

## ACTIVITY FOUR: SEEING AT NIGHT

### Learning Objectives:

To be able to complete a circuit to make a torch.

**All:** students will be able to draw simple circuits and label the components within them.

**Most:** students will be able to describe how increasing the number of bulbs in a circuit reduces their brightness and state that electric current is the same at all points in a series circuit.

**Some:** Some students will be able to use their understanding of how a simple circuit works to describe how a switch works

### HSW:

- setting up simple practical enquiries, comparative and fair tests
- making systematic and careful observations

### Resources per group:

- 3 batteries, 3 light bulbs, wires or circuit boards to connect circuits
- Extension practical equipment: 3 motors, 3 bells/buzzers

### STARTER:

#### Discuss the following question:

What did the soldiers used to read in the trenches?

Intro to question: At night the soldiers needed to be able to read to pass the time for recreation and to read any instructions from senior officers about the orders for tomorrow.

Hopefully they will suggest electrically related objects – from the basic turning on of lights through to computers or touchscreen devices.

To be able to see at night we need a light source, before electricity the soldiers could use candles but there were also large torches.

## INTRODUCTION:

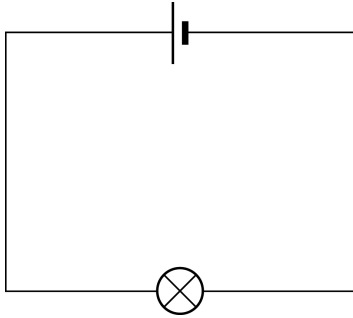
### Check students' understanding of electrical circuit diagrams

Will the following circuits light?

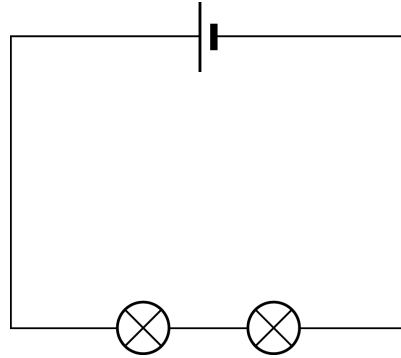
(introduce the symbols for battery, light bulb and ammeter as they come across them)

Build the circuits in front of the students as once they have made their predictions, if an alteration is needed to make the circuit light ask the students to draw a corrected diagram.

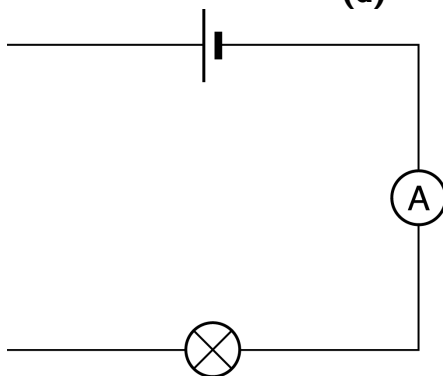
(a)



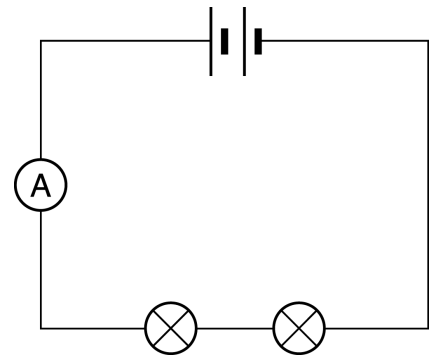
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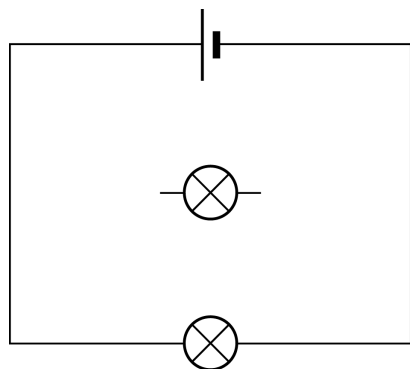
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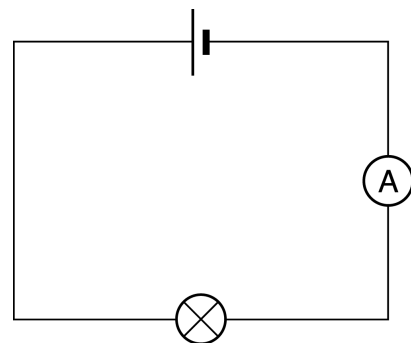
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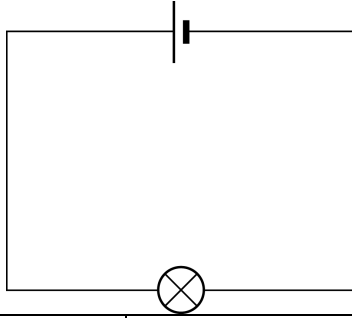


(f)



## MAIN TASKS

Students to investigate the following questions:



1. What patterns can you see about the ratio of batteries to bulb and the brightness of the lamps?
2. What is the job of batteries?

Use a basic series circuit as shown on the left.

Circuit	Number of batteries	Number of bulbs	Ratio of batteries to bulbs	Brightness of bulbs
1	0	1	0/1	
2	1	1	1	
3	2	1	1/2	
4	3	1	1/3	
5	0	2	0/2	
6	1	2	1/2	
7	2	2	1	
8	3	2	3/2	

Students to use the results table to write concluding answers to the key questions.

Extension: Students could investigate the following questions:

1. What do you think you would observe if the bulbs were replaced by motors?
2. What do you think you would observe if the bulbs were replaced by an electric bell?

**REVIEW:**

Students to use their knowledge from the practical session to **design an effective torch** to read a letter from home (could be linked to a creative writing task in which lights are turned off and students read examples they have done)

Example of a piece of work using IT that could be done below (including circuit diagram and object)

