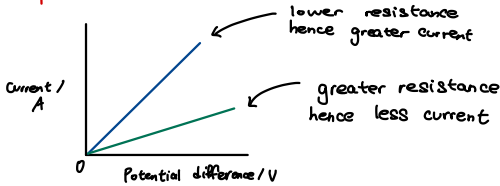


# I-V Characteristics

→ The shallower the gradient of a characteristic I-V graph, the greater the resistance of the component.

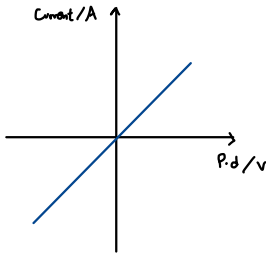


What is meant by an ideal ammeter and an ideal voltmeter?

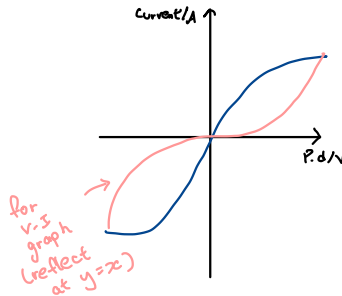
In an experiment:

- Voltmeters are assumed to have an **infinite resistance** (so no current flows through them)
- Ammeters are assumed to have **no resistance** (so will have no potential difference across them)

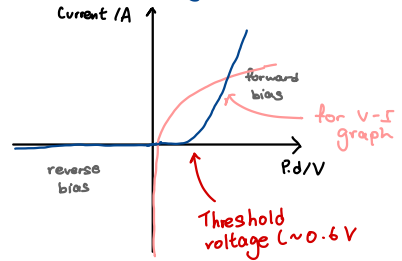
## Ohmic Conductors



## Filament Lamps



## Diodes (including LEDs)



Why does the curve get shallower as voltage increases in filament lamps?

- When a current flows through a metal conductor (like filament in a filament lamp), some of the electrical energy is transferred into heat energy and causes the metal to heat up.
- This extra heat energy causes the particles in the metal to vibrate more. These vibrations make it more difficult for the charge-carrying electrons to get through the resistor — the current can't flow as easily and the resistance increases.

## Forward and reverse bias in diodes

- Diodes are made from **semiconductors** and are designed to let current flow in one direction only.
- Forward bias is the direction in which the current is allowed to flow.
- In reverse bias, the resistance of the diode is very high and the current that flows is very tiny.
- Most diodes require a voltage of about 0.6V in the forward direction before they will conduct — this is called the **threshold voltage**.