Mathematical modelling to solve practical problems involving proportion and scaling...

use mathematical modelling to solve practical problems involving proportion and scaling of objects; formulate problems and interpret solutions in terms of the situation; evaluate and modify models as necessary, and report assumptions, methods and findings

Learning intention

- use mathematical modelling to solve practical problems involving proportion and scaling of objects; formulate problems and interpret solutions in terms of the situation...

Teach and model

- using plans and elevation drawings to investigate making changes to building designs, employing appropriate scales and converting to actual measurements within...
- analysing and applying scale and ratios in situations such as production prototypes and 3D printing; for example, using a 3D printer to produce scaled versions of actual objects
- estimating the scale of an object, such as a toy car, by measuring a linear dimension and using a typical car dimension to work out the scale factor

Check understanding

- Explain the main idea in mathematical modelling to solve practical problems involving proportion and scaling... using an example.
- Show the idea in a second way: with words, a model, a diagram or symbols.
- Apply the idea to a short unfamiliar situation and justify the result.

Teaching cautions

- Ask the student to explain their choice, not only state an answer.
- Check that key vocabulary is understood in a new example.
- Mix representations so the skill is transferred rather than copied.

Quick lesson sequence

- Connect to prior knowledge and introduce the key vocabulary.
- Model one clear example, then solve a second example together.
- Finish with an independent check and a short student explanation.