

Name _____

Class _____

Date _____

By the end of this worksheet I can...

- ☐ assemble components with mate, align and centre axis
- ☐ use orientate, offset and tangent constraints to fully constrain an assembly
- ☐ explain top-down and bottom-up modelling and sub-assemblies
- ☐ explain STEP, IGES, DXF and 3DS file types

I DO**Worked example** Read how a full-mark answer is built

A wheel is fitted onto an axle and pushed against the side of a bracket, with its outer face level with the bracket's outer face.

1 State the three assembly constraints used. (3 marks)**Full-mark answer** each ✓ is one mark

Centre axis, to line the wheel hole up with the axle ✓. Mate, to bring the wheel face against the bracket ✓. Align, to make the outer faces level ✓.

Why marks are not awarded

"Line up, push together and make level."

0 marks: the course specification terms must be used.

WE DO**Guided practice** Use the starters and word bank to help you

An engineer produces orthographic drawings directly from a 3D CAD assembly.

2 Describe two advantages of producing the drawings from the 3D model. (2 marks)**Sentence starters**

One ... is ..., which means ...
Another ... is ..., so ...

Word bank

dimensions · always · automatically ·
accurate · straight · changed · update ·
drawings

Tip: 2 marks = 2 separate, developed points.

YOU DO

On your own No notes. Check your answers afterwards.

3 Quick check: tick one box for each.

- a) Which constraint lines up a pin with a hole?
☐ Mate ☐ Align ☐ Centre axis ☐ Fillet
- b) Two faces level with each other, facing the same way, is...
☐ Align ☐ Mate ☐ Centre axis ☐ Chamfer
- c) Which format would you send to a company using different CAD software?
☐ JPG ☐ STEP ☐ DOCX ☐ PNG
- d) Modelling parts inside the assembly so changes update related parts is...
☐ Bottom-up ☐ Exploded ☐ Top-down ☐ Suppressed

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

1. Mate	_____	A Two faces brought together facing each other.
2. Align	_____	B Two faces made flush, facing the same way.
3. Centre axis	_____	C Lines up the axes of two round features.
4. Orientate	_____	D Parts modelled in the assembly referencing each other; changes update automatically.
5. Offset constraint	_____	E Sets an angle between two parts.
6. Top-down modelling	_____	F Sets a distance between two faces.

A needle cartridge is modelled in position by projecting the hole sizes from the tonearm head (top-down modelling).

5 Explain two benefits of modelling in this way. (2 marks)

A supplier sends a 3D model of a motor to a company that uses different CAD software.

6 State a suitable file format and explain why it is used. (2 marks)

A tonearm assembly has a base, an axle and a main arm. The arm pivots on the axle and is set at 20° to the base, 13 from the base's inner edge.

7 Describe how the tonearm would be fully assembled. (4 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?
