Activities on Understanding Linear Rates of Change

1. (i) Two cylindrical containers, *A* and *B* are being filled with water.
The volume of water increases at the same rate in both and the height of both containers is 12 cm. Sketch a graph to show the rate at which the height of the water level changes with time for both containers. Put both containers on one graph.
Container *A* is full after 6 seconds and container *B* is full after 24 seconds.
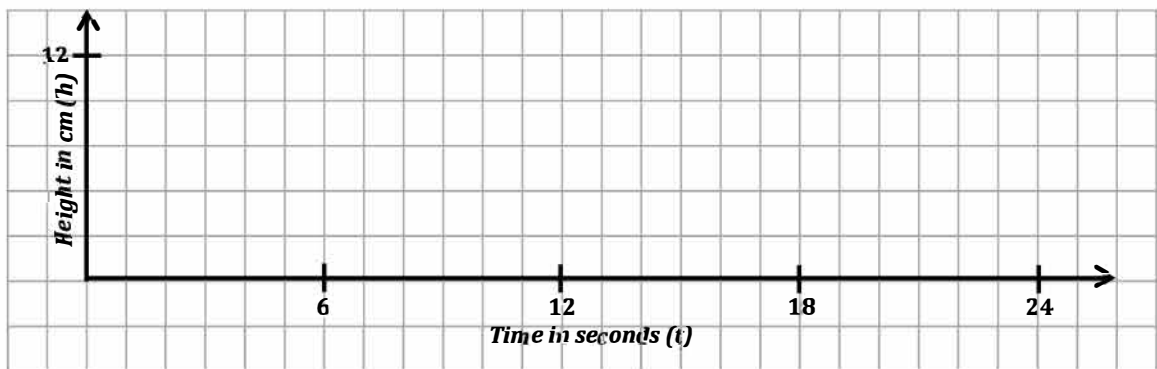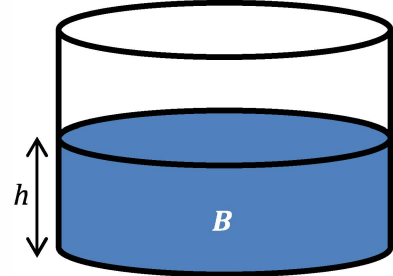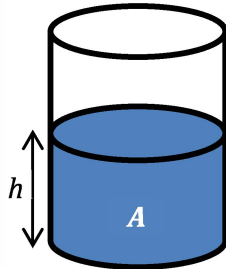
**(ii)** Why does it take container *B* longer to fill?

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2. (i) Water flows into a vessel in the shape of an inverted cone as shown below.
The volume of water increases at the same rate as for the two cylinders above.
The vessel has the same height and radius as container *B*.
How long will it take to fill the vessel?

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(ii) As water is poured into the vessel, sketch a rough graph to show how the height of the water level changes with time.
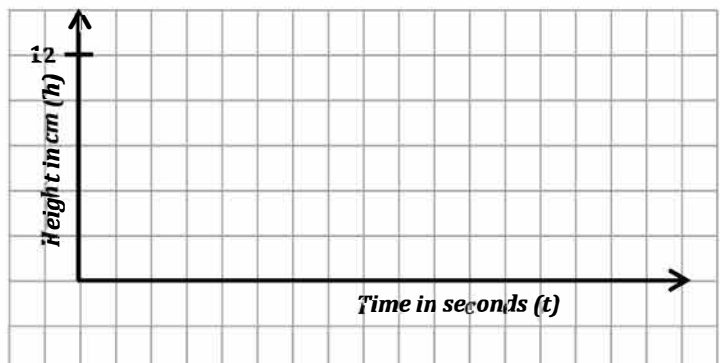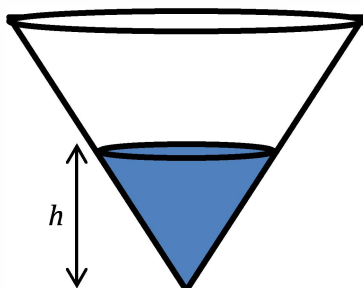
Some Transition Year students decide to carry out an experiment on constant speed. They have a class discussion on where they might see a model for constant speed. They decide that if they go to a train station and choose a train that is not scheduled to stop there, that the train will most likely pass them at a constant speed. Two students from the class arrange to stand 100 meters apart at either end of the platform and time the train between these two positions.

100 metres
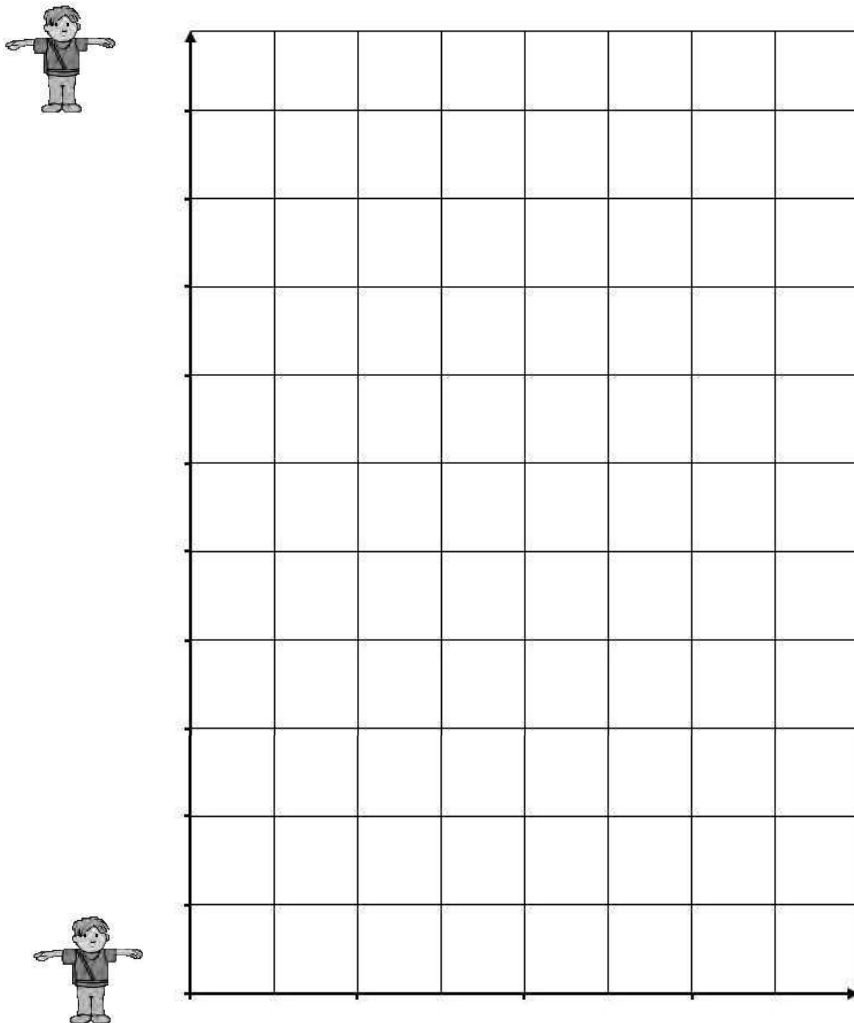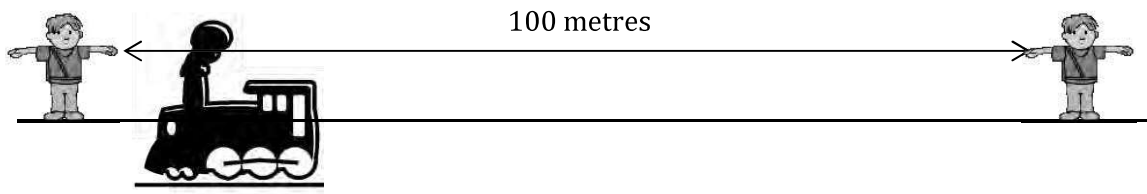
2. At what speed does the train pass the two students in km/hour?

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3. If the teacher was standing half way between the students during the experiment to supervise, at what speed do you think the train passed the teacher? Give a reason for your answer.

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