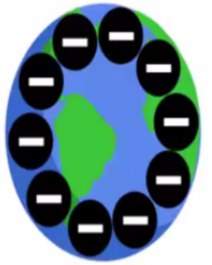
Voltage References (3)

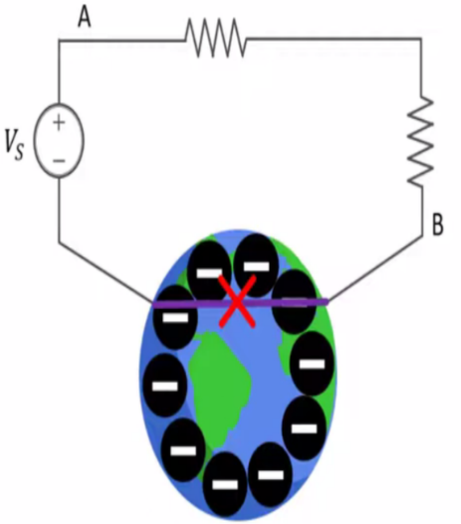
- In addition to batteries, we have DC supplies which plug into the mains.
- There are many of these in our labs, as shown in the picture.

In the case of these power supplies, the 0V reference is the earth!

The surface of the earth is indeed negatively charged, so it provides the point of lowest potential. We assign a value of 0V to this potential and call it earth or ground reference.

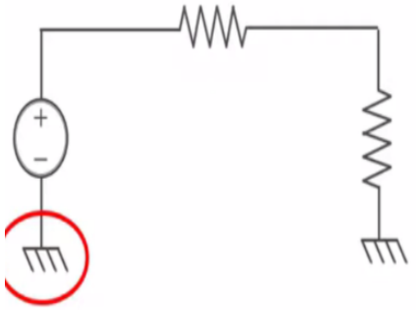


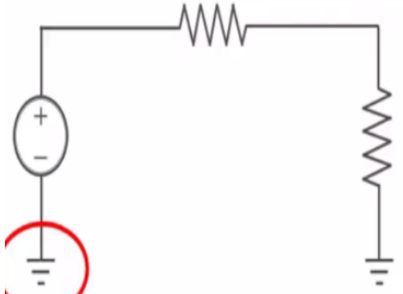
Voltage References (5)



- Since we have only one planet earth, both the negative terminal of the DC supply and the other end of the circuit are connected to it.
- This doesn't mean however that the negative terminal of the power supply and point B are directly connected!
- They are like two pipes partially submerged in an ocean, one drawing water and the other dumping water.
- The water dumped by one pipe, due to the enormity of the ocean, cannot be directly picked up by the other pipe!

Voltage References (6)

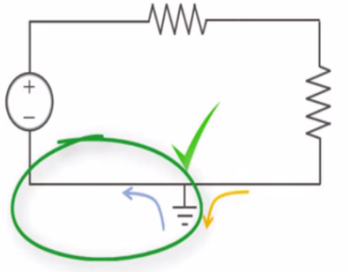


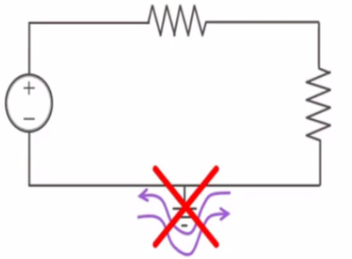


Usually in circuits, instead of using a picture of the earth to indicate the ground reference, we use either of the symbols shown in the figures.

Note that, although we are using separate ground references for each end of the circuit, these represent exactly the same voltage value, 0V.

Voltage References (7)





- Often, different points of the circuit are connected together to a common ground reference.
- Make no mistakes though! Although these points are connected together, they are also connected to the ocean of charges that is the earth.
- This means that no current can flow between them. Current can only flow into and out of the earth, as shown in the figures.