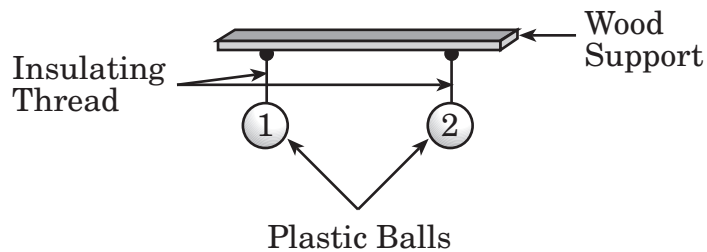
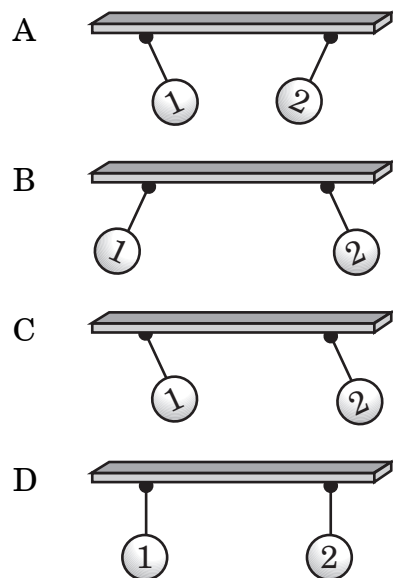


1. When a plastic rod is rubbed with fur, the plastic rod becomes negatively charged. Which statement explains the charge transfer between the plastic rod and the fur?
- A Protons are transferred from the plastic rod to the fur.
 - B Protons are transferred from the fur to the plastic rod.
 - C Electrons are transferred from the plastic rod to the fur.
 - D Electrons are transferred from the fur to the plastic rod.
2. How do electrically charged objects affect neutral objects when they come in contact?
- A Electrons move from negatively charged objects to neutral objects.
 - B Electrons move from neutral objects to negatively charged objects.
 - C Protons move from positively charged objects to neutral objects.
 - D Protons move from neutral objects to positively charged objects.

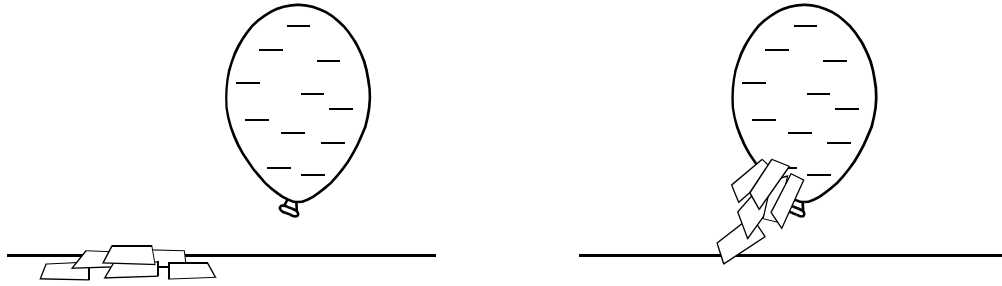
3. The drawing shows two uncharged lightweight plastic balls suspended by thin, insulating threads. Ball 1 is given a positive charge. Ball 2 is given an equivalent negative charge.



Which diagram **best** shows how the balls will react after becoming charged?



4. This diagram shows a negatively charged balloon. When the charged balloon is brought near some pieces of paper, the papers are attracted to the balloon.

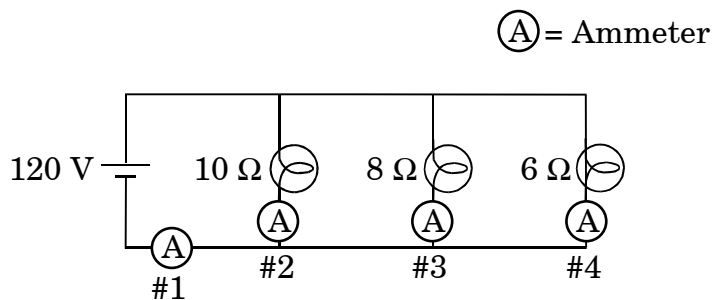


Which describes the charging of the pieces of paper?

- A positive, due to induction
 - B positive, due to conduction
 - C negative, due to induction
 - D negative, due to conduction
-
5. A series circuit has a 6-V battery and 3 ohms of resistance. How much current will flow through the circuit?
- A 0.5 A
 - B 2 A
 - C 3 A
 - D 18 A

6. What voltage is required to run a 45-watt light bulb if the current is 0.5 ampere?
- A 45 volts
 - B 90 volts
 - C 120 volts
 - D 225 volts
7. How much current is used by a 120-V refrigerator that uses 650 W of power?
- A 0.18 A
 - B 5.4 A
 - C 120 A
 - D 78,000 A

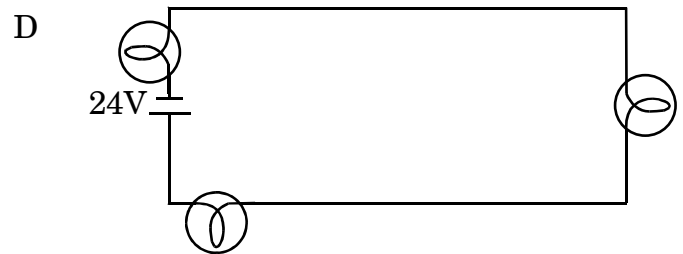
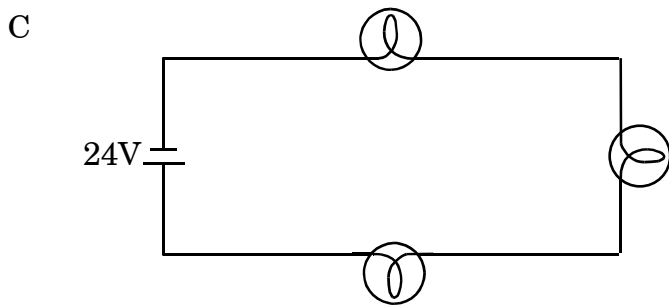
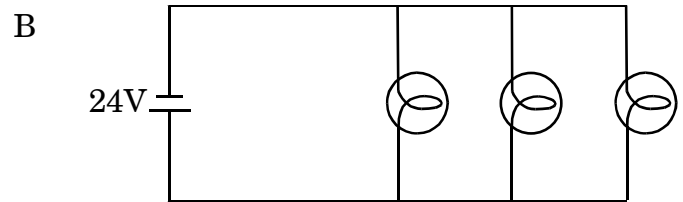
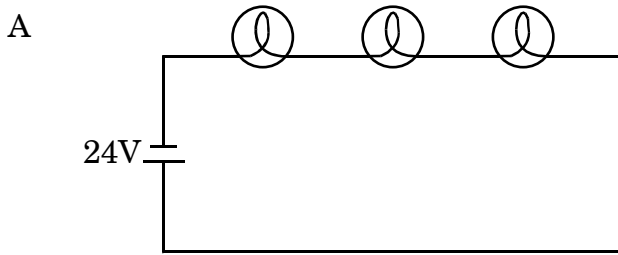
8. Three light bulbs are connected to a 120-V potential difference. Ammeters are placed at four different locations labeled #1, #2, #3, and #4.



At which location will the current be greatest?

- A #1
- B #2
- C #3
- D #4
-
9. Which **best** describes a circuit in series?
- A Different parts are on separate branches.
- B Current values are different at various points in the circuit.
- C Electrons may take several paths.
- D Electrons have only one path at all times.
10. Which statement is true about parallel circuits?
- A They contain separate branches through which current can flow.
- B They are usually called open circuits.
- C They provide one path through which current can flow.
- D They cease to function when one part of the circuit is disconnected.

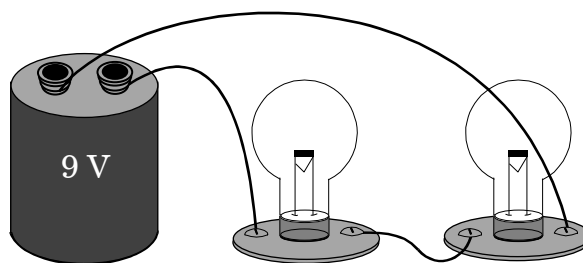
11. Which is the correct diagram for a parallel circuit with three light bulbs powered by a 24-V battery?



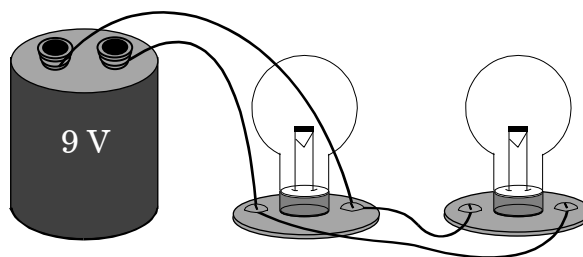
12. A motor has a current of 2 A flowing through it when it is powered with a 12-V battery. What is the power used by the motor?

- A 0.16 W
B 6 W
C 14 W
D 24 W

13. The diagrams represent two complete circuits. A 9-V battery is connected to two light bulbs as shown.



Circuit A



Circuit B

Which statement **best** describes what can be observed?

- A The light from Circuit A will be brighter because each light bulb adds its current to the other light bulb.
- B The light from Circuit B will be brighter because each light bulb has a direct path to both poles of the battery.
- C The light from Circuit A will be dimmer because each light bulb has a direct path to both poles of the battery.
- D The light from Circuit B will be dimmer because each light bulb must share its current with the other light bulb.

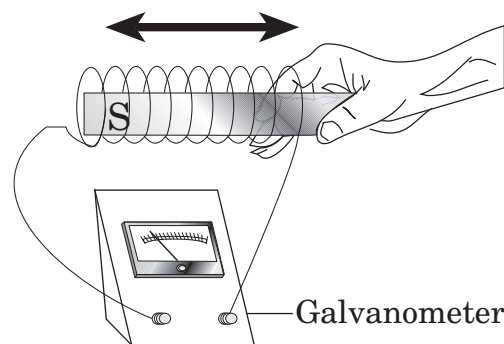
14. A light bulb with a resistance of 100 ohms is plugged into a 120-volt outlet. What is the current flowing through the bulb?

A 0.83 ampere
B 1.2 amperes
C 20 amperes
D 220 amperes

15. A sheet of paper is positioned to completely cover a bar magnet. Iron filings are then gently sprinkled on the paper. What does the pattern created by the iron filings indicate?

A the stronger of the two poles
B the distance between the two poles
C the midpoint of the area between the two poles
D the magnetic field created by the two poles

16. A magnet is moved back and forth through a loop of wire as shown below.



What will happen as the magnet is moved back and forth as shown?

- A The wire will attract the magnet.
B The magnet will attract the wire.
C The galvanometer needle will stay at 0 on the scale.
D The galvanometer needle will move back and forth.

17. Which statement **best** describes a bar magnet that has been broken into two pieces?

- A Both pieces have lost their magnetic poles.
- B One piece has a north pole only, and the other piece has a south pole only.
- C Each piece has both a north and a south pole.
- D Both pieces have a north pole only.

18. A student coiled wire around a nail, attached both ends to a 1.5-V battery, and attempted to lift paper clips with the nail.

Results

Number of Turns of Wire	Paper Clips Picked Up
10	2
20	4
30	10
40	20

What is a valid conclusion for this investigation?

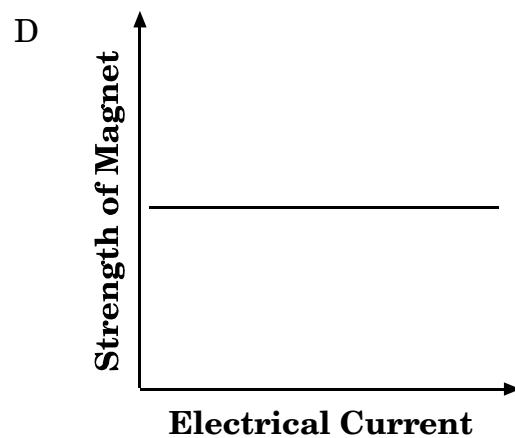
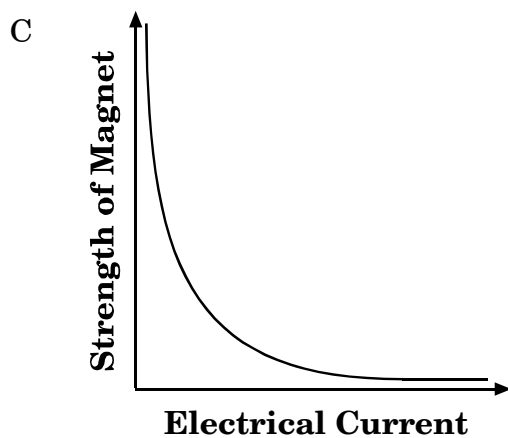
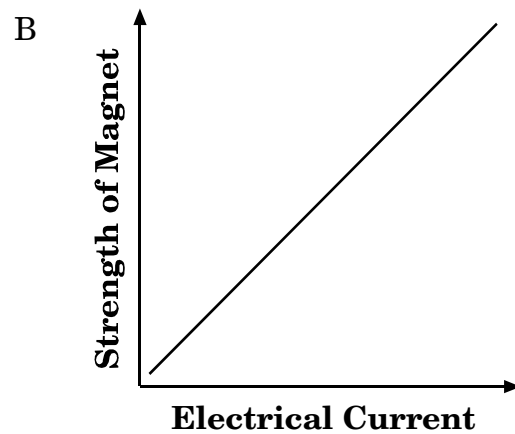
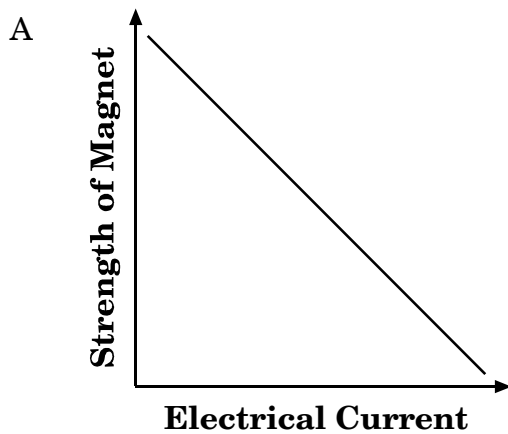
- A Increasing voltage increases electromagnetic strength.
- B Increasing the number of turns of wire decreases electromagnetic strength.
- C Increasing the number of turns of wire increases electromagnetic strength.
- D Increasing the number of turns of wire has no effect on electromagnetic strength.

19. A student performed an experiment to determine the number of paper clips that are attracted to an electromagnet as the amount of current changes.

Data Table

Current	Number of Paper Clips
5 A	20
10 A	40
15 A	60
20 A	80

Which graph **best** describes the relationship between magnetism and electrical current?



20. Which describes the magnetic fields of permanent magnets?
- A domains aligned in different directions
 - B domains aligned in a similar direction
 - C electric current produced by the protons in each atom
 - D electric current produced by a battery or other outside source

End of Goal 4 Sample Items

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