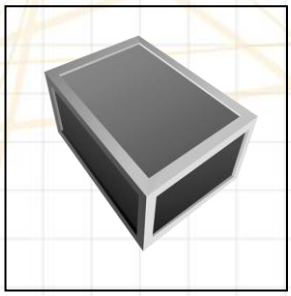
Lesson 3: Further problems

Resource 3.4

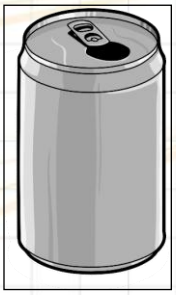
Alternative or further problems or homework

It is now your job to build another new stage from some of the materials found around the festival site.



Crates

length: 60 cm
width: 40 cm
height: 30 cm



drink cans

base radius: 4 cm
height: 12 cm

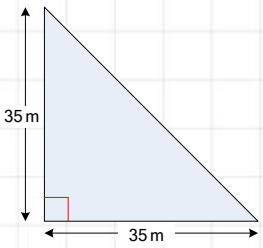
1 You have 1000 empty drink cans to build a scale model of a stage.
The model will be a cuboid with height (h), width (w) and length (l), subject to $h \leq w \leq l$.

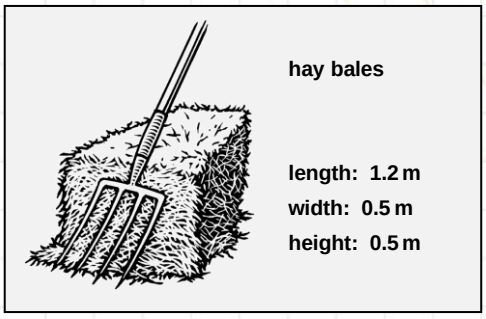
a How many different models could you make with 1000 cans?
How many cans will fit along the height, width and length of each possible model?

b Choose the model that you will use to make the real stage.
Explain why you chose that particular model.

c The actual stage will be made by replacing each can in your chosen model with a crate.
What could the actual size of the stage be? Which one do you think would be best, and why?

2 A triangular stage has been built across a right-angled corner of a field.
The stage floor is an isosceles triangle.





The stage floor needs to be raised by 1.2 m so that the audience will have a better view.
The site manager wants to know the maximum number of hay bales needed to support the stage floor without sticking out at the edges. Only whole hay bales may be used.
What would you advise her?

Extension problem

3 You have decided to build a triangular stage using the middle of one side of the field as one side of the triangle. You have two sets of lighting strips, one 30 m long and one 40 m long, which will form the other two sides of the triangle. What is the maximum possible area of the stage?