ELECTRICITY AND MAGNETISM

GRADES 6-8 · WORKSHEETS · ANSWER KEYS



My name _____ Date _____

Will the Magnet Pick It Up?

Does the magnet pick it up? Check one.

Some metals are attracted to a magnet. Look at each thing. Check one box.

iron nail
☐ picked up ☐ not picked up

aluminum foil
☐ picked up ☐ not picked up

steel paper clip
☐ picked up ☐ not picked up

copper wire
☐ picked up ☐ not picked up

iron washer
☐ picked up ☐ not picked up

wooden stick
☐ picked up ☐ not picked up

glass marble
☐ picked up ☐ not picked up

rubber eraser
☐ picked up ☐ not picked up

Tell one thing the magnet picks up. Tell one it does not.

Electricity and Magnetism – Will the Magnet Pick It Up?

PRINT AND GO

Bright Path Sped

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This is a fillable PDF

- Open it in a PDF reader (Adobe Acrobat Reader, Preview, or your browser), click into a line or a box, type, and Save As.
- The name line, every answer box, every ruled work box and every check box on the student pages are type-in fields, and so are the tracker, class grid, team note and family page. You can also print any page and write by hand.
- It works offline. No account, no subscription, no internet connection needed after you download it.

Print at 100 percent

Turn off fit to page and shrink to fit so the ruled lines stay 0.34 inch apart. Every student page has a colored border and colored drawings, and it still reads when copied in black and white. The colors copy as shades of gray.

Student work

A filled-in tracker, class grid or team note carries a real student's name. Keep it in the data folder, and use a first name only on any page that leaves your hands.

Need help?

If a field will not behave or a page will not print the way you expect, use Ask a Question on the product page before leaving a review. Every question is read, and a fix to the file ships as a free update: re-download it any time from My Purchases.

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PREVIEW

How To Read a Page

The parts of a student page, then the kinds of sheet in the order they come.

The parts of a page

- **The answer box.** A bordered box for a letter, a number or a word. Click it to type, or print and write in it.
- **The ruled work box.** Lines 0.34 inch apart for sentences. Write one idea to a line.
- **The check box.** True or false, series or parallel, conductor or insulator: click or mark.
- **The word bank.** A box of words to use. Each word in a bank is used one time unless the page says otherwise.
- **The cut line.** Pieces in a short grid, edge to edge: a few straight cuts across and down.

Kind of sheet	How many	What the student does
Readings and cards	4 sheets	Read, answer, and keep the cards to look things up.
Words and labels	3 sheets, 21 items	Match nine words, label a circuit and two magnets.
Materials and charge	3 sheets, 20 items	Test results, what a magnet picks up, and counting charges.
Series and parallel	4 sheets, 36 items	Name circuits, fill in a chart and a Venn, predict a removed bulb.
Electromagnets	2 sheets, 17 items	Read a bar graph, then compare a bar magnet with an electromagnet.
True or false and mistakes	2 sheets, 12 items	Check sentences, fix false ones, find Theo's mistakes.
Writing	2 sheets, 5 questions	Short answers with ruled lines, then explain-it boxes with room to write.
Quizzes, exit tickets, sorts	12 items, 3 tickets, 22 pieces	Two quizzes, one exit sheet, three cut-and-sort pages.

Untimed, unscored on the page

No student page has a timer or a score on it. The keys and the tracker are for you. The answer keys are on pages 32 to 38.

Short answers and explain-its

Their keys (page 37) say what to look for, not one right sentence. Accept any answer that uses a fact from the readings or the cards.

Batteries only

Every circuit and electromagnet in this file is a battery and wire. Nothing asks a student to plug into a wall outlet or touch household wiring. If you build a circuit in class, follow your school's own lab rules.

Printing and the type-in fields

Every page prints clean in black and white. The name line, every answer box, every ruled box and every check box are type-in fields in any PDF reader: click one, type, then save. This is a fillable PDF, not a slideshow or a word-processor file.

PREVIEW

Preview · Bright Path Sped

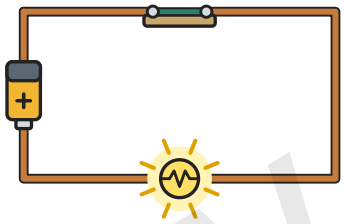
My name _____ Date _____

Reading 1: How a Circuit Works

Read about circuits. Then answer.

Circuits and current

An electric **circuit** is a path that electric charge can follow. A simple circuit has a battery, wires, a switch and a bulb. The moving charge is called **current**. Current flows only when the path is a closed loop with no gaps. When the switch is open, the loop has a gap, so the current stops and the bulb goes out. Some materials let current move easily. These are **conductors**, like copper wire and iron. Other materials block current. These are **insulators**, like rubber, plastic and wood. A circuit can be built in two ways. In a **series** circuit there is one path, so if one bulb is removed, all the bulbs go out. In a **parallel** circuit there are two or more paths, so the other bulbs stay lit.



A simple circuit: a battery, a switch, a bulb and wire in one closed loop.

Main idea: What is this reading mostly about?

Check what you read. Write the letter in the box.

1. What is current?
   - **A** A kind of battery
   - **B** Moving electric charge
   - **C** A gap in a wire

2. When does current flow?
   - **A** When the switch is open
   - **B** When a bulb is removed from a series circuit
   - **C** When the circuit is a closed loop

3. Which one is an insulator?
   - **A** Rubber
   - **B** Copper wire
   - **C** An iron nail

4. What happens in a series circuit when one bulb is removed?
   - **A** The other bulbs stay lit
   - **B** All the bulbs go out
   - **C** The battery gets stronger

PREVIEW

My name _____ Date _____

Circuit Parts Cards

Read the cards. Keep them all week.

Battery



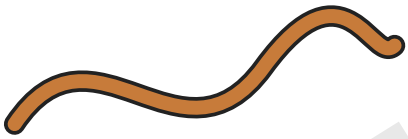
It pushes the current around the loop.

Bulb



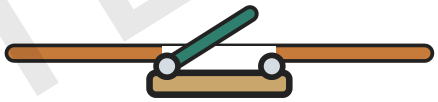
It lights up when current flows through it.

Wire



It is a conductor. Current moves along it.

Switch: open



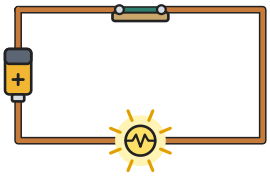
There is a gap. The current stops.

Switch: closed



The loop is complete. Current flows.

A complete circuit



A closed loop with a battery, a switch, a bulb and wire.

Pick one part. Tell what it does in your own words.

PREVIEW

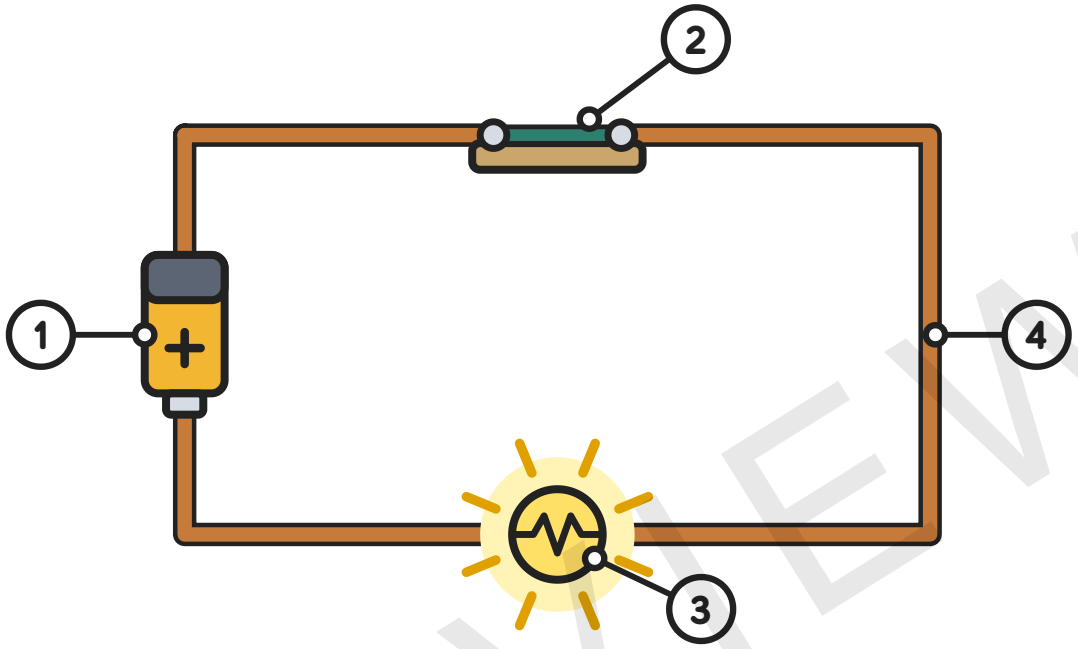
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My name _____ Date _____

Label the Circuit

Write the name of each part of the circuit.

Look at the numbers on the picture. Write each part's name. Use the word bank.



Wire **Battery** **Bulb** **Switch**

1 _____

2 _____

3 _____

4 _____

5 Is this circuit open or closed? ☐ **open** ☐ **closed**

PREVIEW

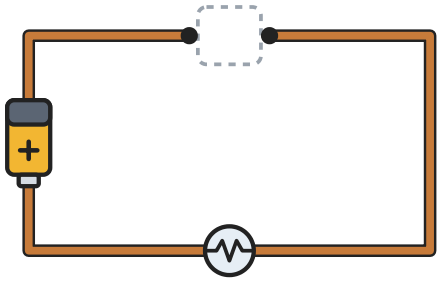
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My name _____ Date _____

Conductor or Insulator? Test Results

Read the test results. Check conductor or insulator.

Pretend you put each material in the gap. These results are made up for practice.



1	copper wire	Bulb: lit	☐ conductor	☐ insulator
2	rubber band	Bulb: not lit	☐ conductor	☐ insulator
3	steel paper clip	Bulb: lit	☐ conductor	☐ insulator
4	plastic ruler	Bulb: not lit	☐ conductor	☐ insulator
5	aluminum foil	Bulb: lit	☐ conductor	☐ insulator
6	wooden craft stick	Bulb: not lit	☐ conductor	☐ insulator

How can you tell a conductor from an insulator by watching the bulb?

PREVIEW

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My name _____ Date _____

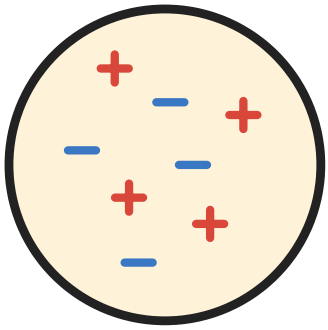
Count the Charges

Count the + and - marks. Check one.

These objects are invented for practice. Each + or - is one charge.

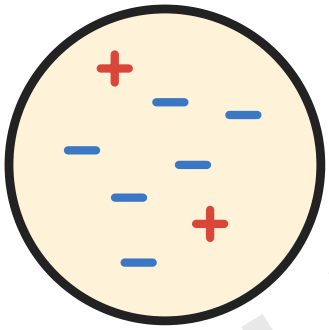
Rule: more + than - is positive. More - than + is negative. The same number of each is neutral.

1



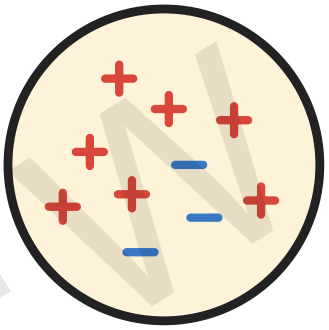
☐ positive ☐ negative ☐ neutral

2



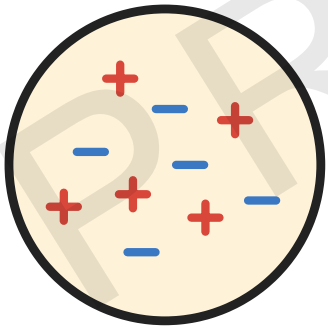
☐ positive ☐ negative ☐ neutral

3



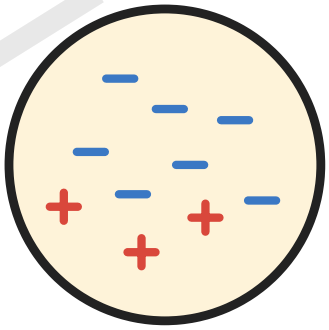
☐ positive ☐ negative ☐ neutral

4



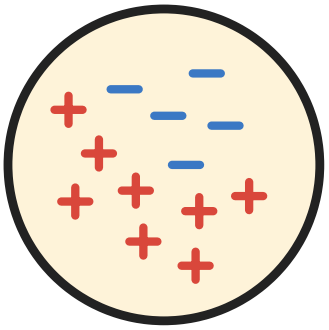
☐ positive ☐ negative ☐ neutral

5

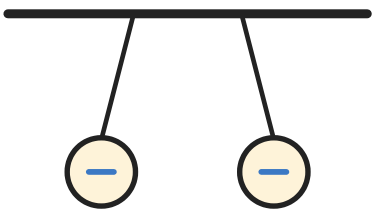


☐ positive ☐ negative ☐ neutral

6



☐ positive ☐ negative ☐ neutral



Both balls are negative. Will they attract or repel? Tell why.

PREVIEW

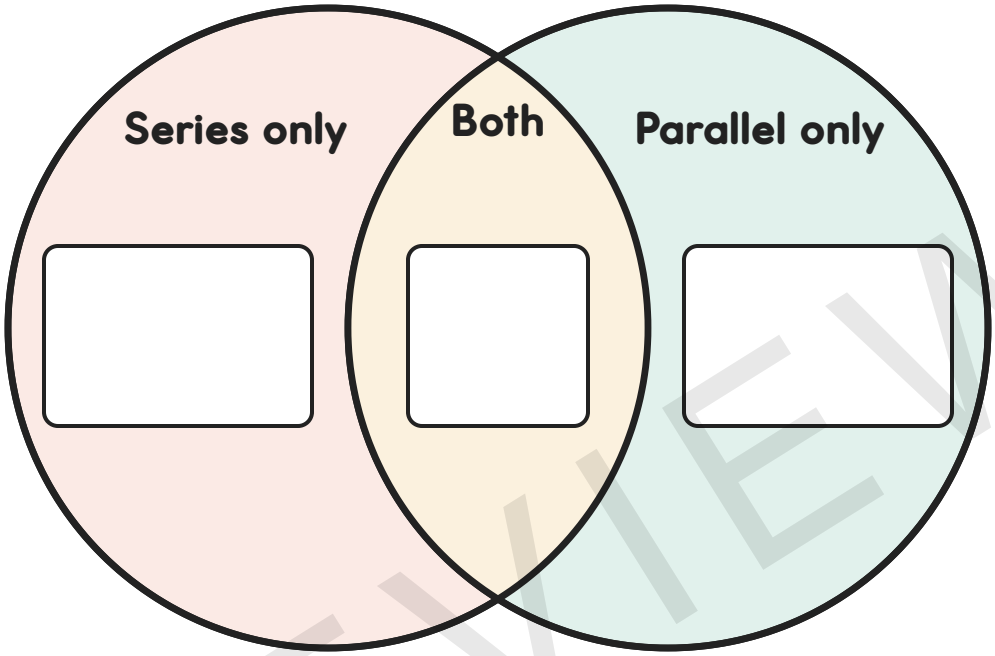
Preview · Bright Path Sped

My name _____ Date _____

Venn Diagram: Series and Parallel

Write each number where it belongs in the circles.

Read each statement. Write its number in the right part of the circles. Some parts get more than one number.



1 Has only one path.

2 Has two or more paths.

3 Needs a closed loop to work.

4 If one bulb is removed, all the bulbs go out.

5 If one bulb is removed, the others stay lit.

6 A switch can turn the bulbs off.

7 Adding bulbs makes each bulb dimmer.

8 Adding bulbs keeps each bulb bright.

9 Current flows from a battery through wires.

10 Current passes through every bulb in turn.

11 Current splits where the wires branch.

12 The wires are made of a conductor.

Pick one statement from Both. Tell why it is true for a series circuit and a parallel circuit.

PREVIEW

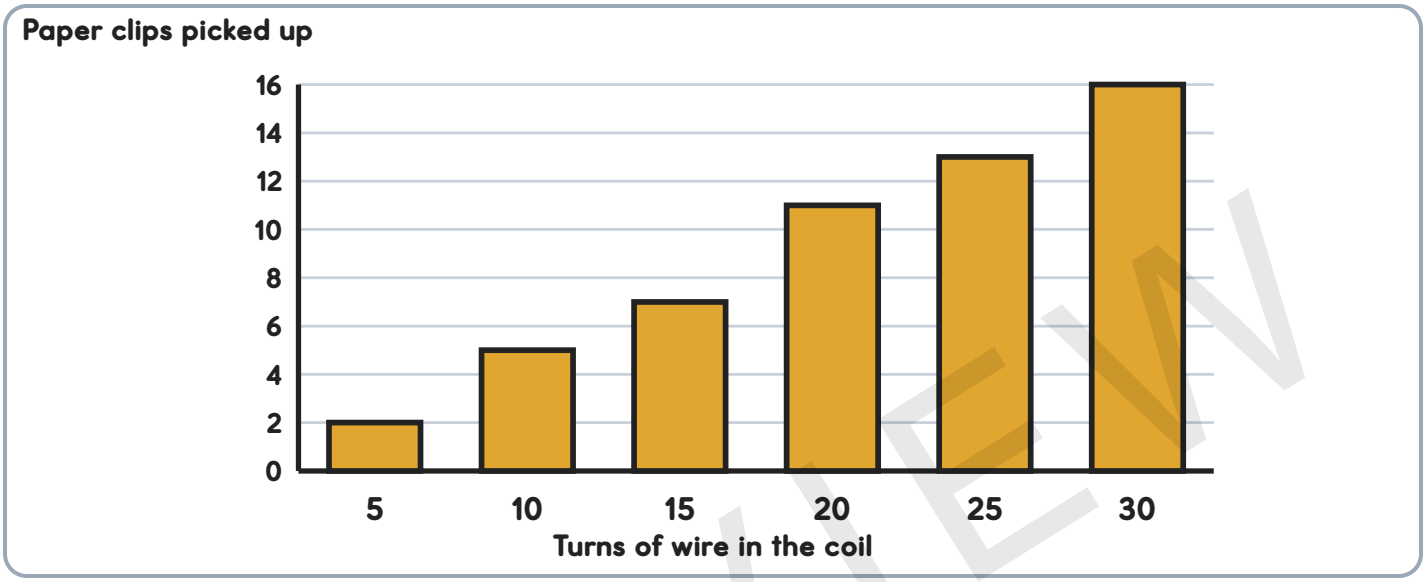
Preview · Bright Path Sped

My name _____ Date _____

Electromagnet Investigation

Read the graph. Fill in the table. Answer.

An invented class tested an electromagnet: a battery, an iron nail and wire. Read each bar. Write the number in the table.



Turns	5	10	15	20	25	30
Clips						

1 How many turns of wire picked up the most clips? ☐

2 How many more clips did 30 turns pick up than 10 turns? ☐

3 As the turns of wire go up, do the clips picked up go up or down? ☐ **up** ☐ **down**

PREVIEW

Preview · Bright Path Sped

My name _____ Date _____

Find the Mistake

Find the mistake. Then fix it.

Theo is made up for practice. Each sentence has one mistake.

1 **Theo wrote:**

"An open switch lets current flow."

What is wrong?

Write it the right way.

2 **Theo wrote:**

"In a series circuit, the other bulbs stay lit when one bulb is removed."

What is wrong?

Write it the right way.

3 **Theo wrote:**

"Plastic is a conductor because it covers wires."

What is wrong?

Write it the right way.

4 **Theo wrote:**

"The north poles of two magnets attract."

What is wrong?

Write it the right way.

PREVIEW

My name _____ Date _____

Explain It

Explain your thinking in sentences.

Use what you know about circuits and magnets. Say why.

Start with: I know that ____ because ____.

1. A student builds a circuit with two bulbs. When one bulb is unscrewed, the other bulb goes out. Is the circuit series or parallel? Explain.

2. An electromagnet with 10 turns of wire picks up 5 paper clips. The student adds 10 more turns of wire. Tell what you expect and why.

PREVIEW

My name _____ Date _____

Quiz B

Pick the best answer. Write its letter.

Take your time. Guess if you are not sure.

7 Which circuit has only one path for the current?

A Parallel
B Series
C Open

8 An object has 3 plus marks and 7 minus marks. What is its charge?

A Positive
B Neutral
C Negative

9 What happens to an electromagnet when you add more turns of wire?

A It gets stronger
B It gets weaker
C It stays the same

10 Which one lets current pass easily?

A Glass
B Aluminum foil
C Wood

11 Two balloons have the same charge. What do they do?

A Repel
B Attract
C Nothing

12 What is the space around a magnet where its force acts?

A A circuit
B An insulator
C A magnetic field

PREVIEW

Preview · Bright Path Sped

My name _____ Date _____

Cut and Sort: Conductor or Insulator

Cut out the pieces. Sort them into Conductor and Insulator.

A conductor lets current through. An insulator blocks it. Glue each piece in a box.

Conductor	Insulator

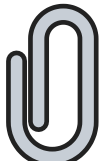
Cut on the dashed lines: eight pieces, one cut across and three cuts down.



Plastic spoon



Copper wire



Steel paper clip



Wooden stick



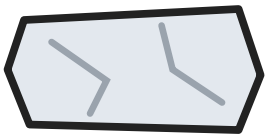
Rubber eraser



Iron nail



Glass marble



Aluminum foil

Which piece was hardest to sort? Why?

PREVIEW

My name _____ Date _____

Cut and Sort: Will the Bulb Light?

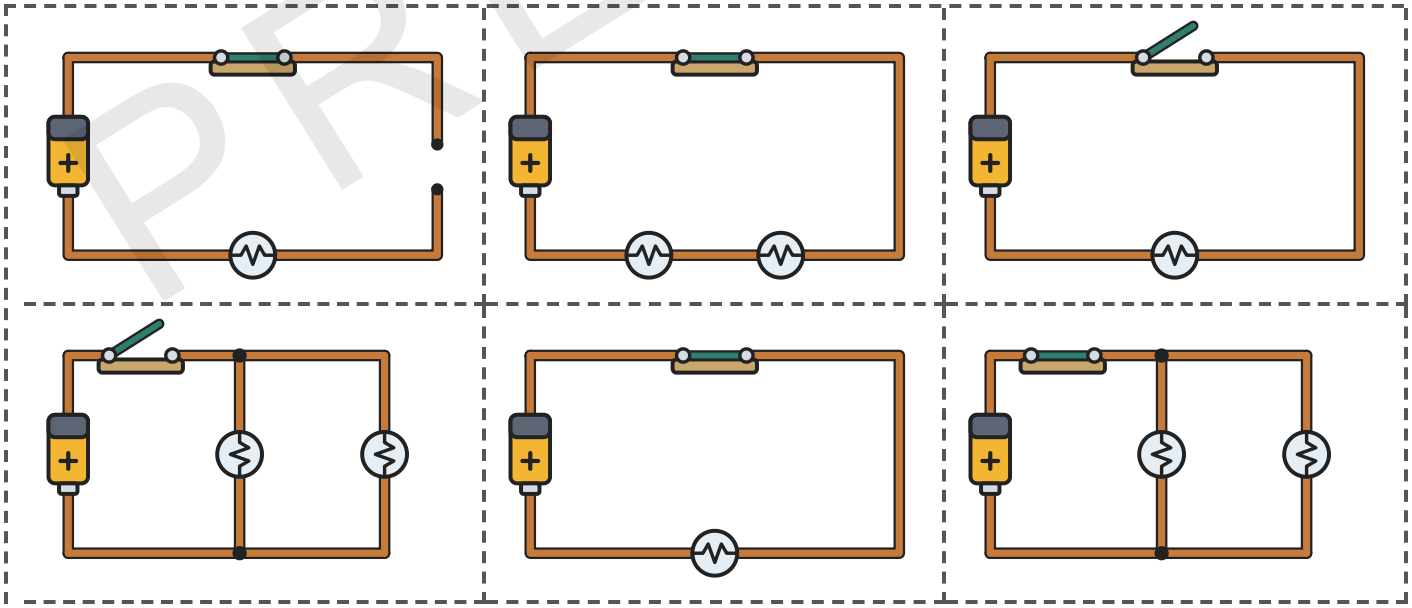
Cut out the circuits. Will the bulb light?

Follow the path from the battery. Is the loop closed? Glue each circuit in a box.

Bulb lights	Bulb stays off

PREVIEW

Cut on the dashed lines: six pieces, one cut across and two cuts down.



Tell why one of the circuits will not light the bulb.

Answer Key: Labels, Materials, Charge

Accept the name as printed in the word bank.

Label the Circuit page 10

Item	Answer
10.1	Battery
10.2	Switch
10.3	Bulb
10.4	Wire
10.5	closed

Label the Magnets page 11

Item	Answer
11.1	North pole
11.2	South pole
11.3	Field line
11.4	Iron nail
11.5	Coil of wire
11.6	Battery
11.7	Paper clip

Conductor or Insulator? page 12

Material	Bulb	Answer
1. copper wire	lit	conductor
2. rubber band	not lit	insulator
3. steel paper clip	lit	conductor
4. plastic ruler	not lit	insulator
5. aluminum foil	lit	conductor
6. wooden craft stick	not lit	insulator

Will the Magnet Pick It Up? page 13

Item	Answer
1. iron nail	picked up
2. aluminum foil	not picked up
3. steel paper clip	picked up
4. copper wire	not picked up
5. iron washer	picked up
6. wooden stick	not picked up
7. glass marble	not picked up
8. rubber eraser	not picked up

Count the Charges page 14

Object	Answer
1. 4 plus, 4 minus	neutral
2. 2 plus, 6 minus	negative
3. 7 plus, 3 minus	positive
4. 5 plus, 5 minus	neutral
5. 3 plus, 7 minus	negative
6. 8 plus, 5 minus	positive

A note on the magnet page

Iron and steel are attracted to a magnet. Aluminum, copper, wood, glass and rubber are not. Copper and aluminum are good conductors, but a magnet does not pick them up. The test results and the charged objects are invented.

PREVIEW

Answer Key: Quizzes and Mistakes

The student in Find the Mistake is invented. Accept any wording that fixes the mistake.

Quizzes pages 25, 26

Item	Letter	Answer
25.1	A	A closed path for current
25.2	B	Copper wire
25.3	C	The current stops
25.4	A	They stay lit
25.5	A	North and south
25.6	C	Current in a coil of wire
26.1	B	Series
26.2	C	Negative
26.3	A	It gets stronger
26.4	B	Aluminum foil
26.5	A	Repel
26.6	C	A magnetic field

Find the Mistake page 22

Item	What went wrong	Right sentence
22.1	An open switch makes a gap.	An open switch makes a gap in the circuit, so the current stops.
22.2	That is true of a parallel circuit.	In a series circuit all the bulbs go out. The other bulbs stay lit in a parallel circuit.
22.3	Plastic is an insulator.	Plastic is an insulator. It covers wires to block the current.
22.4	Like poles repel.	Two north poles repel each other. A north pole and a south pole attract.

PREVIEW

Answer Key: Sorts

Pieces are named by their row and column in the cutting grid, left to right and top to bottom.

Cut and Sort: Conductor or Insulator page 29

Piece (row, column)	Box
r1 c1: Plastic spoon	Insulator
r1 c2: Copper wire	Conductor
r1 c3: Steel paper clip	Conductor
r1 c4: Wooden stick	Insulator
r2 c1: Rubber eraser	Insulator
r2 c2: Iron nail	Conductor
r2 c3: Glass marble	Insulator
r2 c4: Aluminum foil	Conductor

Cut and Sort: Magnets Attract or Repel page 30

Piece (row, column)	Box
r1 c1: N faces N	Repel
r1 c2: N faces S	Attract
r1 c3: S faces S	Repel
r1 c4: S faces N	Attract
r2 c1: S faces S	Repel
r2 c2: N faces S	Attract
r2 c3: S faces N	Attract
r2 c4: N faces N	Repel

Cut and Sort: Will the Bulb Light? page 31

Piece (row, column)	Box
r1 c1: series, 1 bulb, wire gap	Bulb stays off
r1 c2: series, 2 bulbs, switch closed	Bulb lights
r1 c3: series, 1 bulb, switch open	Bulb stays off
r2 c1: parallel, 2 bulbs, switch open	Bulb stays off
r2 c2: series, 1 bulb, switch closed	Bulb lights
r2 c3: parallel, 2 bulbs, switch closed	Bulb lights

A note on the sorts

Metals such as copper, iron, aluminum and steel are conductors; rubber, plastic, wood and glass are insulators. For the magnet pairs, the letters on the two facing ends decide: different letters attract, the same letter repels. For the circuits, a bulb lights only when the loop is closed: an open switch or a gap in the wire stops the current. In the parallel picture with the switch closed, both bulbs light.

PREVIEW

Team Note

Use this page between team meetings or when a student moves classes, to hand off what changed without writing a note from scratch. Everything below is observable, with a blank for the number or the wording your team already uses.

Student _____ Team member _____ Date _____

Kind of sheet	Covered since last note (Y/N)	Items right	Still blank
Readings and words			
Labels			
Materials and charge			
Series and parallel			
Electromagnets			
True or false, mistakes			
Quizzes			
Sorts			

What I saw (observable, not a conclusion)

- Filled in ___ of 10 chart boxes (page 16).
- Placed ___ of 12 statements in the Venn (page 17).
- Named ___ of 8 series or parallel items (page 15).
- Chose the right result for ___ of 6 removed-bulb pictures (page 18).
- Explained one difference between a series and a parallel circuit in a complete sentence: yes / no / with a reminder.

Next step

- Next page or set: ___, because ___ (what you saw).
- What to try in another class or at home: ___.
- What to keep doing because it is working: ___.
- Anything for the team meeting to decide: ___ (this page records what happened, never a label or a plan).

Summary, in one or two sentences, for whoever reads this next

A filled-in line, for reference

"Chose the right result for 5 of 6 removed-bulb pictures on 10/21. Next step: reread the chart and ask how many paths the current has." That is the level of detail this page is built for. It matches the filled example on page 43.

PREVIEW

Casey's Tracker (Invented Student)

Casey L. is invented; nothing on this page describes a real student. The blank tracker is on page 39.

Student: Casey L. (an invented student)

Teacher: Ms. Patel (invented)

Month: October

Page	Page type and set	Items	Right	Date	Notes
5	Reading 1: How a Circuit Works	4	3	10/6	Mixed up current and charge
6	Reading 2: Magnets and Charge	4	4	10/7	-
9	Electricity and Magnet Words	9	7	10/8	Swapped series and parallel
10	Label the Circuit	5	5	10/9	-
11	Label the Magnets	7	6	10/10	Swapped the coil and the nail
12	Conductor or Insulator? Test Results	6	6	10/13	-
13	Will the Magnet Pick It Up?	8	6	10/14	Thought aluminum is magnetic
14	Count the Charges	6	6	10/15	-
15	Series or Parallel?	8	7	10/16	Counted one bulb too few
16	Series and Parallel Chart	10	8	10/17	Mixed up dimmer and bright
17	Venn Diagram: Series and Parallel	12	8	10/20	Put one path in Both
18	A Bulb Is Removed	6	5	10/21	Said series bulbs stay lit
19	Electromagnet Investigation	9	7	10/22	Misread two bars
20	Bar Magnet or Electromagnet?	8	-	-	-
21	True or False	8	6	10/23	Thought like poles attract
22	Find the Mistake	4	-	-	-
25	Quiz A	6	-	-	-
26	Quiz B	6	-	-	-
29	Cut and Sort: Conductor or Insulator	8	-	-	-
30	Cut and Sort: Magnets Attract or Repel	8	-	-	-
31	Cut and Sort: Will the Bulb Light?	6	-	-	-

How to read it

Casey L. has done **14 of 21** scored sheets and got **84 of 102** items right with no prompt. **4** sheets were all right and **10** carry a note. Every number comes from the table.

What the table points to

The lowest sheet is Venn Diagram: Series and Parallel (8 of 12). That is where the next practice goes. The 7 sheets left blank are not tried yet, never wrong.

PREVIEW