From Young Astronaut School in S1

Experiences and Outcomes plus selected relevant benchmarks for pupils.

I have collaborated in investigations to compare magnetic, electrostatic and gravitational forces and have explored their practical applications. SCN 2-08a

- *Measures gravitational force with a force meter or newton meter and records results using appropriate units (newtons).*

I have collaborated in investigations into the effects of gravity on objects and I can predict what might happen to their weight in different situations on Earth and in space.

SCN 3-08a

- *Knows that weight is a force caused by the Earth's (or other planet's) gravitational pull on an object, measured in newtons (N), and uses the formula W = mg to calculate weight.*
- *Predicts the effects on the weight of an object due to the gravitational field strength in different positions in the universe, for example, at different altitudes on Earth, on different planets and in deep space.*

Level 3 Sciences Exemplar

Summary Task – to produce a presentation linking everything that has been learned in the topic and explaining how this relates to a mission to Mars.

The attached video is an exceptional piece of work in terms of the quality of production, clarity of explanation and also because it met the brief and included many of the learning points from the topic.

3mins 30s – note that the poster says 0 kg in space which is incorrect, however, the audio correctly explains that the mass remains constant and the weight changes.

The following is a screenshot from a worksheet used in class.

Weight and Gravity Silver

Here is data for the gravitational field strength of some planets.

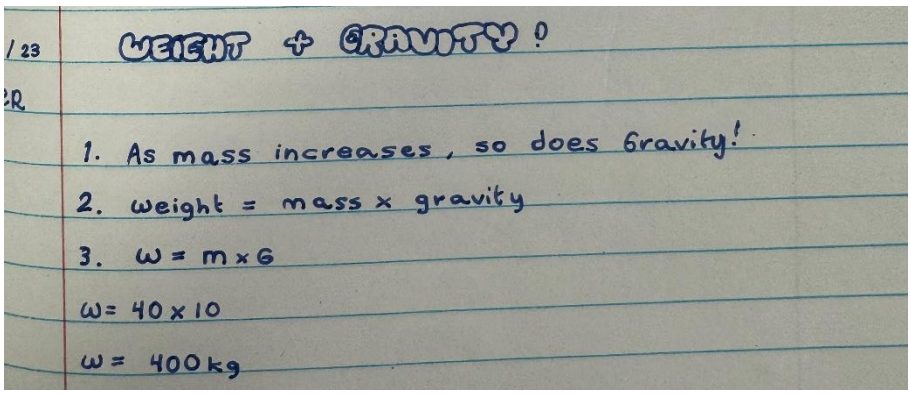
Use the data in the table and the equation -

weight = mass x gravity

to answer these questions.

Planet	Gravity (N/kg)	Relative mass of planet (compared to earth)	Radius (km)
Mercury	4	0.05	2400
Venus	9	0.96	6100
Earth	**10**	**1.00**	**6400**
Mars	4	0.11	3400
Jupiter	25	320	71700
Saturn	10	95	60800
Uranus	11	14.5	23700
Earth's moon	1.6	0.01	1700

1. What is the relationship between the size of the planet and its gravity?
2. What is the unit of measurement for weight?
3. What is the weight of a 40kg child on earth?



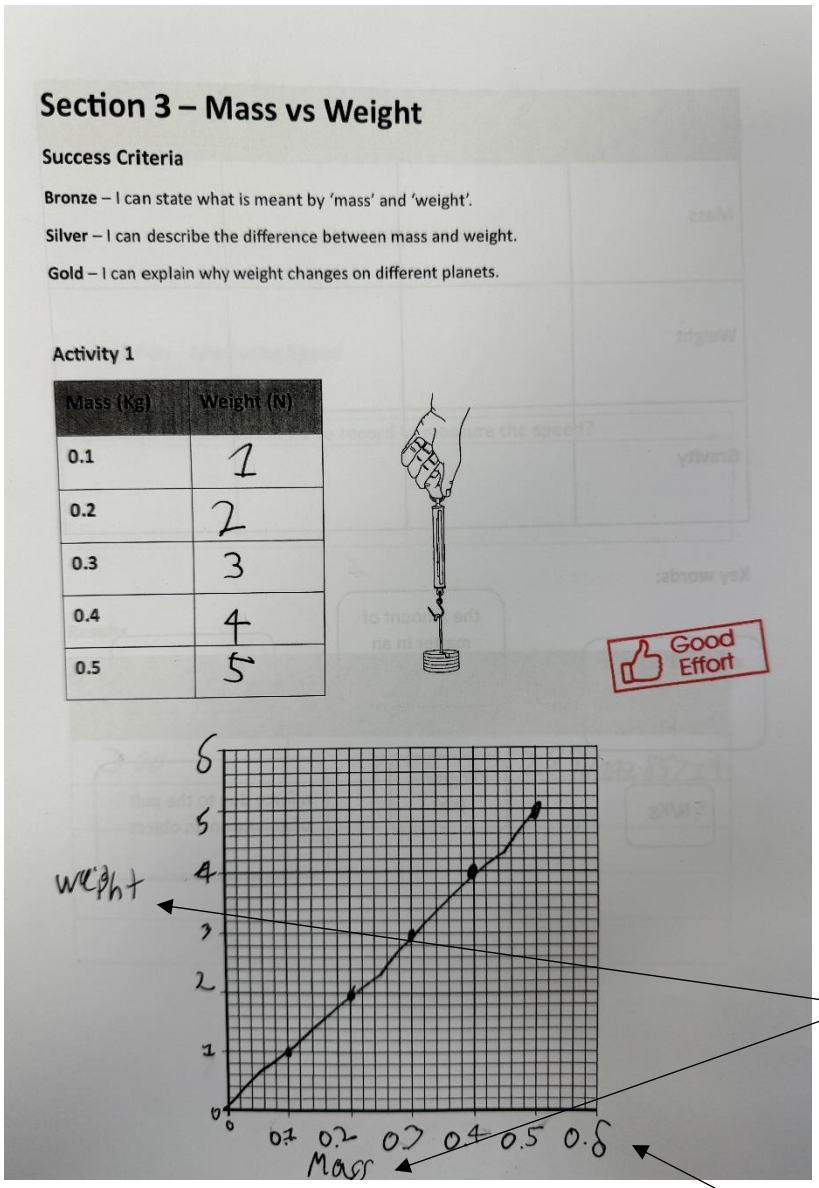
Commentary

1. The student has the correct idea that as the mass of the planet increases so does gravity.

2. There is a confusion here about the question. We are looking for "N" or "Newtons" as the unit for weight rather than the equation to calculate weight.

3. The calculation has been carried out correctly and the working shown. The answer is correct, however, the unit should be N rather than kg.

The following examples are the results of an experiment in class.



Section 3 – Mass vs Weight

Success Criteria

Bronze – I can state what is meant by 'mass' and 'weight'.

Silver – I can describe the difference between mass and weight.

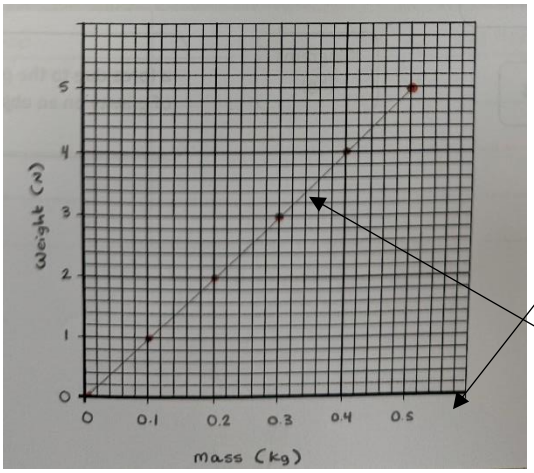
Gold – I can explain why weight changes on different planets.

Activity 1

Mass (Kg)	Weight (N)
0.1	1
0.2	2
0.3	3
0.4	4
0.5	5

Good Effort

The units are missing here



Scales are correctly drawn

The line has been drawn with a ruler