Improving functionality

Unit 4 · Common specialist technical principles · matches the "Improving functionality" 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 "Reinforce" means in their own words before the lesson ends. Add material or parts to make something stronger. 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.

Reinforce:
Add material or parts to make something stronger.

Stiffen:
Reduce how much something bends.

Lamination:
Bonding layers together to improve strength.

Corrugation:
Folds or flutes that add stiffness to thin sheet.

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: "It has a waterproof coating" is correct.
Why it is wrong: the correct answer is "The fluted layer resists bending". The wave shape spreads load and resists bending.

Pupils may think: "Lets it fold flat" is correct.
Why it is wrong: the correct answer is "Reinforces it". Triangles keep the joint rigid.

Pupils may think: "Moulding" is correct.
Why it is wrong: the correct answer is "Lamination". Layers are bonded with the grain alternating.

Pupils may think: "Its solid section has no weak points" is correct.
Why it is wrong: the correct answer is "Material sits where bending stress is highest". Flanges at top and bottom carry most of the stress.

Pupils may think: "Lowers its strength" is correct.
Why it is wrong: the correct answer is "Stiffens it". Folds increase stiffness, like a flanged tray.

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 "Reinforce": say — Add material or parts to make something stronger. Ask: "can someone give me an example?"

When the deck reaches "Stiffen": say — Reduce how much something bends. Ask: "can someone give me an example?"

When the deck reaches "Lamination": say — Bonding layers together to improve strength. Ask: "can someone give me an example?"

When the deck reaches "Corrugation": say — Folds or flutes that add stiffness to thin sheet. 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. Why is corrugated card stiffer than flat card of the same weight?

a) It has a waterproof coating, b) It is pressed denser than flat card, c) The fluted layer resists bending, d) It is made from thicker fibres

Answer: c) The fluted layer resists bending. The wave shape spreads load and resists bending.

2. Adding a triangular gusset to a corner joint…

a) Lets it fold flat, b) Makes it more flexible, c) Makes it lighter, d) Reinforces it

Answer: d) Reinforces it. Triangles keep the joint rigid.

3. Plywood is an example of…

a) Moulding, b) Galvanising, c) Lamination, d) Corrugation

Answer: c) Lamination. Layers are bonded with the grain alternating.

4. An I-beam is efficient because…

a) Its solid section has no weak points, b) Material sits where bending stress is highest, c) Its thin central web carries most of the stress, d) Its round shape spreads load evenly

Answer: b) Material sits where bending stress is highest. Flanges at top and bottom carry most of the stress.

5. Folding the edges of a metal sheet…

a) Lowers its strength, b) Makes it more ductile, c) Makes it more flexible, d) Stiffens it

Answer: d) Stiffens it. Folds increase stiffness, like a flanged tray.

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.