

## Activity Plan & Guidance (KS3 & KS4)

### Learning Objectives

- Recognise why narrowboats have distinct design features.
- Understand how 2D technical drawings are used to represent 3D shapes.
- Learn how to use **plans** and **elevations** to gather mathematical information.

### Resources

- [Boat Plans PowerPoint Presentation](#)
- [Isometric Drawings & Elevations Activity Sheet](#)
- [Boat Design Online Activity](#)

### Activities

<b>Starter</b>	<ul style="list-style-type: none"> <li>• Use the 'Boat Plans PowerPoint Presentation' to discuss distinctive design features of a narrowboat. N.B. modern narrowboat sizes vary but can be up to 2.08m in width and 21.95m in length.</li> <li>• Find out what learners know about plans and elevations; use slides 6–9 to recap.</li> <li>• Work through the tasks on sides 10–15 as a group.</li> </ul>
<b>Task</b>	<ul style="list-style-type: none"> <li>• Use the 'Isometric Drawings &amp; Elevation Activity Sheet' to run the main task.</li> <li>• Learners will work out the total dimensions of the narrowboat from a scale isometric drawing. Answer: 13m x 2m x 2.5m.</li> <li>• Learners will identify 3D shapes. Answer: 1 Triangular prism and 2 Cuboids.</li> <li>• Learners will complete the front elevation and plan view and add measurements to the drawing based on the given scale.</li> <li>• Some learners will be able to complete the 'Extra Challenge'.</li> </ul>
<b>Embed</b>	<ul style="list-style-type: none"> <li>• Use the 'Boat Design Online Activity' to experiment with plans and elevations. The surface area questions at the end of the activity also help to add further 'real-life' examples to this STEM activity.</li> </ul>

### Suggestions

- Use the topic of canals and narrowboat design constraints to put the information into context and to provide real-life examples.
- Learners may need a refresher on finding the volume of a cuboid and a triangular prism (volume = base area x height).

### Plenary

Students could use page 2 of the 'Isometric Drawings & Elevation Activity Sheet' to create their own boat design. Ask students to justify their design choices. Think about different hull designs or cabin area shapes.

### KS3/4 Curriculum Links

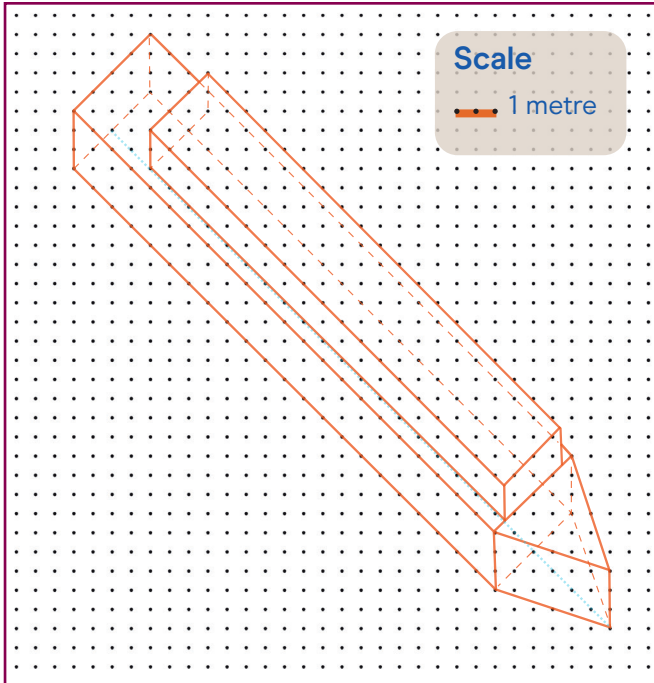
- KS3 Maths
- Geometry and measures (use the properties of faces, surfaces, edges... to solve problems in 3-D)
- KS4 Maths
- Geometry and measures (construct and interpret plans and elevations of 3D shapes)

### Useful links/extra resources

- [Canal & River Trust STEM learning resources](#)

## Isometric Drawings & Elevations

Look at the isometric drawing of the narrowboat and complete the front elevation and plan view.



### Dimensions

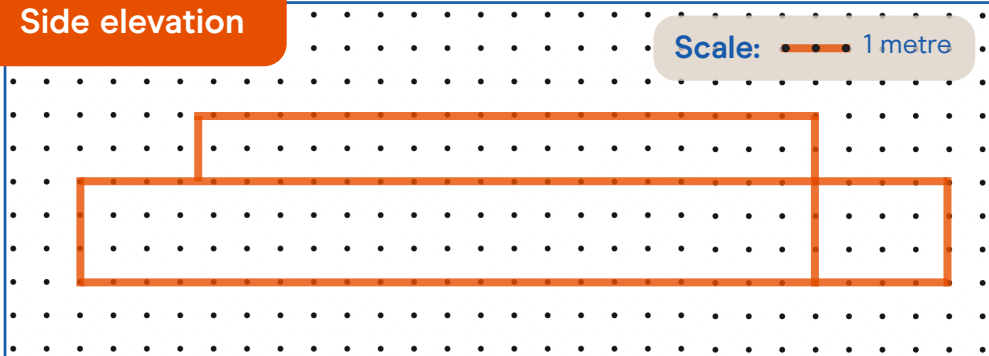
What are total dimensions of the narrowboat?  
Tick the correct box (length x width x height)

- 13m x 2m x 2.5m
- 10m x 4m x 3m
- 15m x 3m x 2m

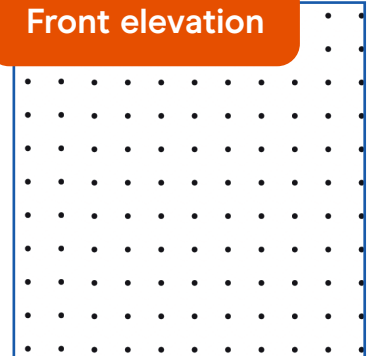
How many of these 3D shapes can you see in the isometric drawing?

- Triangular prism
- Square pyramid
- Cube
- Tetrahedron
- Cuboid

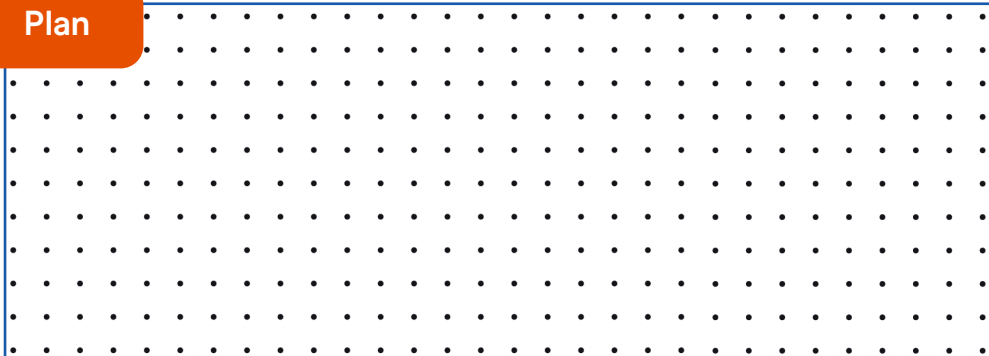
### Side elevation



### Front elevation



### Plan

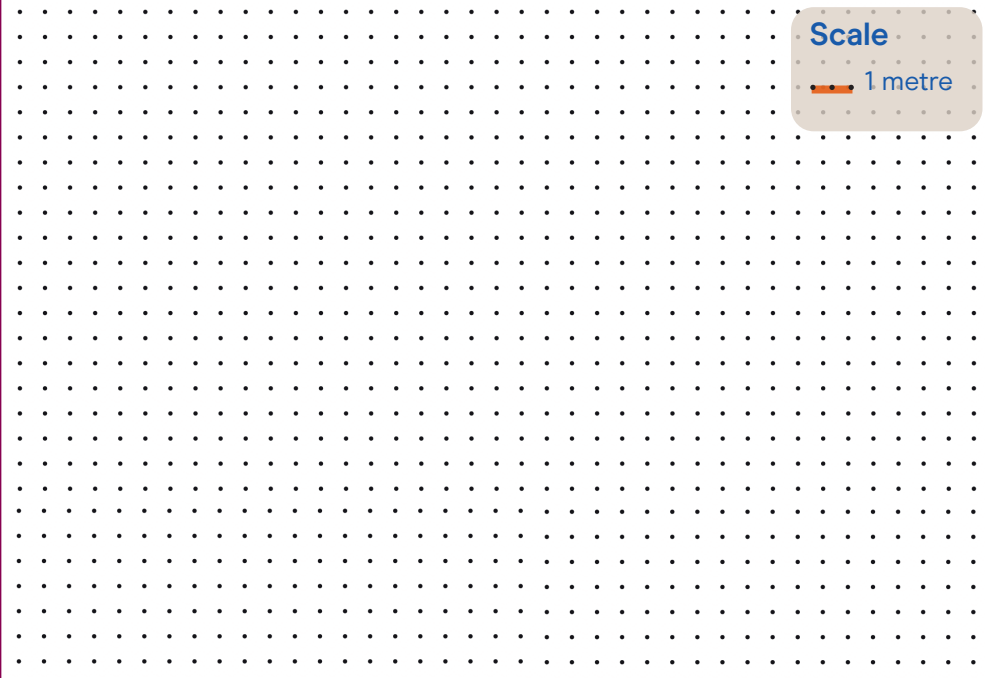


Add measurements to your drawings.

### Extra Challenge!

Using your knowledge of 3D shapes, can you work out the total volume of the boat?

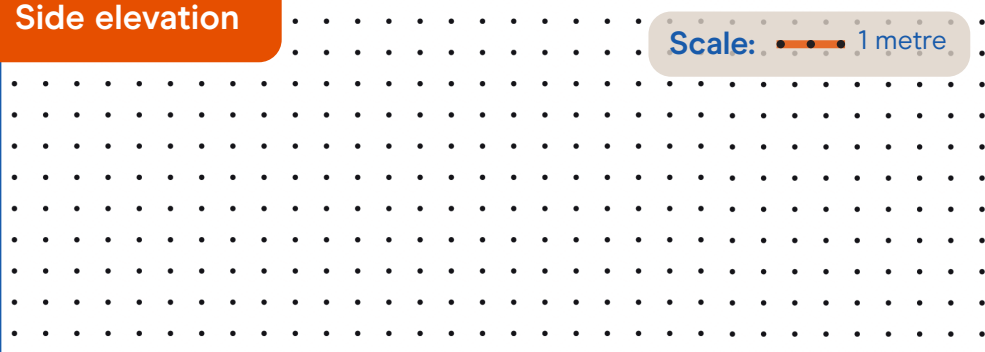
## Create Your Own Design: Isometric Drawings & Elevations



Scale: 1 metre

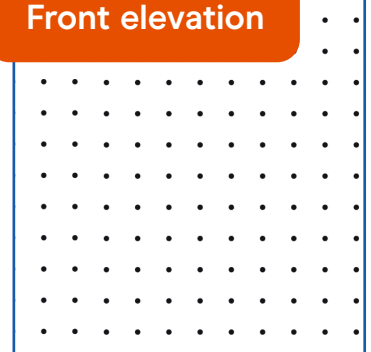
Use this space to create your own isometric drawing of a different boat. Why not try a new hull shape or cabin design?

Side elevation

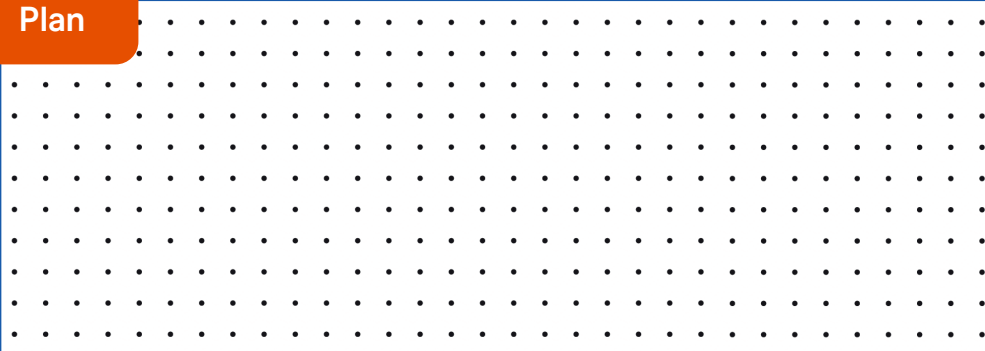


Scale: 1 metre

Front elevation



Plan



Complete the elevations and plan view of your design.

Add measurements to your drawings.