above, just phrased as something you can say out loud.

When the deck reaches "Finite resource": say — A resource used faster than natural processes can replace it, such as crude oil or metal ores. Ask: "can someone give me an example?"

When the deck reaches "Renewable resource": say — A resource that can be replenished when it is managed responsibly, such as timber from replanted forests. Ask: "can someone give me an example?"

When the deck reaches "Life cycle assessment": say — Considering environmental impact across raw material, manufacture, distribution, use and end of life. Ask: "can someone give me an example?"

When the deck reaches "Product miles": say — The distance materials, components and products travel. Ask: "can someone give me an example?"

When the deck reaches "Kaizen": say — Continuous improvement through many small changes. Ask: "can someone give me an example?"

Worked answers to this lesson's questions

The same question bank used for this lesson's knowledge organiser self-check and worksheet exam practice. Use this page as the answer key, or cover the right-hand explanation and hand out the questions as a silent task (see the cover lesson box below).

1. Which resource can be renewable when it is managed and replanted responsibly?

a) Crude oil, b) Iron ore, c) Bauxite, d) Timber

Answer: d) Timber. Timber can be replenished by responsible forestry. Oil and metal ores are finite on human timescales.

2. For a refrigerator used for many years, which stage can contribute a large share of its life-cycle energy impact?

a) Use, b) Distribution, c) Disposal, d) Packaging

Answer: a) Use. A refrigerator consumes electricity continuously throughout its life, so the use stage usually dominates.

3. Which action directly reduces product miles?

a) Switch from sea freight to air freight, b) Source materials closer to the factory, c) Use more suppliers spread across the world, d) Make the packaging fully recyclable

Answer: b) Source materials closer to the factory. Shorter supply chains reduce the distance materials and products travel.

4. Why is "compostable" packaging not automatically low impact?

a) It is always made from crude oil, b) It releases harmful toxic gases whenever it is composted, c) It may need industrial composting to break down, d) It cannot be printed or coloured

Answer: c) It may need industrial composting to break down. Many compostable materials only break down in industrial facilities, and making them still uses resources and energy.

5. What does kaizen mean?

a) Continuous improvement through small changes, b) One major redesign every few years, c) Making parts only at the moment they are needed, d) Holding large stocks to avoid delays

Answer: a) Continuous improvement through small changes. Kaizen is a culture of ongoing, incremental improvement.

READY-TO-RUN COVER LESSON

Project the existing lesson slides as normal; read the key facts and talking points above before the lesson starts.

Low-prep silent task (needs no workshop tools or machinery): write or display the numbered questions above without the "Answer:" line, and have pupils answer them in silence on paper. Mark from the answers above at the end, or next lesson.

If the lesson plan calls for tools, machinery, heat or anything hands-on, do not run that part as a non-specialist cover teacher - set the silent task above instead and leave the practical for the subject teacher. See the general workshop safety guide in the Teachers hub.