

Get Ruby to the Time Capsule!

Ruby the Robot needs to move her time capsule to her secret storage closet, but she does not know how much force is needed to lift the time capsule. The time capsule weighs 4lbs and the robot moves at a rate of 2cm/s. Using the formula below calculate the force required for the robot to lift and move her time capsule.

$$F=M \times A$$

F= Force

M= Mass (weight of robot)

A=Speed

Find the force required, show your work:

$$M=4\text{lbs}$$

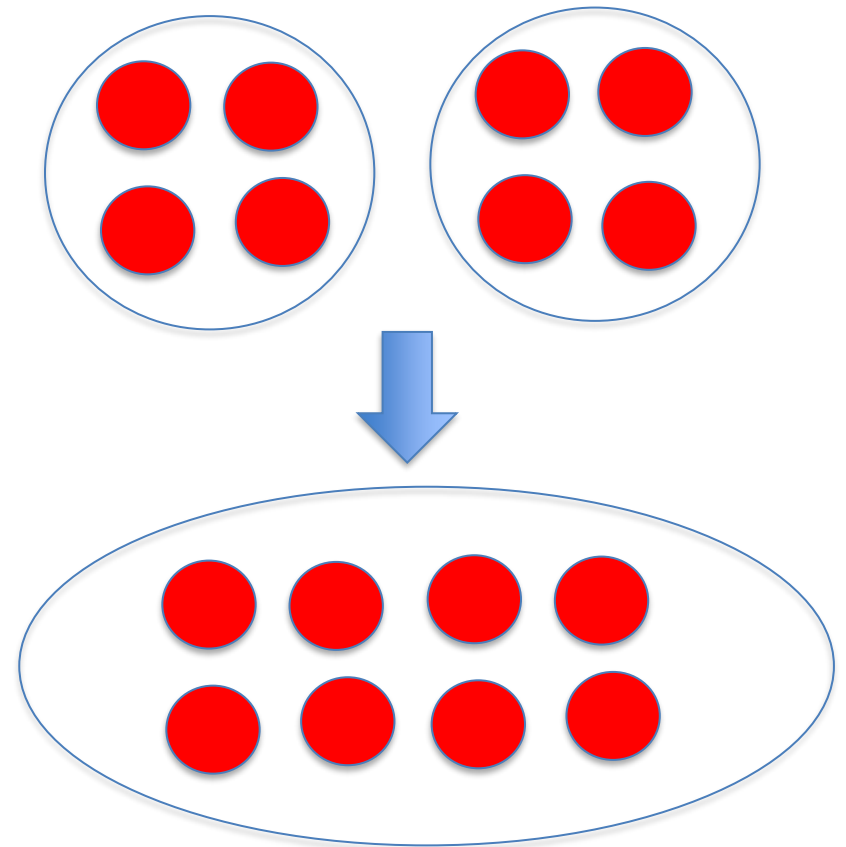
$$A= 2\text{cm/s}$$

$$F= 4 \times 2$$

$$F=8$$

(Units not important as it is grade 3, no conversions to be done)

The force required is 8 newtons to move Ruby the robot.



Once you know how much force is required to lift the time capsule, you will need to determine which path requires less work for Ruby to do. Work is equal to force multiplied by distance, using the information and formula below, help Ruby determine which path requires less work.

$$\text{Work} = \text{Force} \times \text{Distance}$$

$$W = F \times D$$

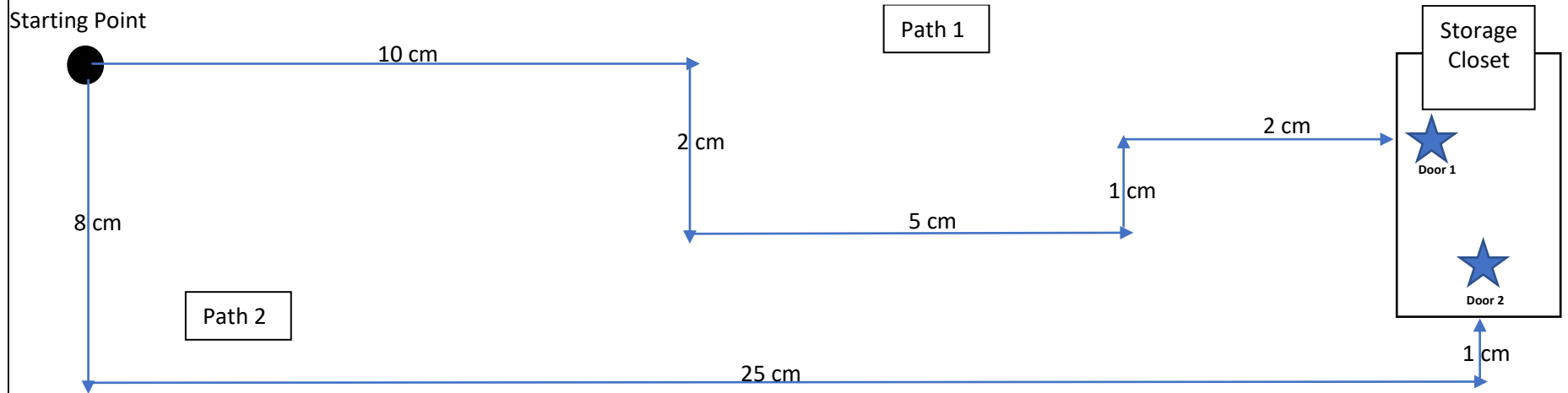
Remember, distance is the TOTAL distance it requires to get to the storage closet from the starting point.

Force = 8

Total distance #1 = 20 cm

Total distance #2 = 34 cm

Find the work required for each path and determine the path with least work. Show your work below:



$$\text{Distance 1} = 10 \text{ cm} + 2 \text{ cm} + 5 \text{ cm} + 1 \text{ cm} + 2 \text{ cm}$$

$$= 20 \text{ cm}$$

$$\text{Distance 2} = 8 \text{ cm} + 25 \text{ cm} + 1 \text{ cm}$$

$$= 34 \text{ cm}$$

Which path requires Ruby to do less work? **Path 1 requires less work, as it is 20 cm and path 2 is 34 cm which is longer by 14 cm.**
 Code the path of least work using the phrases and terms below:

Travel ____ cm right	Start at Point A
Travel ____ cm left	Open Door 1
Travel ____ cm down	Open Door 2
Travel ____ cm up	Then,
Must	Enter closet

Code:

Start at point A,
Then travel 10 cm right,
Then, travel 2 cm down,
Then, travel 5 cm right,
Then, travel 1 cm up,
Then, travel 2 cm right
Then, open door 1
Must, enter closet