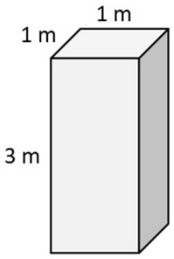
An object with a mass of m kg exerts a downward force of mg newtons.
g = the acceleration of gravity = 9.81 m/s^2
For these questions, assume g = 10 m/s^2

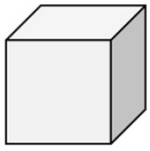
A **column** of stone (density = 1500 kg/m^3).

Calculate the pressure this column exerts on its lowest surface.



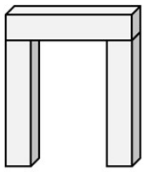
A **cube** of concrete (density = 2000 kg/m^3).

Calculate the pressure this cube exerts on the floor.



Mini-Stonehenge: 3 congruent sandstone cuboids (density = 2.6 t/m^3)

Dimensions of one cuboid = 50 cm × 50 cm × 2.5 m



Calculate the pressure this trilithon exerts on its lowest surfaces.

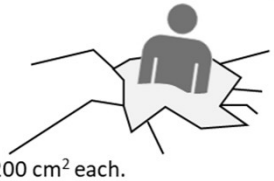
Tom has fallen through the ice!

With its thickness, the ice can only resist a pressure of 14,500 N/m^2.

Humans have a density of 950 kg/m^3.

Tom wears size 10 shoes with a contact area of 200 cm^2 each.

Estimate the volume of Tom's body.



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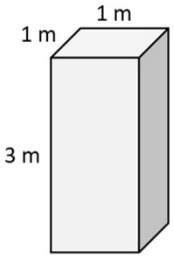
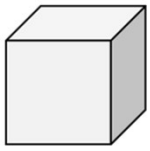


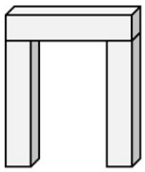
A **cube** of concrete (density = 2000 kg/m^3).

Calculate the pressure this cube exerts on the floor.



Mini-Stonehenge: 3 congruent sandstone cuboids (density = 2.6 t/m^3)

Dimensions of one cuboid = 50 cm × 50 cm × 2.5 m



Calculate the pressure this trilithon exerts on its lowest surfaces.

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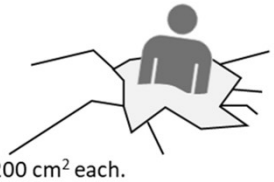

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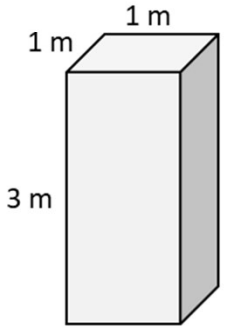
For these questions, assume g = 10 m/s^2

A **column** of stone (density = 1500 kg/m^3).

Calculate the pressure this column exerts on its lowest surface.



Volume = 1 × 1 × 3 = 3 m^3

Mass = 3 × 1500 = 4,500 kg

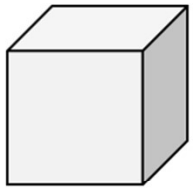
Force = 4,500 × 10 = 45,000 N

Area = 1 × 1 = 1 m^2

Pressure = 45,000 ÷ 1 = 45,000 N/m^2 , 45,000 Pa, 45 kPa

A **cube** of concrete (density = 2000 kg/m^3).

Calculate the pressure this cube exerts on the floor.



Volume = 2 × 2 × 2 = 8 m^3

Mass = 8 × 2000 = 16,000 kg

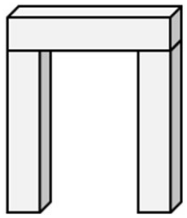
Force = 16,000 × 10 = 160,000 N

Area = 2 × 2 = 4 m^2

Pressure = 160,000 ÷ 4 = 40,000 N/m^2 , 40,000 Pa, 40 kPa

Mini-Stonehenge: 3 congruent sandstone cuboids (density = 2.6 t/m^3)

Dimensions of one cuboid = 50 cm × 50 cm × 2.5 m



Calculate the pressure this trilithon exerts on its lowest surfaces.

Volume = (0.5 × 0.5 × 2.5) × 3 = 1.875 m^3

Mass = 1.875 × 2600 = 4,875 kg

Force = 4,875 × 10 = 48,750 N

Area = (0.5 × 0.5) × 2 = 0.5 m^2

Pressure = 48,750 ÷ 0.5 = 97,500 N/m^2 , 97,500 Pa, 97.5 kPa

Tom has fallen through the ice!

With its thickness, the ice can only resist a pressure of 14,500 N/m^2.

Humans have a density of 950 kg/m^3.

Tom wears size 10 shoes with a contact area of 200 cm^2 each.

Estimate the volume of Tom's body.

Pressure > 14,500 N/m^2

Area = 200 × 2 = 400 cm^2 = 0.04 m^2

Force = 14,500 × 0.04 = 580 N

Mass = 580 ÷ 10 = 58 kg

Volume = 58 kg ÷ 950 = 0.06 m^3