The Properties of Matter

Characteristic vs. Non characteristic properties

- A characteristic property is something that is **specific to that substance.** (i.e. Density, melting point, boiling point)

- Non-characteristic properties **are common to many substances.** (i.e. states of matter, temperature, volume, mass, acidity and alkalinity)

Terminology

- **States of matter :** (solid, liquid or gas)
- **Mass :** the quantity of matter of the substance
- **Volume:** the space that matter occupies
- **Temperature:** quantity of heat an object or matter contains
- **Acidity and alkalinity :** determines whether a substance is an acid, a base or neutral in its chemical composition.

States of Matter

- Solids:
- - Particles held tightly together by chemical bonds
- - Particles cannot move freely. Only vibrate

States of Matter

- Liquids:
- - Particles held weakly together (compared to solids)
- - Particles can move slightly with respect to each other.

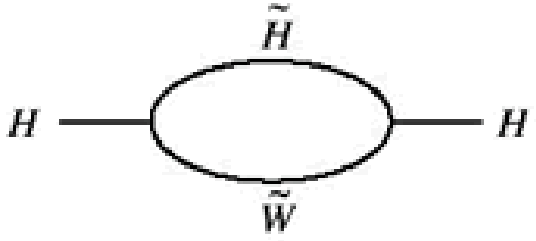
States of Matter

- Gases:
- - Particles are far apart from each other.
- - Particles move freely

Particle Theory

- Matter is composed of particles that are invisible to the naked eye.

$$\Delta m_H^2 \sim \frac{\alpha}{4\pi} m_{SUSY}^2 \log(m_H r_H)$$

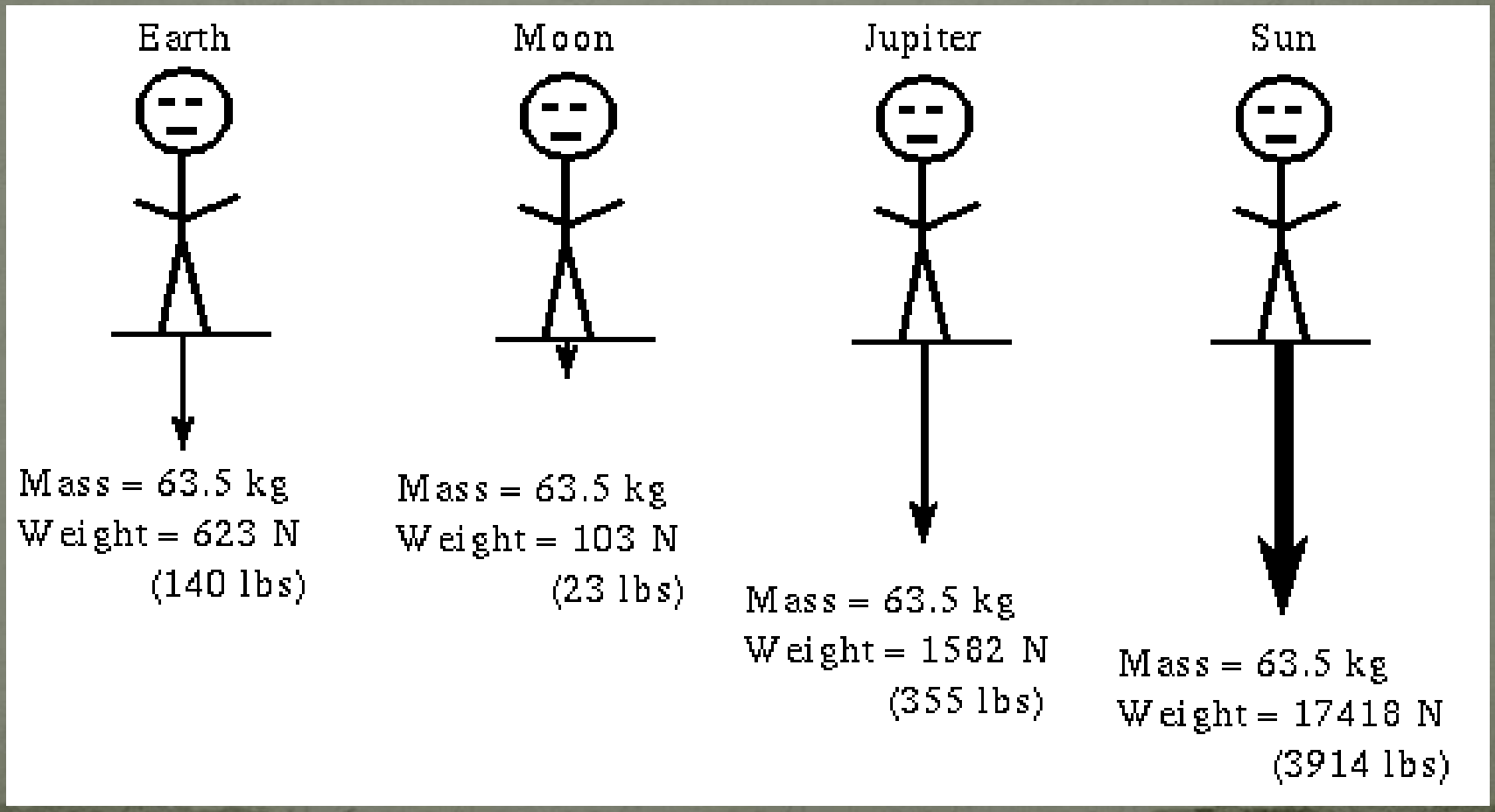


UNITS

- Metre : (m) → Length
- Kilogram : (kg) → mass
- Gram : (g) → mass
- Second: (s) → time
- Litre (L) → volume
- Millilitre (ml) → volume
- Cubic centimetre →cm^3

Mass vs. Weight

- Mass stays the same…weight changes



Temperature Vs. Heat

- Heat : form of energy
- Temperature : indication of the amount of energy

Temperature and particle theory

- Increase temperature → increase speed of particles