Unit challenge: choosing materials

Unit 3 · Materials · matches the "Unit challenge: choosing materials" 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 "Property" means in their own words before the lesson ends. A characteristic of a material, such as hardness or toughness. 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.

Property:
A characteristic of a material, such as hardness or toughness.

Hardness:
Resistance to scratching and wear.

Toughness:
Ability to absorb impact without breaking.

Trade-off:
Gaining one benefit means accepting a drawback.

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: "Ductility" is correct.
Why it is wrong: the correct answer is "Hardness". Hardness is resistance to wear and scratching.

Pupils may think: "Lead" is correct.
Why it is wrong: the correct answer is "Aluminium alloy". Aluminium alloys have a high strength-to-weight ratio.

Pupils may think: "Malleability" is correct.
Why it is wrong: the correct answer is "Toughness". Toughness lets it absorb impact without breaking.

Pupils may think: "It is waterproof without a coating" is correct.
Why it is wrong: the correct answer is "It reduces the use of new raw materials". Recycled material reduces environmental impact.

Pupils may think: "Lean manufacturing" is correct.
Why it is wrong: the correct answer is "A trade-off". Every material choice balances cost, performance, appearance and sustainability.

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 "Property": say — A characteristic of a material, such as hardness or toughness. Ask: "can someone give me an example?"

When the deck reaches "Hardness": say — Resistance to scratching and wear. Ask: "can someone give me an example?"

When the deck reaches "Toughness": say — Ability to absorb impact without breaking. Ask: "can someone give me an example?"

When the deck reaches "Trade-off": say — Gaining one benefit means accepting a drawback. 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 property describes resistance to scratching?

a) Ductility, b) Hardness, c) Elasticity, d) Toughness

Answer: b) Hardness. Hardness is resistance to wear and scratching.

2. A bike frame must be light and strong. Which is the best choice?

a) Lead, b) Cast iron, c) MDF, d) Aluminium alloy

Answer: d) Aluminium alloy. Aluminium alloys have a high strength-to-weight ratio.

3. A child's toy must not shatter when dropped. Which property matters most?

a) Malleability, b) Stiffness, c) Hardness, d) Toughness

Answer: d) Toughness. Toughness lets it absorb impact without breaking.

4. Why might a designer choose recycled card for packaging?

a) It reduces the use of new raw materials, b) It is waterproof without a coating, c) It is always stronger than new card, d) It gives a brighter white print surface

Answer: a) It reduces the use of new raw materials. Recycled material reduces environmental impact.

5. Choosing a cheaper but heavier material is an example of…

a) Lean manufacturing, b) A trade-off, c) Planned obsolescence, d) Market pull

Answer: b) A trade-off. Every material choice balances cost, performance, appearance and sustainability.

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.