

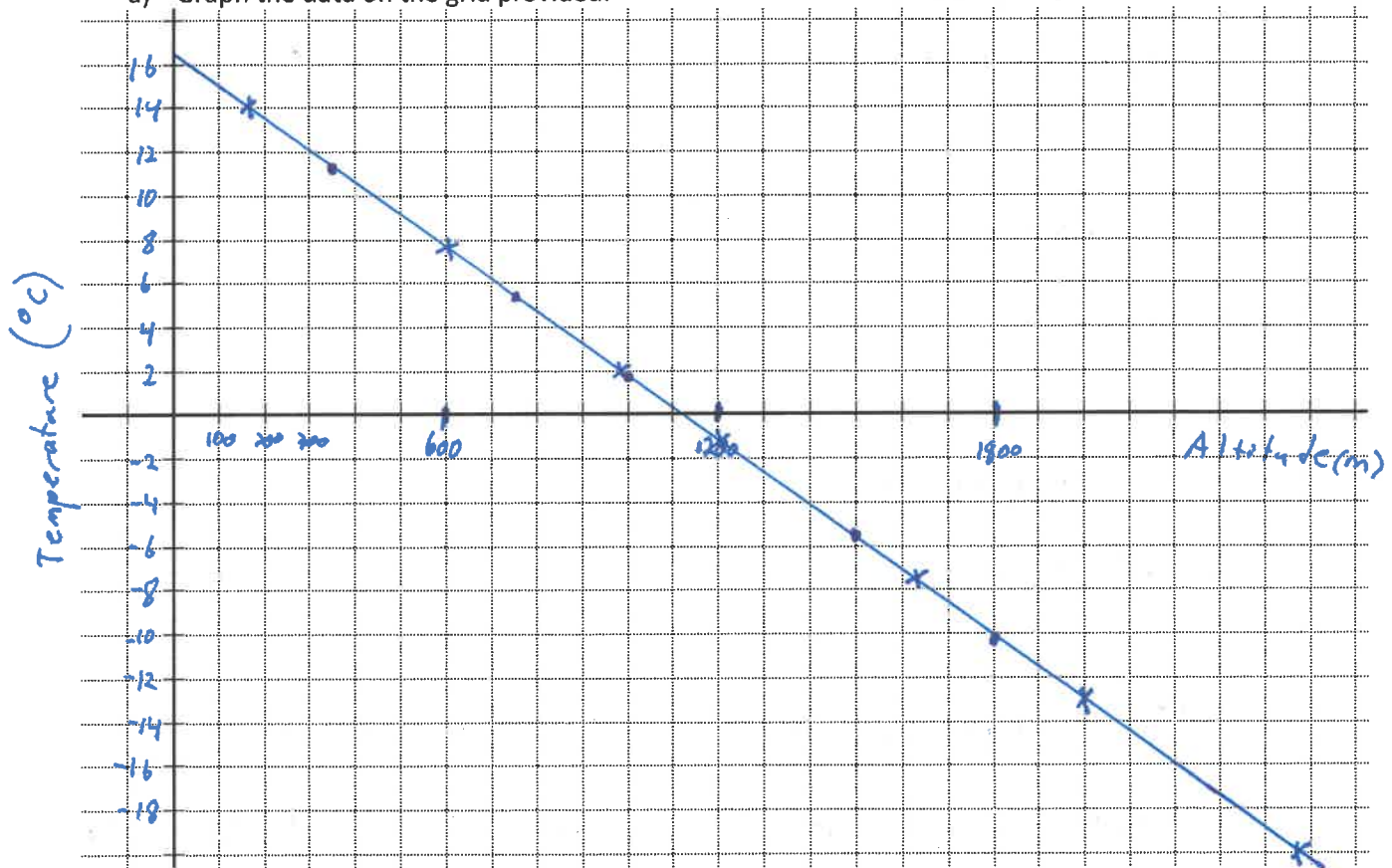
Unit 7 Linear Relations

7.2 Interpreting Graphs

Ex. A weather balloon recorded the air temperature at different altitudes. The data, shown in the table below, approximately represents a linear relationship.

independent	Altitude, a (m)	350	750	1000	1500	1800
dependent	Temperature, t ($^{\circ}\text{C}$)	11.4	5.5	1.8	-5.8	-10.2

a) Graph the data on the grid provided:



b) **Interpolate** the approximate value for the air temperature when the balloon was at a height of 600m? 1200m?

$$600\text{ m} \rightarrow 7.8^{\circ}\text{C}$$

$$1200\text{ m} \rightarrow -1^{\circ}\text{C}$$

c) What was the approximate altitude of the balloon at an air temperature of 2°C ? -7.5°C ?

$$2^{\circ}\text{C} \rightarrow 980\text{ m}$$

$$-7.5^{\circ}\text{C} \rightarrow 1640\text{ m}$$

d) **Extrapolate** the approximate value for the air temperature when the balloon was at a height of 2000m? 0m?

$$2000\text{ m} \rightarrow -13^{\circ}\text{C}$$

$$0\text{ m} \rightarrow 16.3^{\circ}\text{C}$$

e) What was the approximate altitude of the balloon at an air temperature of 14°C ? -20°C ?

$$14^{\circ}\text{C} \rightarrow 160\text{ m}$$

$$-20^{\circ}\text{C} \rightarrow 2490\text{ m}$$

Interpolate: estimate a value between given data (if it makes sense to do so)

Extrapolate: estimate a value beyond given data (if it makes sense to do so)

Ex. A spring extends after weights are hung on it. The spring fully compressed is 4 cm long and fully extended is 14 cm long.

- a) Is it reasonable to interpolate data from this graph?

yes, because the data is continuous between 4cm and 14cm

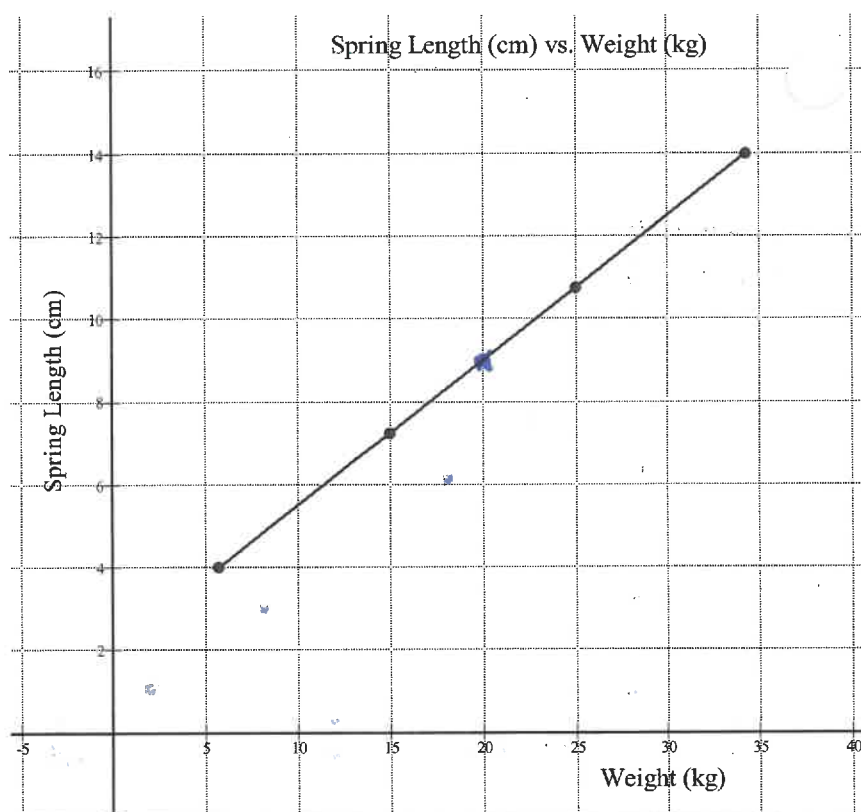
- b) What weight fully extends the spring?

~ 34 kg

- c) What is the spring's length when a 25 kg weight is attached? When a 20 kg weight is attached?

25 kg ~ 10.7 cm

20 kg ~ 9 cm



- d) Is it reasonable to extrapolate data from this graph?

No, the spring cannot compress smaller than 4 cm and it cannot stretch beyond 14 cm