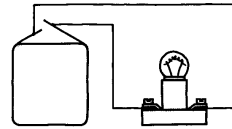
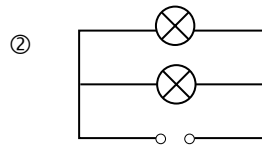
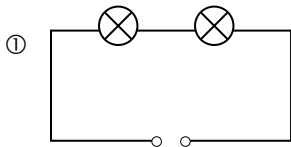


1. Draw the corresponding circuit diagram:



2. Look at the circuit diagrams below. One of them represents a series circuit and the other one a parallel circuit.

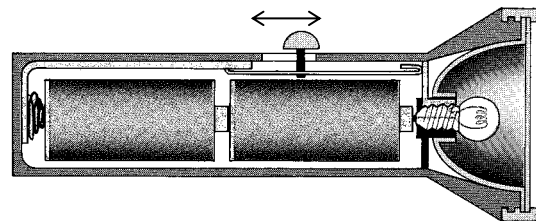


- a) Which one is which? Write the correct answers on the dotted lines.
 b) What happens in either circuit if you unscrew one of the light bulbs from the socket?
 c) Where would a switch have to be built into the series circuit in order to be able to switch both lamps on and off at the same time? There are several options. Draw the circuit diagrams.
 d) Where would a switch have to be built into the parallel circuit in order to be able to
- switch both lamps on and off at the same time?
 - switch only the upper lamp on and off?
 - switch only the lower lamp on and off?

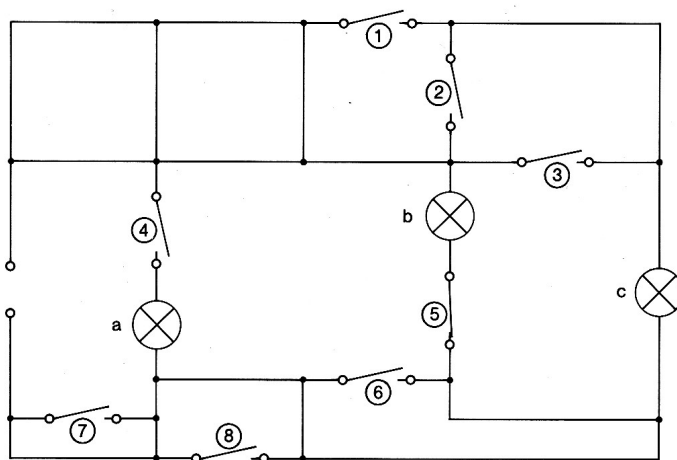
Draw the circuit diagrams.

3. Depicted to the right you can see the internal structure of a flashlight.

- a) Draw the path of the electric current (closed loop) into the picture.
 b) By pushing the button to the left the light can be switched off. How does this work? What happens to the loop in the electric circuit? Where does it happen?



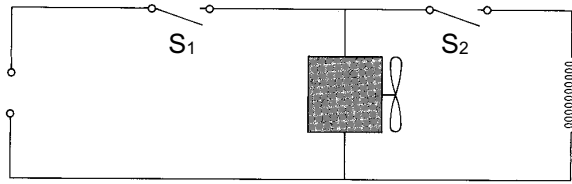
- 4.



- a) Which lamp is on (a, b or c)?
 b) Which ones of the switches need to be closed, if only one of the lamps shall be lit (a, b and c)?
 c) Which ones of the switches need to be closed if all of the lamps shall be lit?

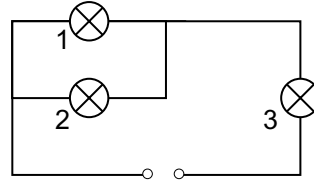
5. Some hairdryers come with two switches: one for the fan, which is blowing out the air (S_1 for cold air) and one for the heating coil, which is heating the cold air that's being blown out (S_2 for hot air).

- What happens, if switch S_1 is closed?
- What happens, if switch S_2 is closed in addition to S_1 ?
- What happens, if only switch S_2 is closed?
- Why are the switches arranged in such a way, that the heating coil can only be turned on in combination with the fan?



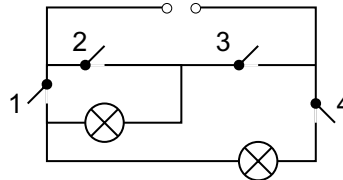
6. Which of the lamps are lit, if

- lamp 1
- lamp 2
- lamp 3 is unscrewed from the socket?
- Which ones of the lamps are connected in parallel, which ones are connected in series?

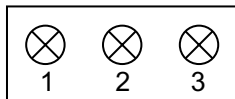


7. Here both lamps shall be lit by closing only two of the four switches.

- Which ones need to be closed?
- How are the lamps connected, in series or in parallel?



8. Depicted below there is a box with three lamps. You cannot look into the inside of the box, but by experimenting you find out the following:



If lamp 1 is unscrewed from the socket, only lamp 1 goes out

If lamp 2 is unscrewed from the socket, lamp 2 and lamp 3 go out

If lamp 3 is unscrewed from the socket, lamp 2 and lamp 3 go out

Draw the corresponding circuit diagram.

solutions:

- b
 - a: only 4; b: only 5; c: 3 or 1
 - 3, 4, 5 or 1, 4, 5
- 2 and 3
 - 1 and 3
 - none
- 2 and 4