

Name _____

Class _____

Date _____

By the end of this worksheet I can...

- ☐ describe how to model a component with extrude and revolve, giving all dimensions
- ☐ describe how to model a component using loft, sweep and helix
- ☐ describe shell, subtract, fillet and chamfer edits in the right order
- ☐ describe models using helix and extrude along a path, including pitch and revolutions
- ☐ use add, subtract, intersect, mirror and array (linear, box, radial)
- ☐ explain modelling terms: work plane, profile, axis, feature, datum, suppress, modelling tree

I DO

Worked example Read how a full-mark answer is built

A cylindrical pen pot is $\varnothing 50$ and 50 tall. It has a $\varnothing 35$ hole 40 deep from the top, a $2.5 \times 45^\circ$ chamfer on the top edge and a R2 fillet on the bottom edge.

1 Describe how the pen pot would be modelled using 3D CAD. (5 marks)

Full-mark answer each ✓ is one mark

Sketch a $\varnothing 50$ circle on the base work plane ✓ and extrude it 50 ✓. On the top face, sketch a $\varnothing 35$ circle and extrude-subtract it 40 ✓. Chamfer the top outer edge $2.5 \times 45^\circ$ ✓ and fillet the bottom edge R2 ✓.

Why marks are not awarded

"Draw a circle and extrude it. Cut out the middle. Add a chamfer and a fillet."

1 mark at most: no sizes, "cut out" is not a CAD term, and the edges for the chamfer and fillet are not identified.

WE DO

Guided practice Use the starters and word bank to help you

2 State the Boolean operation that keeps only the volume where two solids overlap. (1 mark)

Sentence starters

1. ...

Word bank

Intersect

Tip: 1 marks = 1 separate, developed points.

YOU DO**On your own** No notes. Check your answers afterwards.**3 Quick check: tick one box for each.**

- a) Which Boolean keeps only the overlap of two solids?
☐ Add ☐ Intersect ☐ Subtract ☐ Shell
- b) For a revolve, which TWO things carry marks?
☐ Colour and material ☐ Fillet and chamfer ☐ Centre axis and angle ☐ Work plane and zoom
- c) Joining a large circle to a smaller circle on an offset plane is a...
☐ Revolve ☐ Loft ☐ Extrude ☐ Subtract
- d) A wine glass stem with a curved profile is best made with...
☐ Extrude ☐ Chamfer ☐ Shell ☐ Revolve

4 Key terms: write the letter of the matching description next to each term.

1. Extrude	_____	A Pull a 2D profile out to a set distance to make a solid.
2. Revolve	_____	B Hollow a solid to a wall thickness, removing chosen faces.
3. Loft	_____	C Profile swept in a spiral around an axis; give two of pitch, revolutions and height.
4. Shell	_____	D Rotate a profile around an axis; state axis and angle.
5. Extrude subtract	_____	E Join two or more profiles on offset work planes.
6. Helix	_____	F Remove material using a profile, e.g. for a hole or slot.

A counterweight was modelled by extruding an ellipse sketched on work plane 2. The client now wants a 24 A/F hexagon instead.

5 Describe how the model should be changed. (2 marks)

A rectangular sign holder has a curved top edge.

6 Describe two different ways the curved top could be created in 3D CAD. (3 marks)

A spring is made from Ø3 wire. It has 11 coils, a coil pitch of 20 and an outside radius of 26.5 (centre of wire 25 from the axis).

7 Describe how the spring would be modelled. (3 marks)

Check and reflect

Mark your answers with the answer sheet. Go back to the checklist on the site and re-rate each “I can” statement above. Which one still needs work?
