

## CHAPTER

## 3

## Mass, Weight and Density

## Exercise 3A

## Mass and Weight

- 1 Use the words given to fill in the blanks in the sentences. Use each word once, more than once or not at all.

gram kilogram mass newton volume weight

- (a) The measure of the quantity of matter in an object is called \_\_\_\_\_.
- (b) Two units of mass are the \_\_\_\_\_ and the \_\_\_\_\_.
- (c) The amount of space an object occupies is called its \_\_\_\_\_.
- (d) The gravitational force on an object is called its \_\_\_\_\_.
- (e) The unit of weight is the \_\_\_\_\_.
- (f) The effect of a gravitational field on an object is the \_\_\_\_\_ of the object.
- 2 Draw one or more lines to match each quantity to be measured to the measuring instrument required.

| Quantity | Measuring instrument |
|----------|----------------------|
| Mass     | Beam balance         |
| Volume   | Electronic balance   |
| Weight   | Measuring cylinder   |
|          | Spring balance       |

- 3 Draw a ring around the correct equation connecting gravitational field strength  $g$ , weight  $W$  and mass  $m$ .

$g = mW$     $g = \frac{m}{W}$     $g = \frac{W}{m}$     $g = \frac{m^2}{W}$     $g = m^2W$

For questions 4 to 6,  $g = 9.8 \text{ N/kg}$  on the Earth and  $g = 1.6 \text{ N/kg}$  on the Moon.

- 4 Calculate the weight of these objects on the Earth and on the Moon. Give your answers to 2 significant figures.
- (a) 5 kg rock

weight on the Earth = \_\_\_\_\_ N  
weight on the Moon = \_\_\_\_\_ N

(b) 400 g rock

weight on the Earth = \_\_\_\_\_ N

weight on the Moon = \_\_\_\_\_ N

- 5 Complete Table 3.1 to show the mass and weight of the food in a packet that an astronaut brings on a journey from the Earth to the Moon.

Table 3.1

| Contents of food packet                        | Mass/kg | Weight/N |
|------------------------------------------------|---------|----------|
| On the Earth                                   | 0.5     |          |
| In space where there is no gravitational field |         |          |
| On the Moon                                    |         |          |

- 6 Figure 3.1 shows a beaker placed on an electronic balance when it is empty and when it contains a chemical. Calculate the mass and the weight of the chemical on the Earth.

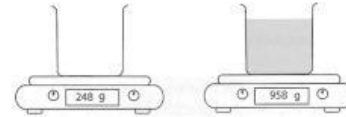


Figure 3.1

mass = \_\_\_\_\_ kg  
weight = \_\_\_\_\_ N

## Exercise 3B

## Density

- 1 Fill in the blanks in the sentences.

- (a) The density of a substance is its \_\_\_\_\_ per unit \_\_\_\_\_.
- (b) Density is measured in  $\text{kg/m}^3$  or  $\text{g/cm}^3$ , where  $1 \text{ kg/m}^3$  is equal to \_\_\_\_\_  $\text{g/cm}^3$ .

For questions 2 to 4, choose the correct answer and write your choice in the brackets.

- 2 Which is the correct equation for calculating density  $\rho$ , where  $W$  = weight,  $m$  = mass and  $V$  = volume?

A.  $\rho = \frac{m}{V}$    B.  $\rho = \frac{V}{m}$   
C.  $\rho = \frac{W}{V}$    D.  $\rho = \frac{V}{W}$

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