**Mass and Weight Lab**

**Objectives:**

* Measure mass using a balance.
* Calculate the weight of objects on Earth, the Moon, and Jupiter.

**Procedure:**

1. Use the triple-beam balance to measure the mass of each object. Record the masses in the data table.

2. Calculate the weight of the objects on the Earth, the Moon, and Jupiter in pounds. To calculate the weight, multiply the mass by the number given in the data table. Record the weights in the data table.

3. Measure and record the volume of each object in the data table.

The formula for the volume of a cube is length x width x height or V = L x W x H.

*Example for calculating volume:*

The formula for the volume of a cube is length x width x height or V=L x W x H

10 cm

5 cm

8 cm

Volume = 10 cm x 5 cm x 8 cm

Volume = 400 cm3

**Data Table:**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Object 1** | **Object 2** | **Object 3** |
| **Mass on Earth** (in grams) |  |  |  |
| **Weight on Earth** (in pounds)  mass x 0.002 |  |  |  |
|  | | | |
| **Mass on the Moon** (in grams) |  |  |  |
| **Weight on the Moon** (in pounds)  mass x 0.0002 |  |  |  |
|  | | | |
| **Mass on Jupiter** (in grams) |  |  |  |
| **Weight on Jupiter** (in pounds)  mass x 0.005 |  |  |  |
|  | | | |
| **Volume**  (in cm3) |  |  |  |

**Questions:**

1. Does the **mass** of the objects change depending on what planet they are measured on?

2. Does the **weight** of the objects change depending on what planet they are measured on?

3. If a person has a **mass** of 50,000 grams on Earth, what would the person’s **mass** be on the Moon?

4. If a person has a **mass** of 50,000 grams on Earth, what would the person’s **weight** be on the Moon? (**Hint**: weight on Moon = mass x 0.0002)

5. Why is the **volume** of the objects the **same** on the Earth, the Moon, and Jupiter?

**Conclusion**

In your own words, what is the difference between mass and weight?

**Answer KEY - Mass and Weight Lab**

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10 cm

5 cm

8 cm

Volume = 10 cm x 5 cm x 8 cm

Volume = 400 cm3

**Data Table: *Answers will vary depending on masses of object. Example numbers are given.***

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Object 1** | **Object 2** | **Object 3** |
| **Mass on Earth** (in grams) | 35 | 20 | 180 |
| **Weight on Earth** (in pounds)  mass x 0.002 | 0.07 | 0.04 | 0.36 |
|  | | | |
| **Mass on the Moon** (in grams) | 35 | 20 | 180 |
| **Weight on the Moon** (in pounds)  mass x 0.0002 | 0.007 | 0.004 | 0.036 |
|  | | | |
| **Mass on Jupiter** (in grams) | 35 | 20 | 180 |
| **Weight on Jupiter** (in pounds)  mass x 0.005 | 0.175 | 0.1 | 0.9 |
|  | | | |
| **Volume**  (in cm3) | 10 | 22 | 30 |

**Questions:**

1. Does the **mass** of the objects change depending on what planet they are measured on?

*no, the mass stays the same*

2. Does the **weight** of the objects change depending on what planet they are measured on?

*yes, the weight changes*

3. If a person has a **mass** of 50,000 grams on Earth, what would the person’s **mass** be on the Moon?

*50,000 grams (mass does not change)*

4. If a person has a **mass** of 50,000 grams on Earth, what would the person’s **weight** be on the Moon? (**Hint**: weight on Moon = mass x 0.0002)

*50,000 x 0.0002 = 10 pounds*

5. Why is the **volume** of the objects the **same** on the Earth, the Moon, and Jupiter?

*because they don’t grow or shrink when they are taken different places.*

**Conclusion**

In your own words, what is the difference between mass and weight?

*Answers will vary:* Mass depends on how much matter you have and isn’t changed by gravity. Weight depends on how much something is pulled by gravity and it changes depending on what planet the object is on.