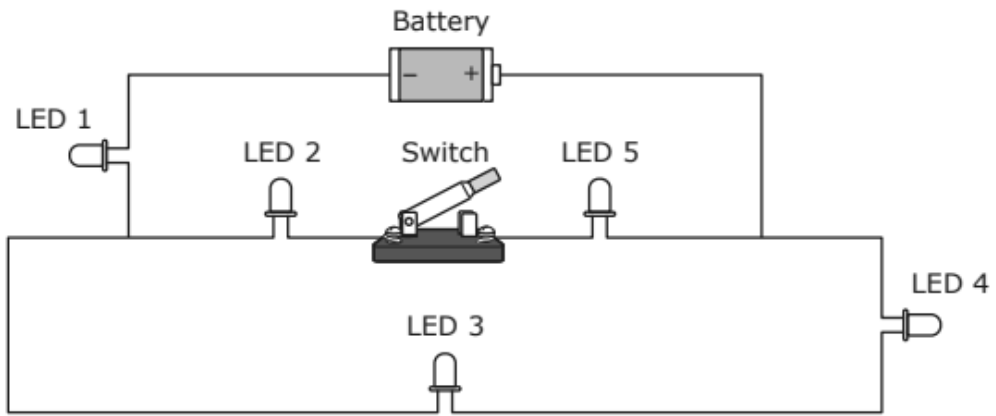


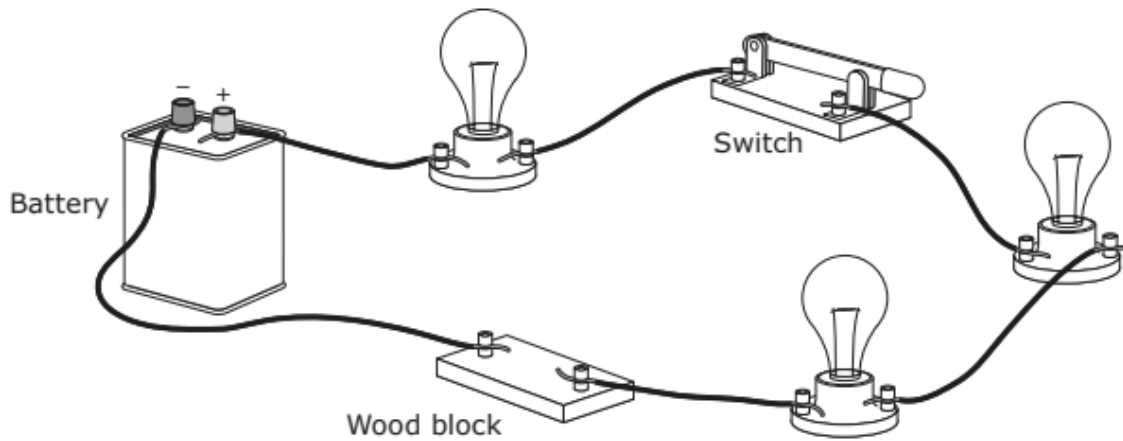
- 15** This circuit has five light-emitting diode, or LED, lights. It also has one battery and one switch.



Which LEDs produce light when the switch is in the position shown?

- A** LEDs 1, 3, and 4 only
- B** LEDs 1, 2, 3, and 4
- C** LEDs 3 and 4 only
- D** LEDs 1, 3, 4, and 5

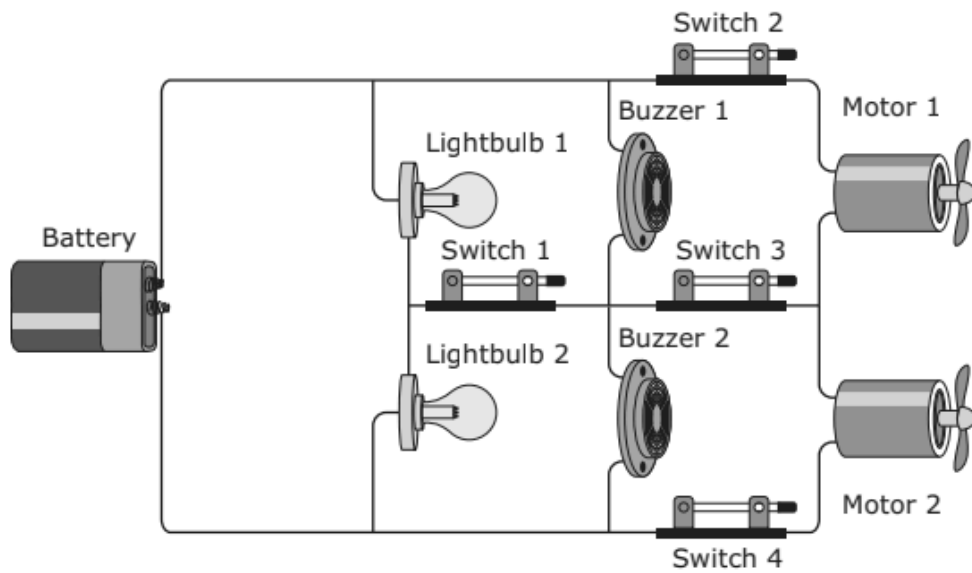
**31** The circuit below does not work.



Which procedure would most likely allow the bulbs to light?

- A** Open the switch and then connect the two wires that are attached to the wood block
- B** Switch the positions of the two wires that are connected to the battery and then open the switch
- C** Move the switch closer in the circuit to the battery
- D** Connect the two wires that are attached to the wood block

- 12 A student builds a circuit allowing the lightbulbs to light, the buzzers to make sound, and the motors to turn.

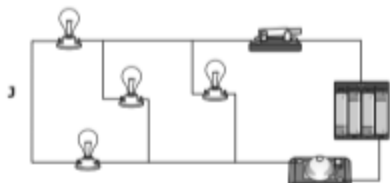
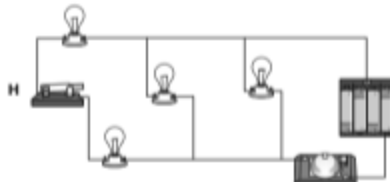
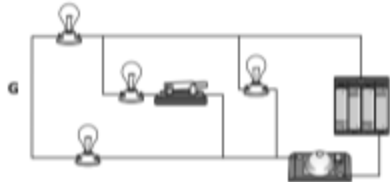
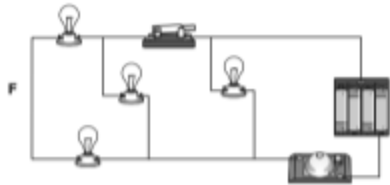


Which two switches can be open and still allow all of the parts to work?

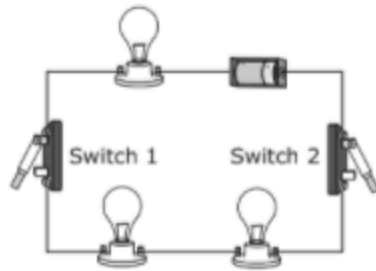
- F Switches 1 and 3
- G Switches 1 and 4
- H Switches 2 and 3
- J Switches 3 and 4

- 16 A student wants to build a circuit with four lightbulbs and one bell. The student wants to place a switch in the circuit so that only one light will still be on and the bell will still ring when the switch is opened.

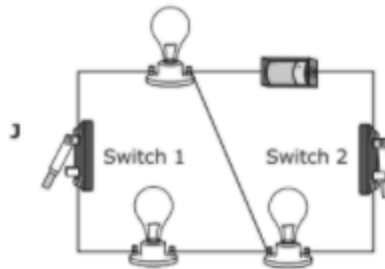
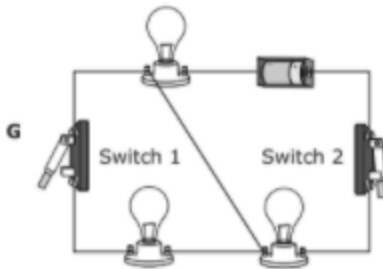
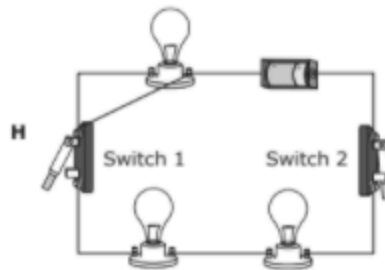
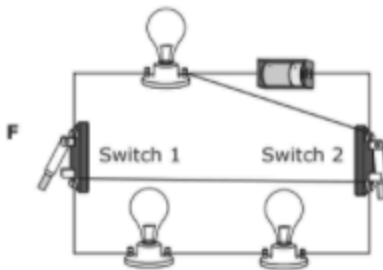
Which of these circuits should the student build?



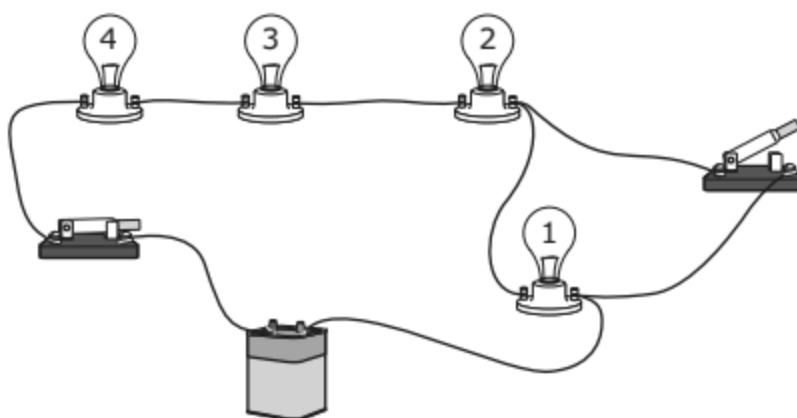
A student wants to make a change to the circuit shown below so that when Switch 1 is open and Switch 2 is closed, only one light will be on in the circuit.



Which diagram shows how the student should change the circuit?



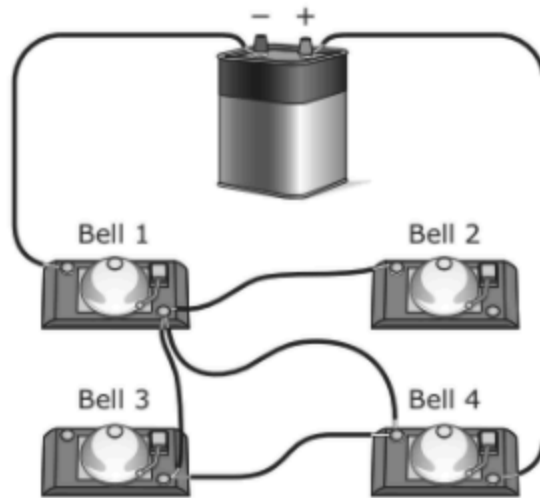
**20** A student constructs the circuit shown for a science demonstration.



With the switches in these positions, which lights are on?

- F** All the lights
- G** Lights 1 and 2 only
- H** Lights 3 and 4 only
- J** None of the lights

4 The diagram shows an electric circuit with four bells that a student plans to build.

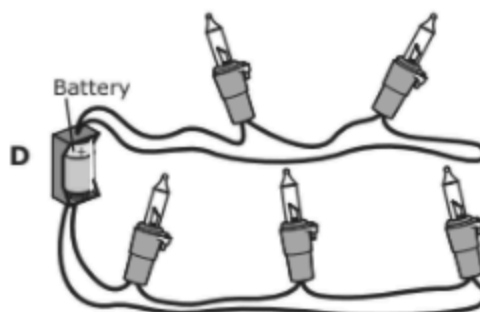
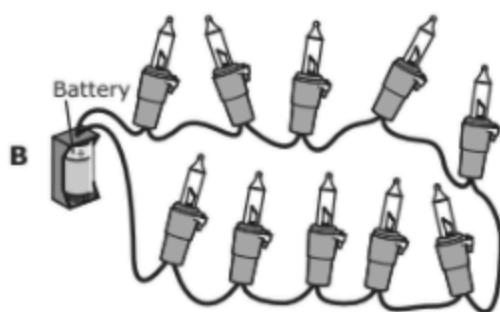
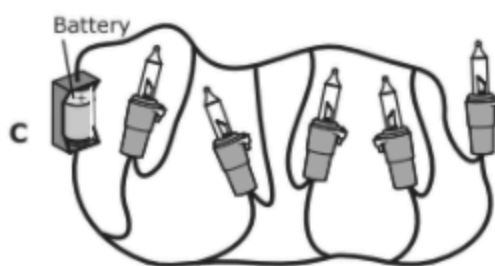
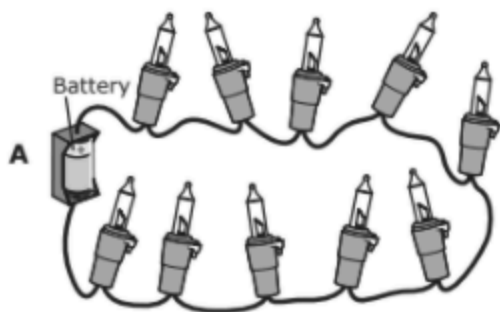


When the student connects the wires as shown, which of the bells will ring?

- F** Bell 1 only
- G** Bells 1 and 4 only
- H** Bells 3 and 4 only
- J** Bells 1, 2, 3, and 4

- 27 In some circuits that are used for decorating, one burned-out lightbulb will prevent all the other lightbulbs from lighting. In other circuits, one burned-out lightbulb will have no effect on the other lightbulbs.

In which of these circuits will the other lightbulbs still light even if one bulb is burned out?





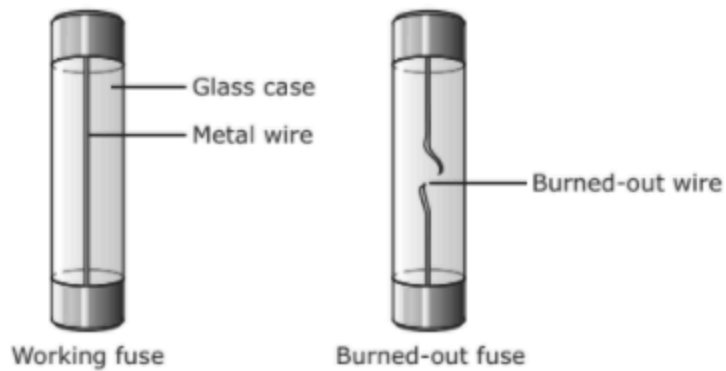
- 15** The diagram shows the metal posts that are usually found on a battery.



The battery can be connected to a bell and a switch to produce sound. Which statement best explains why there are two metal posts on the battery?

- A** The battery needs only one metal post to connect to the bell, but the other metal post is present in case the first post fails to work.
- B** The battery needs to form a complete circuit that starts with one metal post and ends with the other metal post.
- C** One metal post makes a complete circuit with the switch, and the other metal post makes a complete circuit with the bell.
- D** One metal post makes the bell start to ring, and the other metal post makes the bell ring louder.

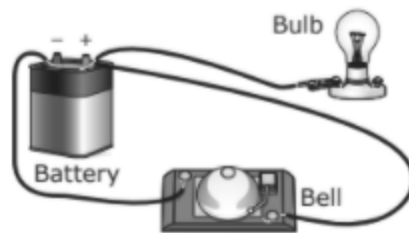
- 26** Most cars have lights, power locks, radios, and other equipment that use electricity. Electric circuits power this equipment. Each circuit has a fuse that completes it. The picture below shows one type of fuse a car may have.



Which of these describes one thing that could happen if the wire in a car fuse burns out?

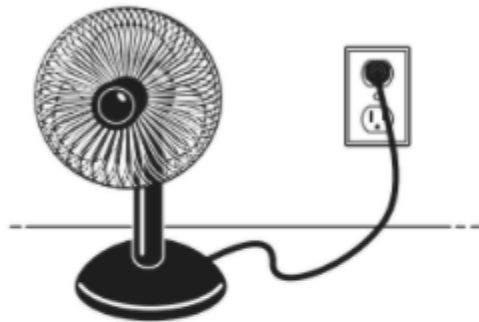
- F** The car's lights will burn brighter.
- G** The car's radio will not work.
- H** The car's turn signal will blink too slowly.
- J** The car's power windows will open faster.

- 4 A group of students built the circuit shown below.



The lightbulb does not glow. Which statement explains this observation?

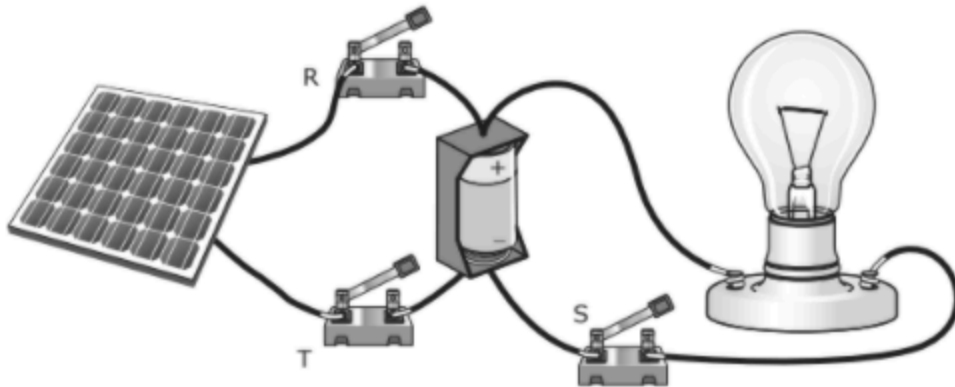
- F The battery is not charged.
  - G The lightbulb is not part of a complete circuit.
  - H The circuit does not have a switch.
  - J The bell uses most of the energy from the battery.
- 16 Many types of fans are used in homes. One type of electric fan is shown below.



In addition to mechanical energy, which of these is produced as electric current passes through the circuit of this fan?

- F Heat
- G Mass
- H Light
- J Water vapor

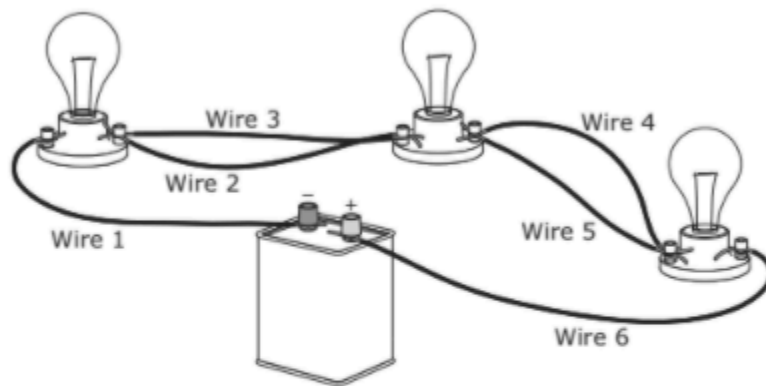
25 A simplified diagram of a system using solar energy is shown.



To recharge the battery for later use without lighting the bulb, which of the following switches should be closed?

- A Switch S only
- B Switches R and S only
- C Switches R and T only
- D Switches R, S, and T

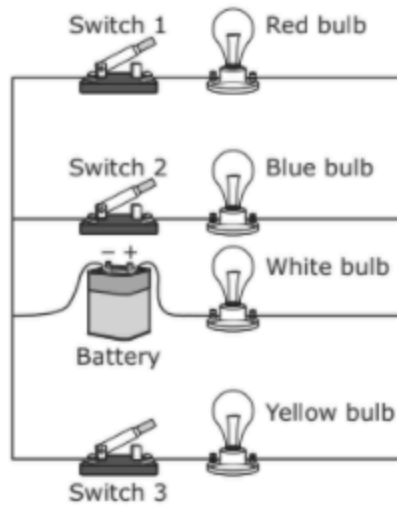
7 All the lightbulbs in this circuit are lit.



Which change would cause all the bulbs to go out?

- A Removing Wire 1
- B Removing Wires 2 and 4
- C Removing Wires 2 and 5
- D Removing Wires 3 and 4

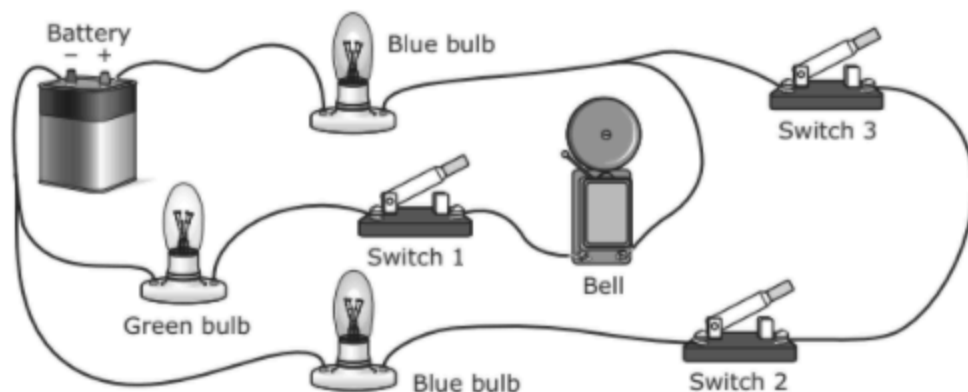
25 Students constructed a circuit using different-colored lightbulbs.



What will happen if Switch 3 is closed and the other switches are left open?

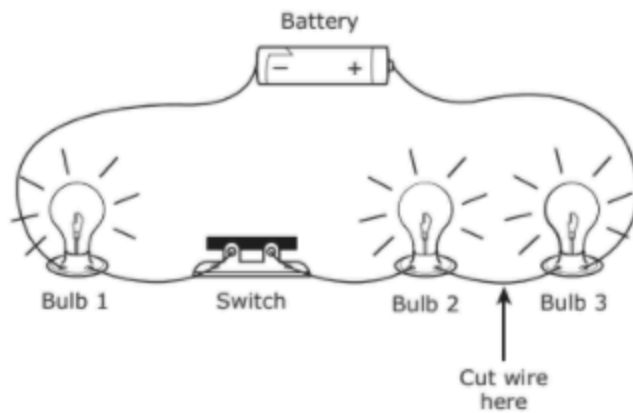
- A Only the white bulb will operate.
- B None of the bulbs will operate.
- C Only the white and yellow bulbs will operate.
- D Only the red and blue bulbs will operate.

35 This circuit has three lightbulbs and a bell.



Which procedure will result in only the blue lightbulbs operating?

- A Close Switches 1 and 2 and leave Switch 3 open
- B Close Switch 3 and leave Switches 1 and 2 open
- C Close Switches 2 and 3 and leave Switch 1 open
- D Close Switch 2 and leave Switches 1 and 3 open



**16** The diagram shows a series circuit with three lit bulbs. How many of the bulbs will remain lit if the wire is cut at the point shown by the arrow?

- F** 0
- G** 1
- H** 2
- J** 3

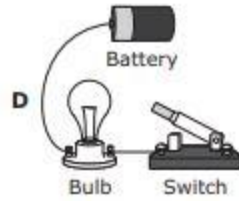
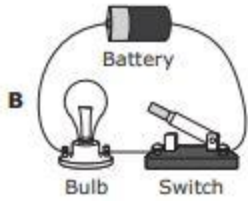
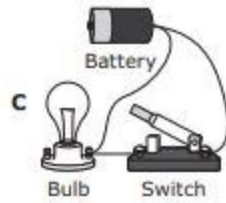
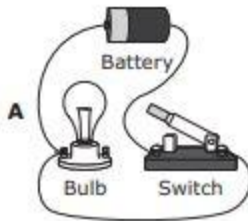
**43** A string of lights with small bulbs is shown below. The bulbs are connected by wire that is covered with an insulator.



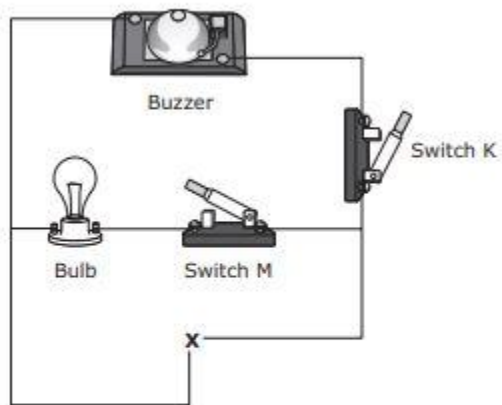
When the lights are on, electricity travels in —

- A** a complete circuit
- B** a sound wave
- C** a light ray
- D** an incomplete path

1 Which circuit shown will produce light when the switch is closed?



24 A group of students is building the circuit represented in the diagram.



What object can be used at Position X for the buzzer to sound when Switch K is closed?

F A power source

H Another bulb

G An insulated wire

J Another switch