Lesson 1 - Levers and Pivots

Physics - Key Stage 3
Forces at Work
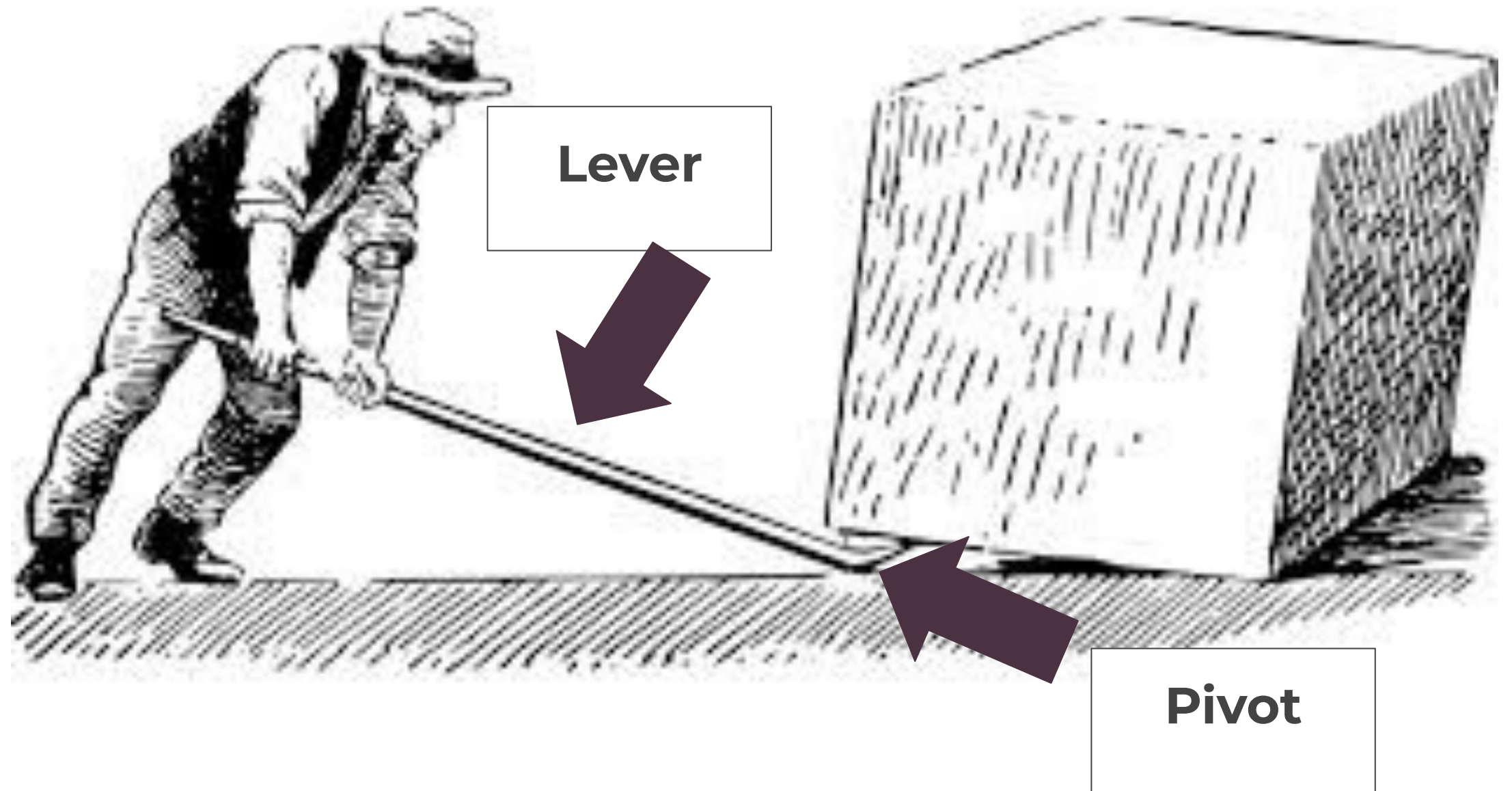
Mrs Wolstenholme

What is a Lever?

A lever is a simple machine

A lever is a rigid object that will rotate around a fixed point (pivot)

Lever

Pivot

What is a lever?

Option 1

A simple machine. A flexible object that can rotate.

Option 2

A simple machine. A rigid object that can rotate.

Option 3

A complex machine. A flexible object that can rotate.

Option 4

A complex machine. A rigid object that can rotate.

What does a lever rotate about?

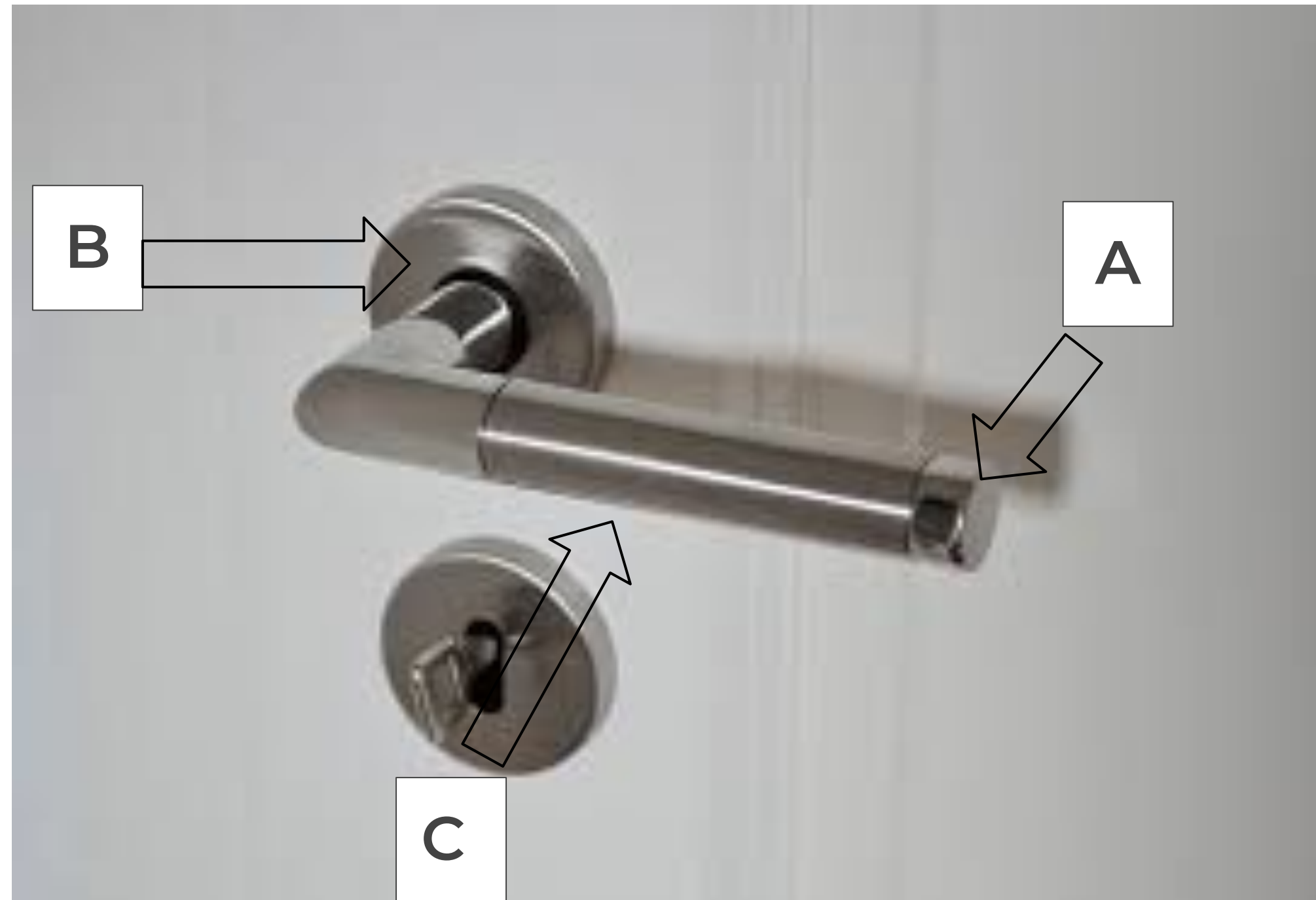| Option 1 |
|---|

A point called the Sun.

Option 2

A place called a lever.

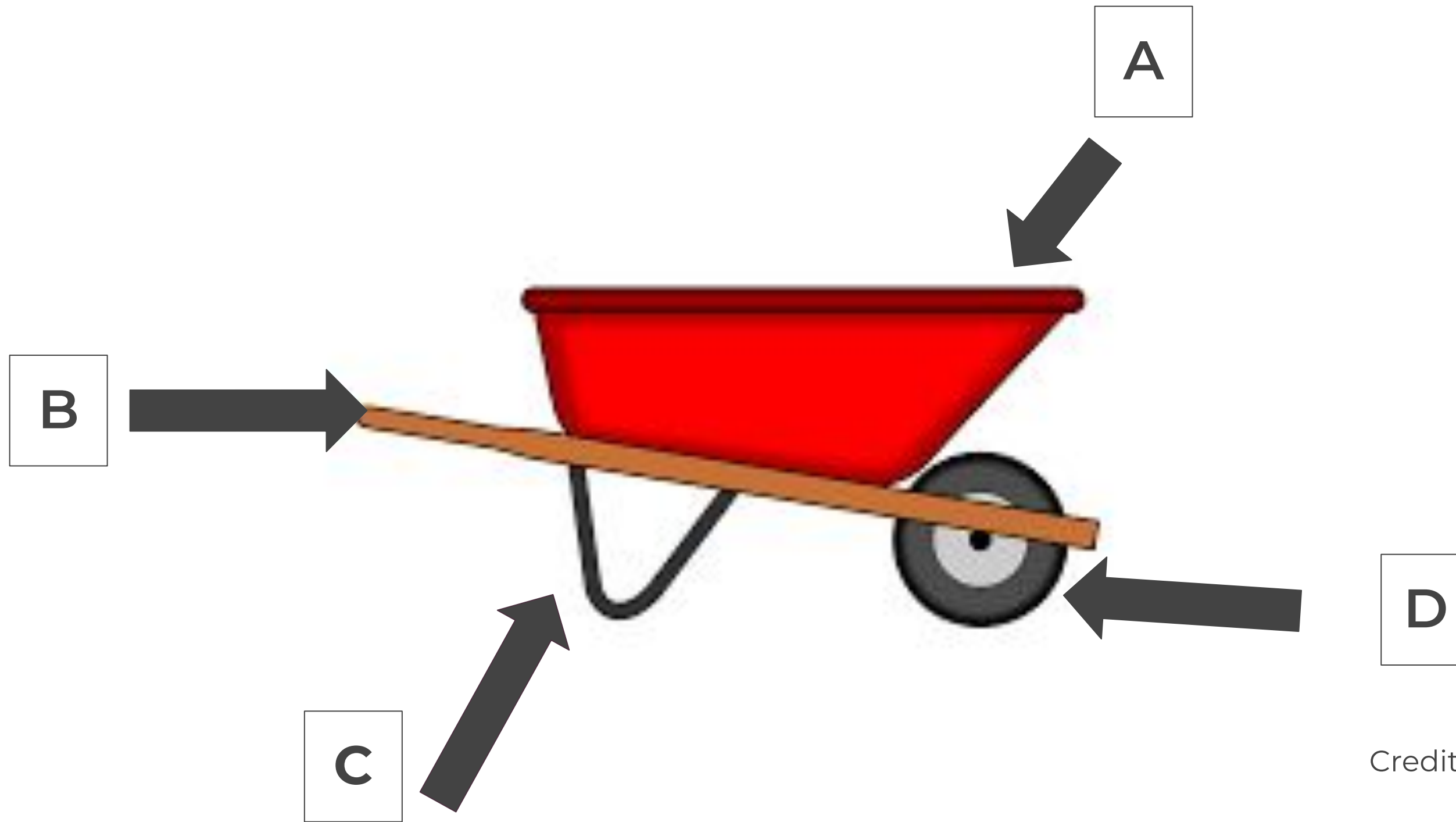| Option 3 |
|---|

A point called a pivot.

Option 4

A line called a pivot.

Which point of my door handle is the pivot?

Which point of my wheelbarrow is the pivot?

A

B

C

D

Credit: no attribution required

Moment: turning effect of a force

Lift up:
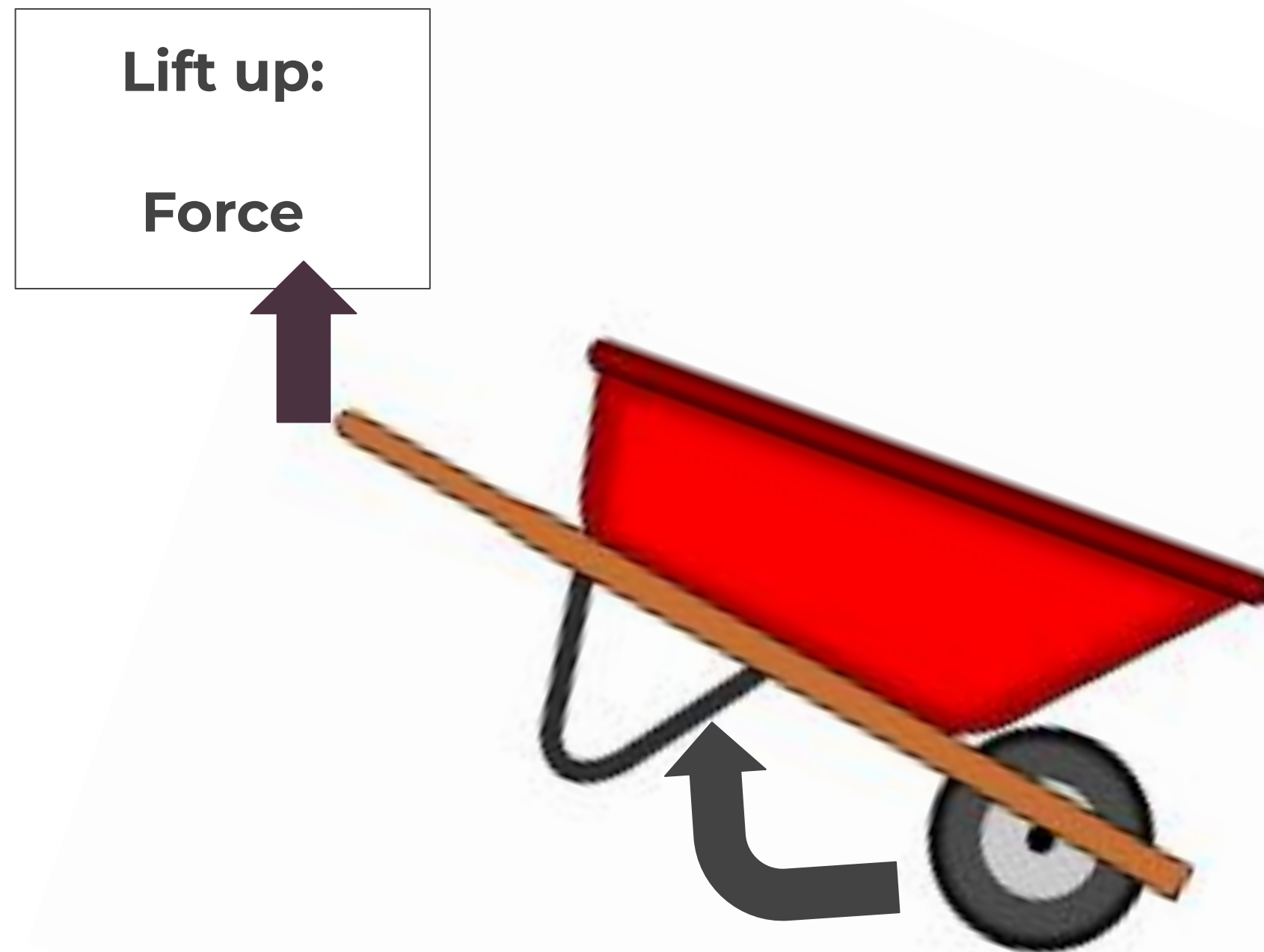
Force

Two options to make a moment bigger

Make my force large

Make the perpendicular distance from my force to the pivot bigger

What is a moment?

Option 1

The turning effect of a force.

Option 2

The turning effect of a lever.

Option 3

The turning effect of a pivot.

Option 4

The spinning effect of a force.

How could I increase the moment of a force? (Choose 2 options)

Option 1

Increase the force.

Option 2

Move closer to the pivot.

Option 3

Increase the perpendicular distance from the force and the pivot.
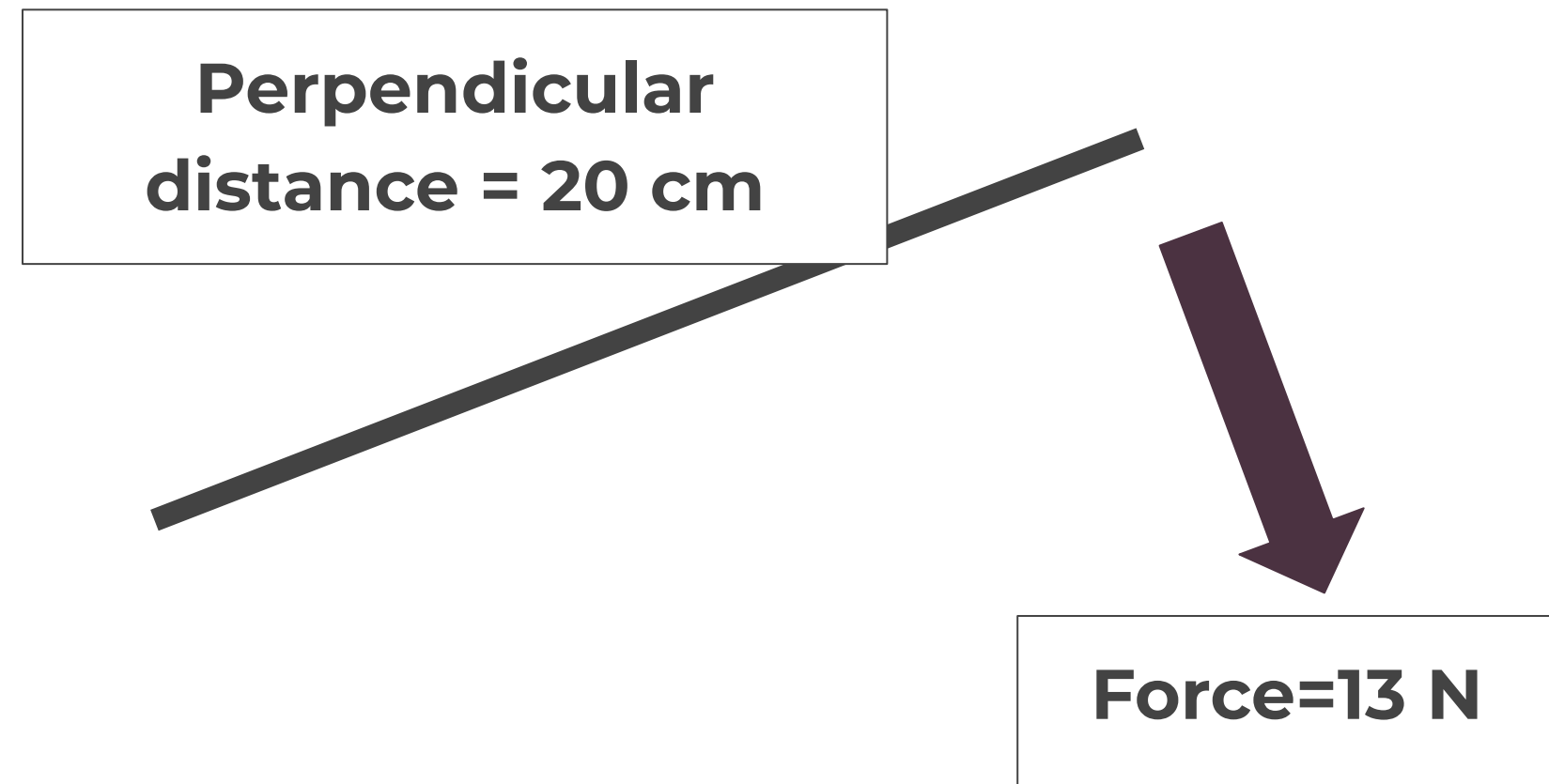
Option 4

Decrease the force.

Calculating moments

Moment   =   Force   x   Perpendicular distance

(Nm)   (N)   (m)

(Ncm)   (cm)

Calculate the moment (turning force) of a spanner that is 20 cm long when a force of 13 N is applied

Moment = Force x Perpendicular Distance

Perpendicular distance = 20 cm

Moment = 13   x 20

Moment = 260 Ncm

Force=13 N

Calculating moments: Together

Moment   =   Force x   Perpendicular distance

(Nm)   (N)   (m)
(Ncm)   (cm)

Calculate the turning force of a wheelbarrow with an arm that is 2m long when a force of 30N is applied.

Moment = Force x Perpendicular Distance

Moment =

Force

Perpendicular distance
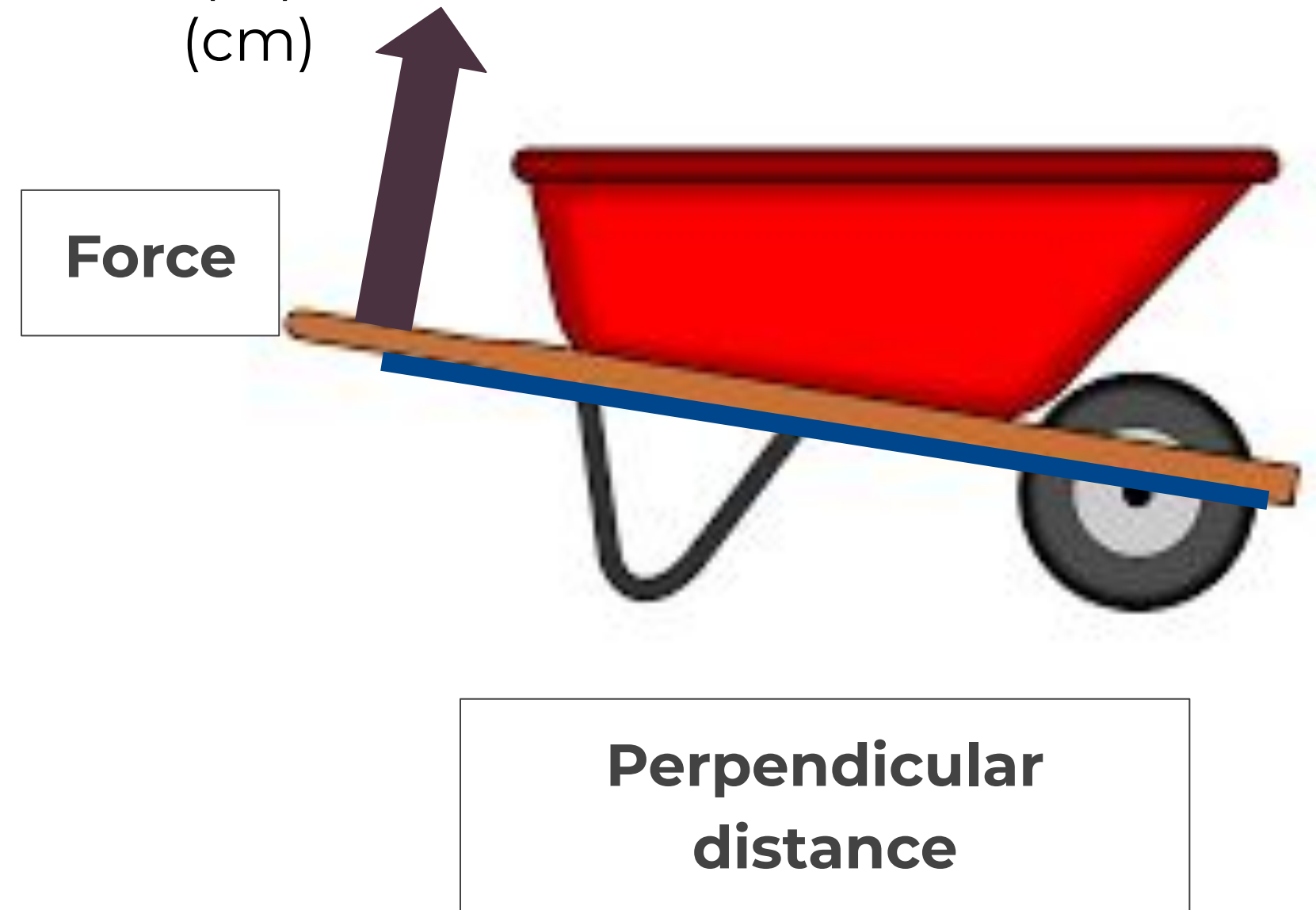
Calculating moments: Independently

Moment = Force x Perpendicular Distance

1. What is the moment of a 20N force which is exerted 30cm from the pivot?

2. What is the moment when someone with weight 600N sits 0.5m from a pivot?

What are the units for moment?

Option 1

Cm and m

Option 2

Nm and m

Option 3

N and Ncm

Option 4

Nm and Ncm

What are the units for perpendicular distance?

Option 1

Cm and m

Option 2

Nm and m

Option 3

N and Ncm

Option 4

Nm and Ncm

What is the unit for force?

Option 1

m

Option 2

Nm

Option 3

Ncm

Option 4

N