APS physics

COLOR ME PHYSICS!

Activity Book featuring Abigail Atom

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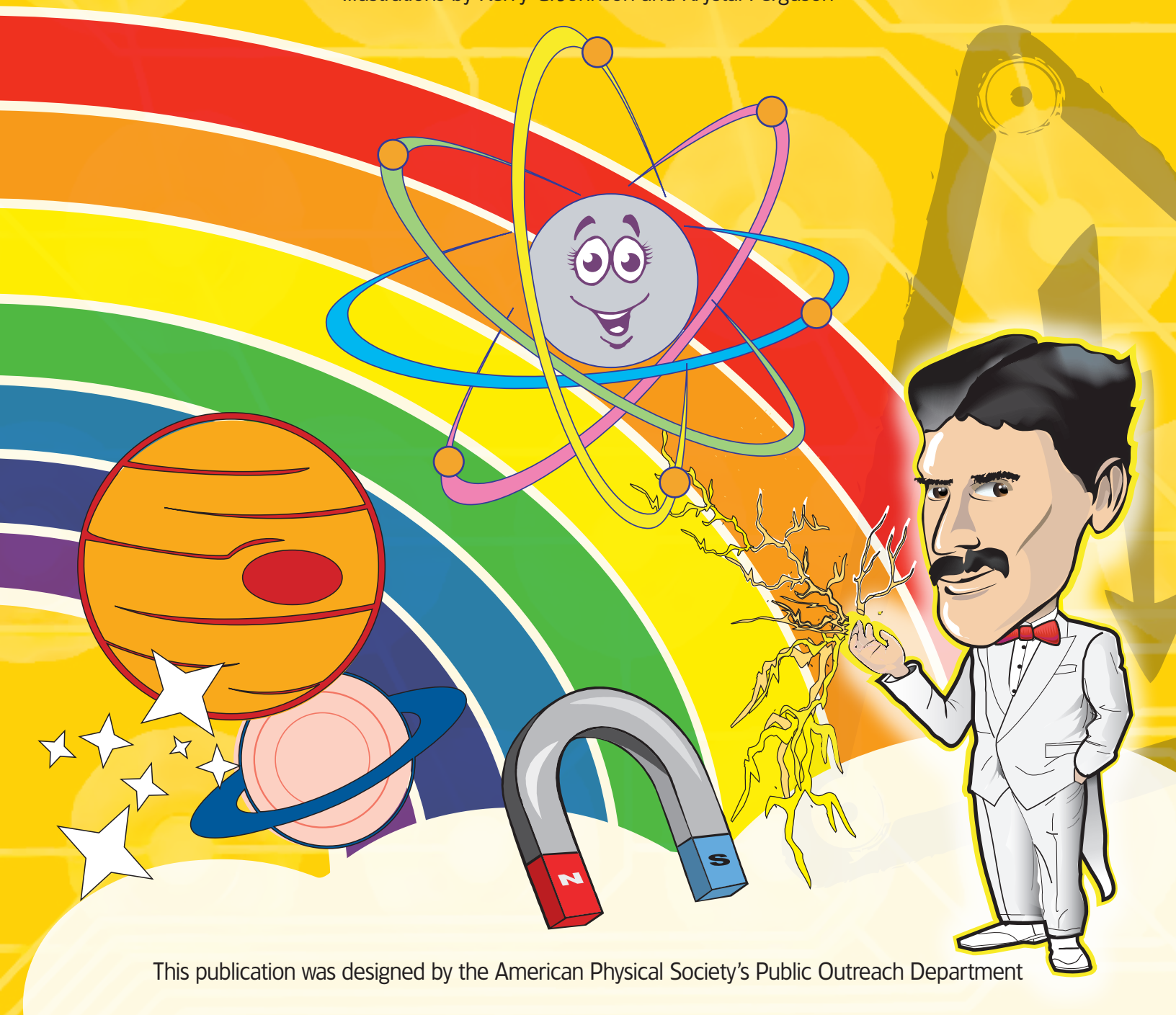
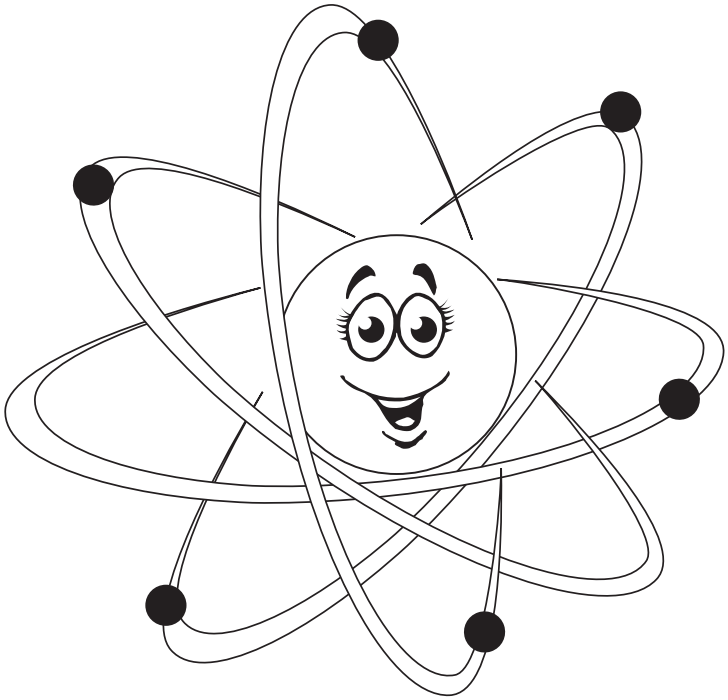


This publication was designed by the American Physical Society's Public Outreach Department

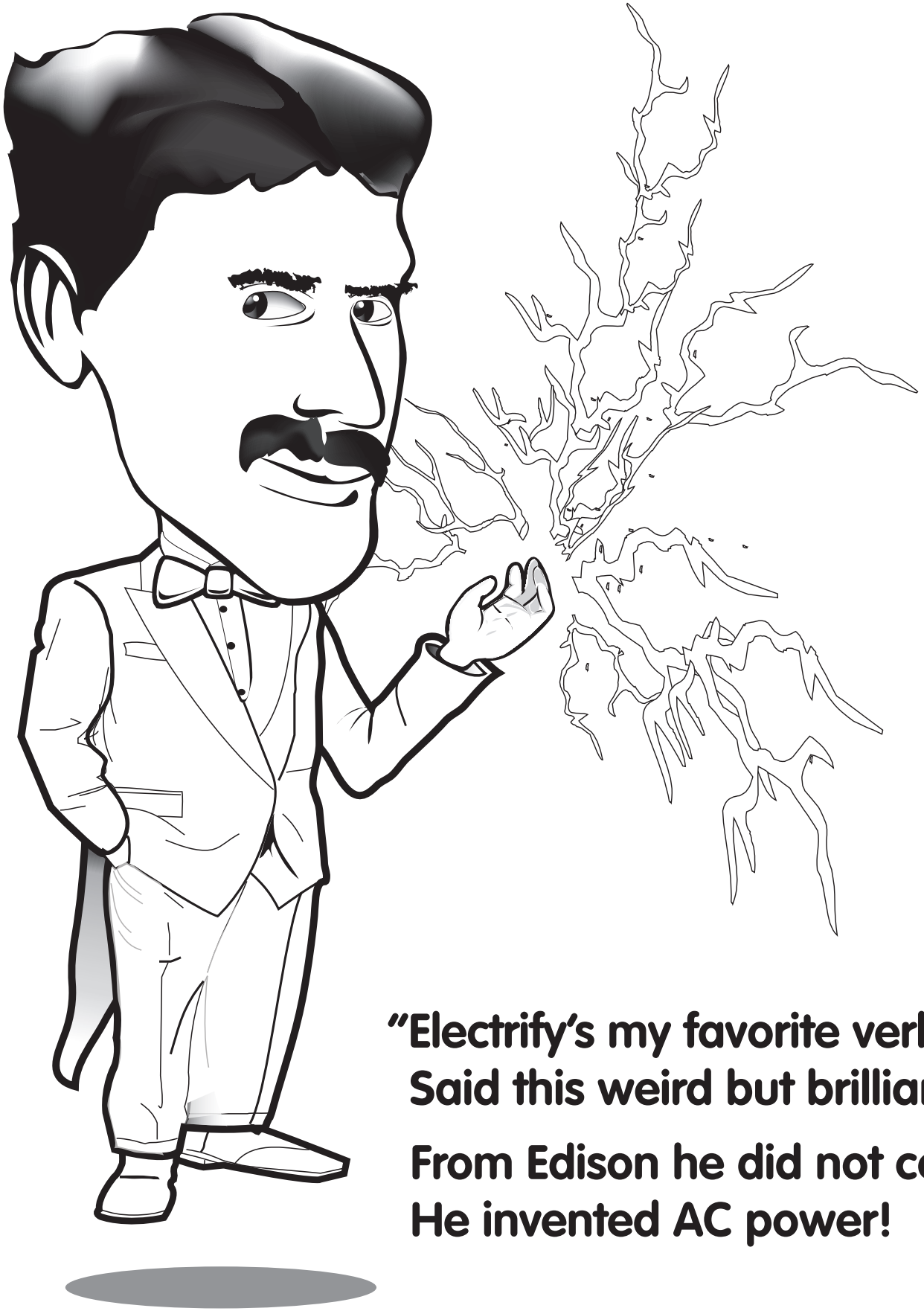
Meet Abigail Atom!



Hi, I'm Abigail Atom! Let me tell you a little bit about myself. Positive protons and neutral neutrons sit at my center. Negative electrons whirl around the outside of me. All together, these three things make up me, Abigail Atom! I'm going to be your tour guide through the amazing world of physics. I will help you do fun activities so that you can learn more about your world and how it works. If you still can't get enough, visit my good friend Buzz the Bee at physicscentral.com. He can show you even more fun physics. Come join me on this big adventure through our world!

APS physics

This activity book is brought to you by the American Physical Society's Public Outreach Group. Our goal is to make physics fun and exciting for all ages. We hope you like the activity book, and we hope you learn a bit more about the world around you. Stop by physicscentral.com to learn about some of our other projects.



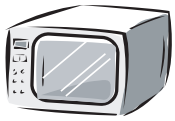
"Electrify's my favorite verb"
Said this weird but brilliant Serb

From Edison he did not cower,
He invented AC power!

Hidden Treasures

Tesla invented many things including the world's first remote controlled toy boat! Can you find seven of Tesla's inventions hidden in this room?

loud speaker



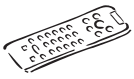
microwave

radio

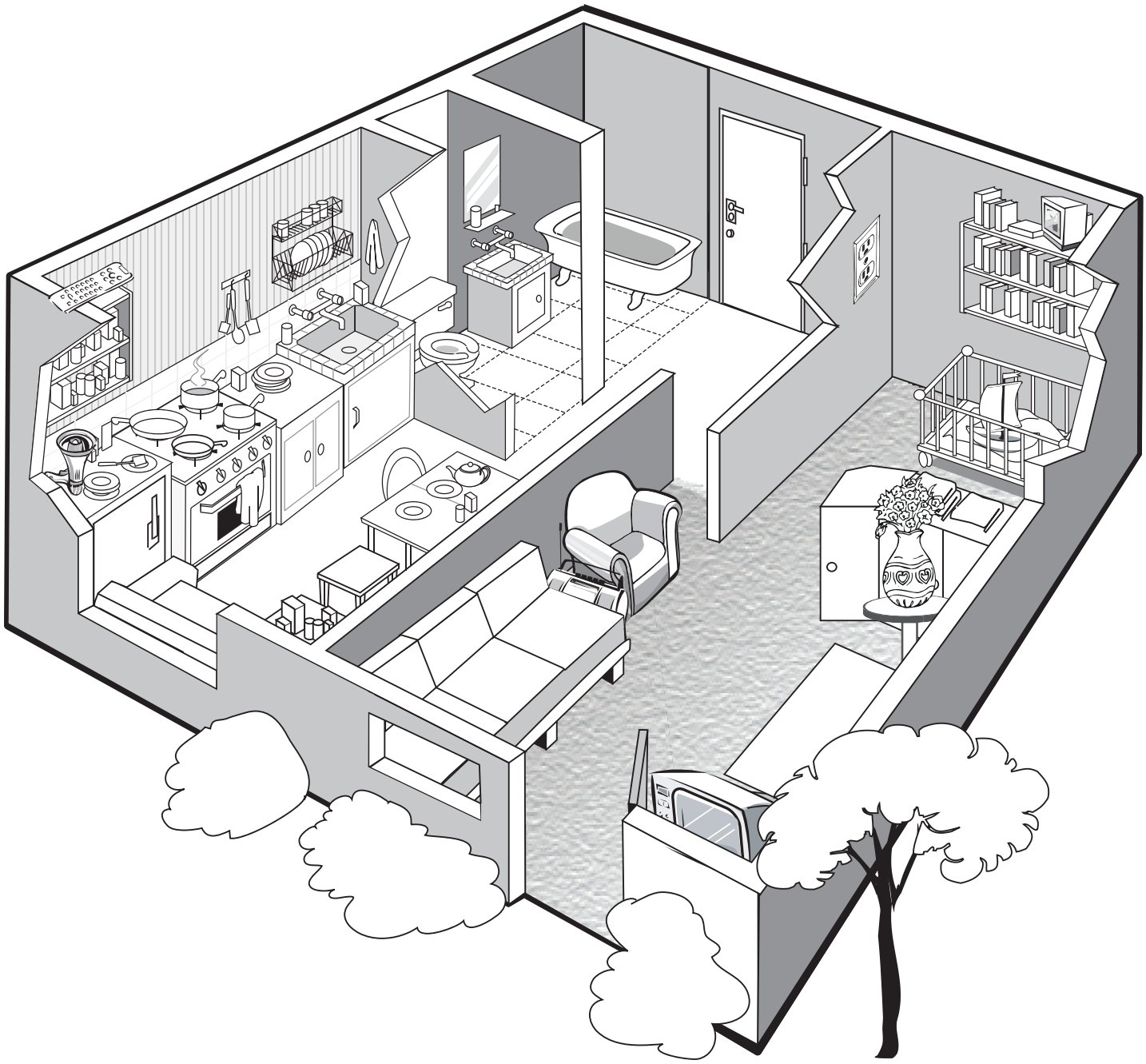
television

wall socket

toy boat

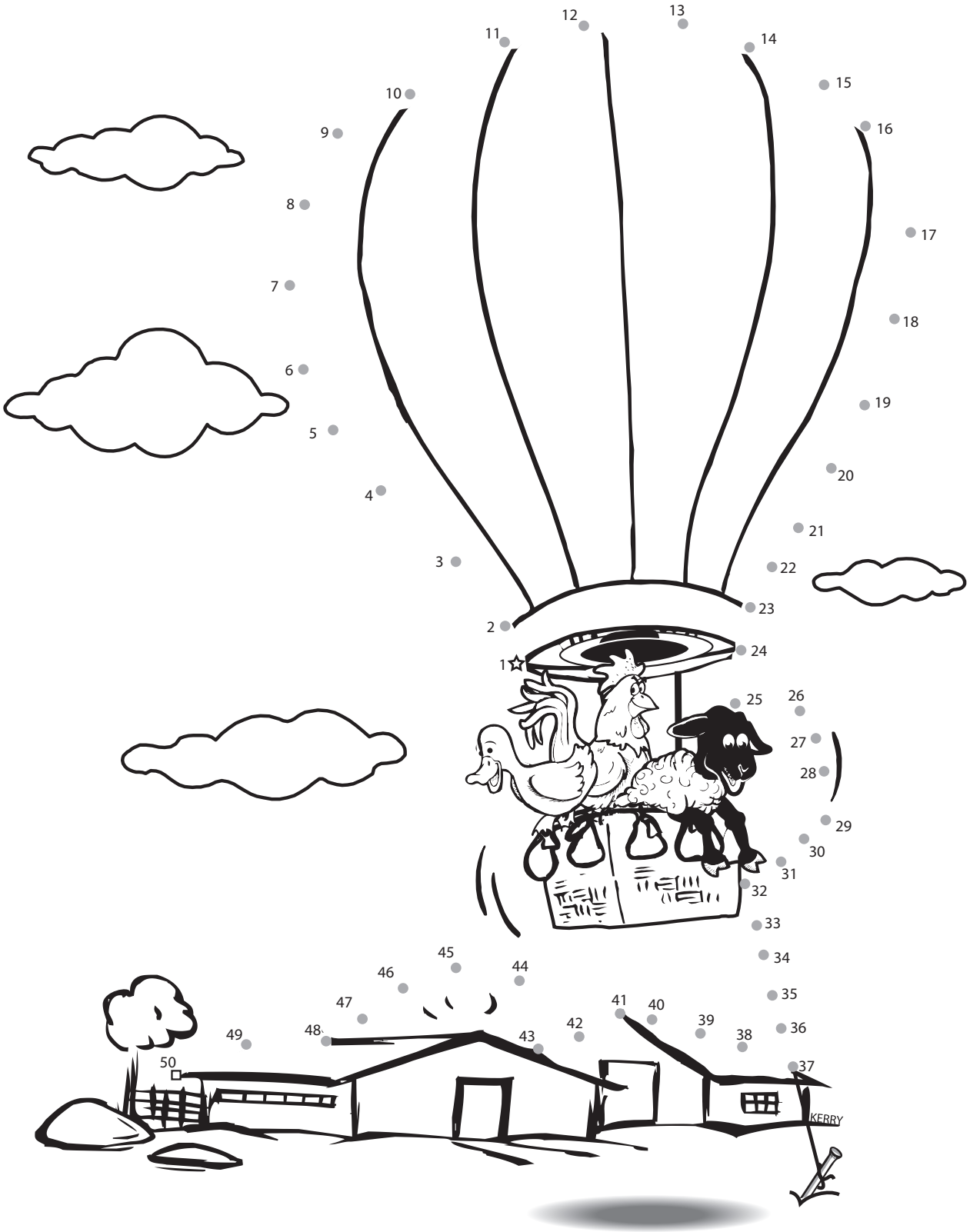


remote control

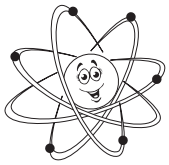


Balloon Animals

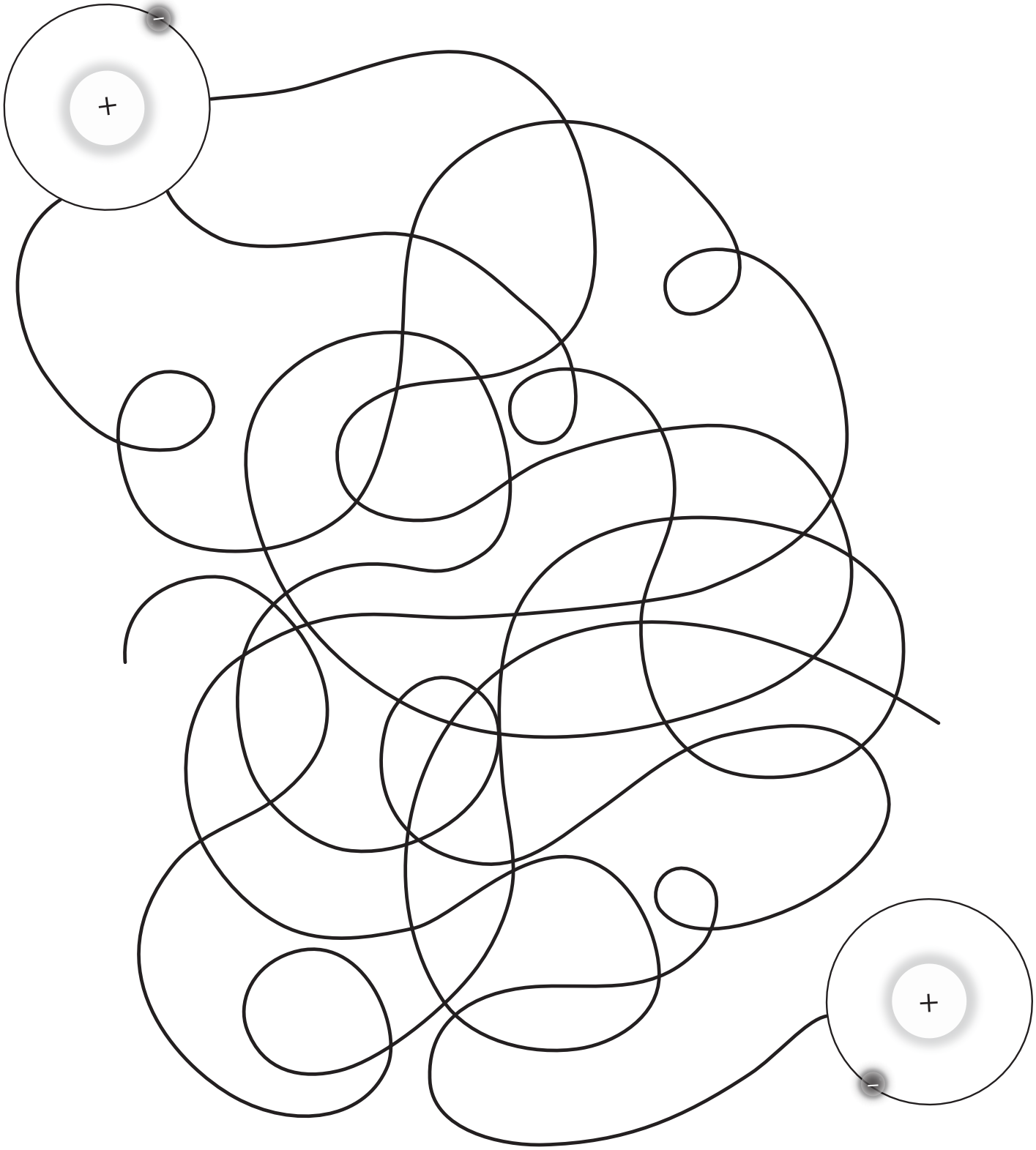
The first hot air balloon carried a sheep, a duck, and a rooster. Hot air balloons fly because hot air rises. You can experience this for yourself. In the summer, feel which air is hotter, the air near the ceiling or the air near the floor. Connect the dots to complete the picture.



Best Friends

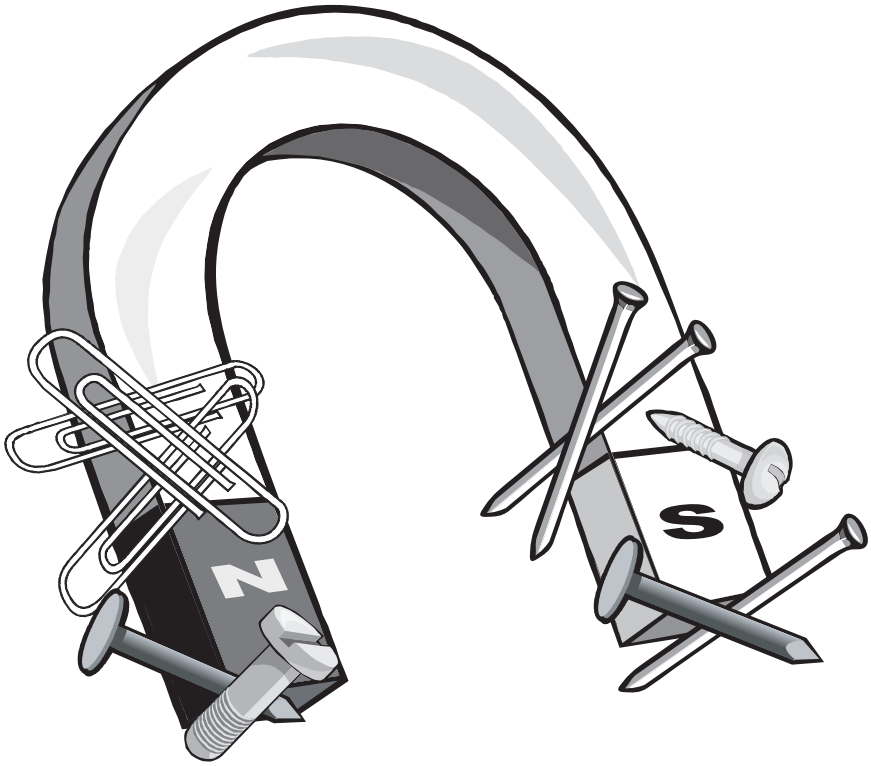


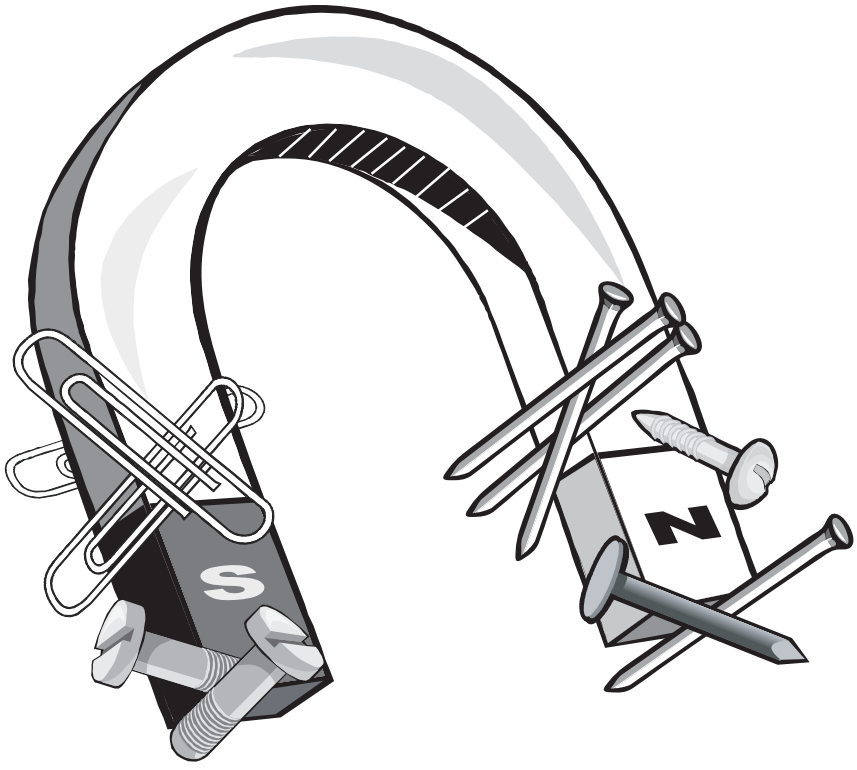
Hydrogen atoms don't like to be alone. In nature, hydrogen is almost always found with a friend such as another hydrogen atom. Which path connects the two hydrogen atoms?



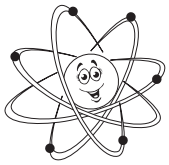
Different Attractions

Magnets always have a north end and a south end. North and south are attracted to each other. They attract many metal things, but not things made of aluminum like soda cans. Can you find all the differences between the two pictures?





Help the Electron Find the Proton!



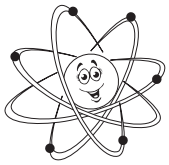
Electrons are negatively charged and protons are positively charged. Positive and negative charges like to be together. Can you help the electron find the proton?

Electron −

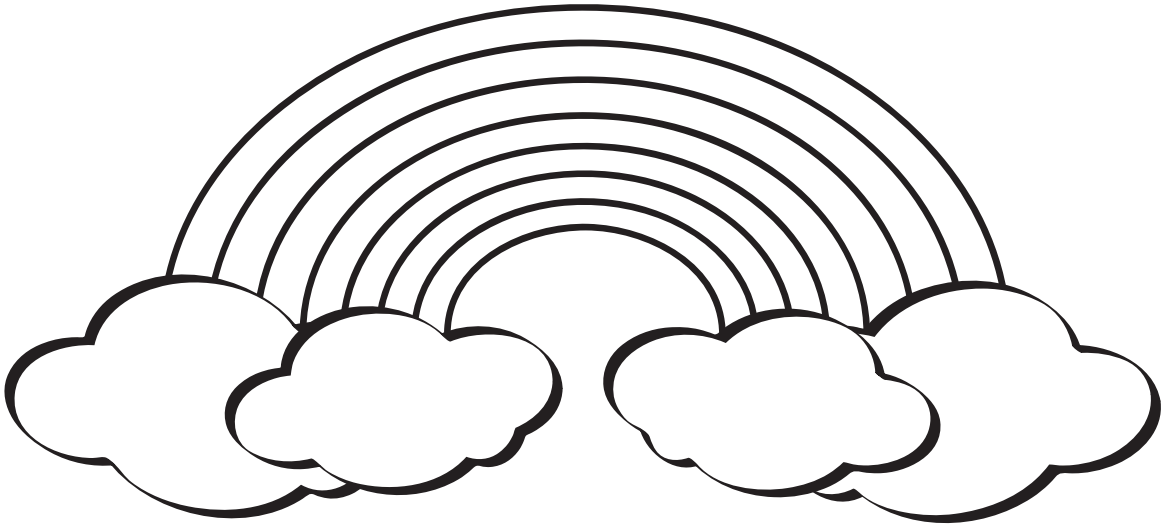
+

Proton

Bright Ideas



A rainbow is made up of seven colors: red, orange, yellow, green, blue, indigo, and violet. You can remember these colors and their order in a rainbow by remembering Roy G. Biv. Can you find these words about light in this puzzle?

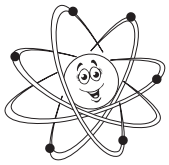


RAINBOW
RAY
RED
BLUE
BEAM
SUN
WAVE
LENS
LASER
SHINE

G	Z	L	Y	N	S	S	V	U	K
R	P	M	V	G	H	X	E	S	P
N	S	L	Z	T	Z	I	G	T	Y
F	W	H	E	V	G	D	H	R	R
J	R	A	I	N	B	O	W	E	H
V	S	J	V	N	S	T	S	D	F
V	X	F	C	E	E	A	U	N	D
X	I	Z	K	U	L	E	N	G	K
Q	T	E	L	S	J	R	A	Y	C
F	P	B	V	S	B	E	A	M	J

Puzzle generated by theteacherscorner.net

It's a Great, Big Universe!



Can you unscramble these words about our solar system?

rtsas _____

onmo _____

usn _____

ltpou _____

snuaru _____

crymure _____

tenpneu _____

rateh _____

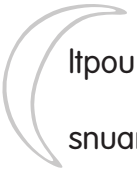
srma _____

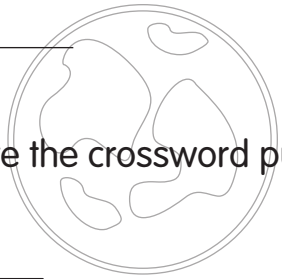
latneps _____

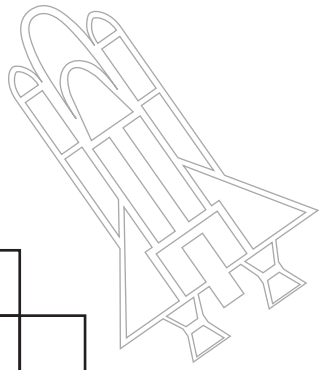
nsveu _____

tipjure _____

runsat _____







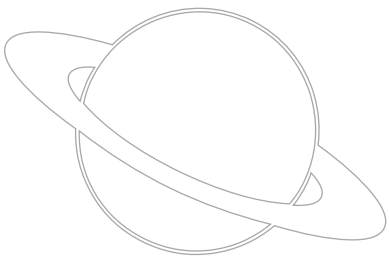
Now use these words to complete the crossword puzzle.

Across

2. There are now 8 of them in our solar system.
5. This planet is very, very hot and is closest to the sun.
6. This is not a planet anymore because it was too small. It is also the name of a popular Disney dog.
9. This planet is named after the Roman god of the sea and is the farthest planet from the sun.
11. Though many people think that little green men live here, most scientists agree there is no life on this planet.
12. This planet has beautiful rings. A popular type of car is named after it.

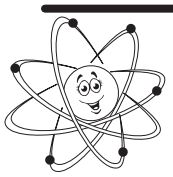
Down

1. They light up the night sky and make up constellations.
3. It is the center of the solar system and is the closest star to earth.
4. This is the largest of the planets with a mass that is 2-and-a- half times that of all other planets combined. It has a great red spot.
5. Mars has two, but we have only one. It is not made of cheese.
7. Named for the Roman god of the sky, it is the coldest of all the planets and spins on a very tilted axis.
8. This planet is covered with clouds, is often called the "morning star," and is named after the Roman goddess of love.
10. Third rock from the sun.



Crossword generated by Eclipse Crossword

Newton's Apple

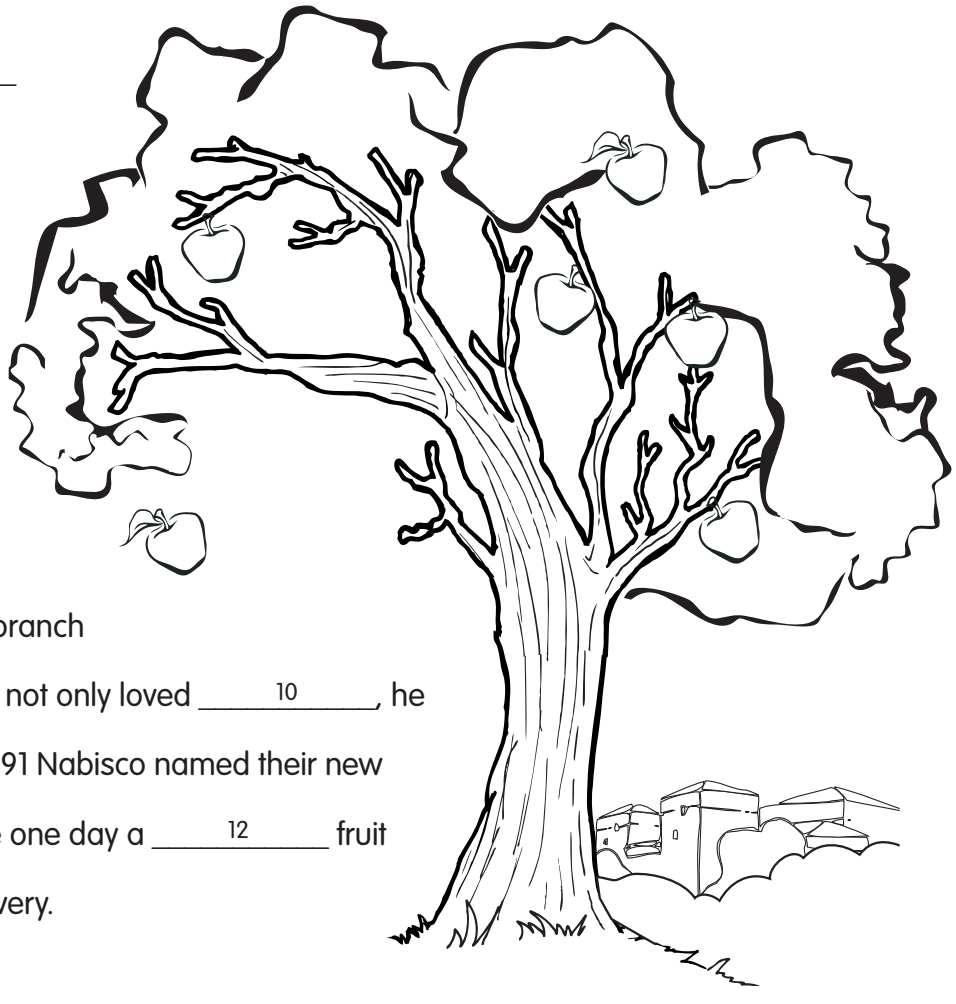


First, fill in the blanks in the Mad Lib list with the correct parts of speech. Then put these words in the blanks in the story and read it out loud. Who knew Sir Isaac Newton could be so funny?!

Parts of Speech:

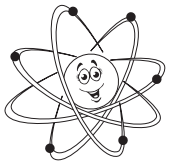
1. Adjective _____
2. Noun _____
3. Past Tense Verb _____
4. Body Part _____
5. Plural Noun _____
6. Plural Noun _____
7. Verb _____
8. Adjective _____
9. School Subject _____
10. Plural Noun _____
11. Verb _____
12. Adjective _____
13. Adjective _____

Isaac Newton



Sir Isaac Newton was a very _____1_____ physicist. One day when he was sitting under an apple _____2_____ an apple _____3_____ on his _____4_____ and he thought "Aha! It must be because of gravity!" He used gravity to explain how _____5_____ fall and how the _____6_____ _____7_____ around the sun. He also created a(n) _____8_____ branch of _____9_____ called calculus. Newton not only loved _____10_____, he also loved to _____11_____ fig tarts. In 1891 Nabisco named their new fig tart after him, the Fig Newton. Maybe one day a _____12_____ fruit will help you make a _____13_____ discovery.

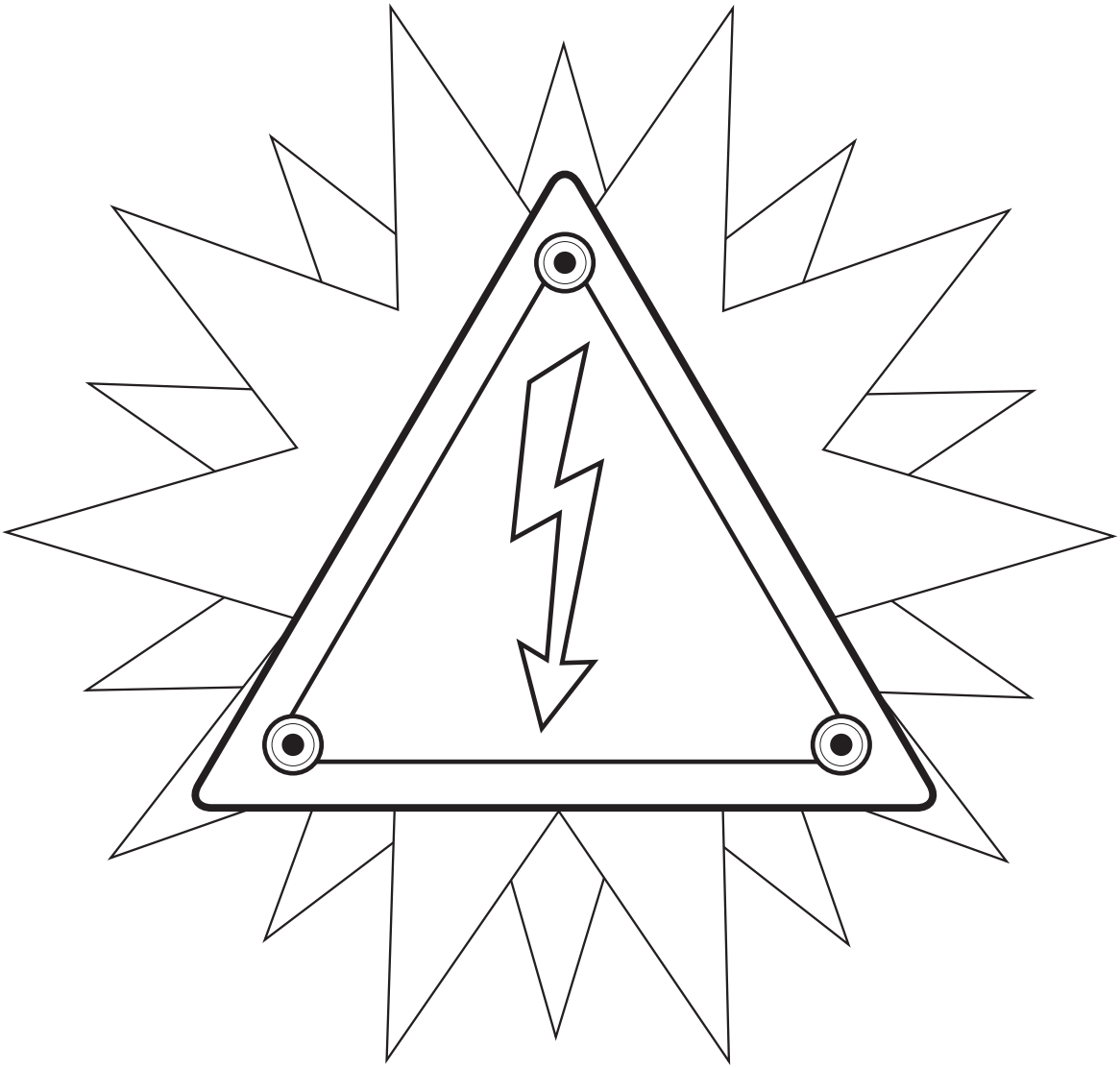
What's In A Word?



Electromagnetism explains how magnets and electricity work together. See how many words you can make using the letters in the word:

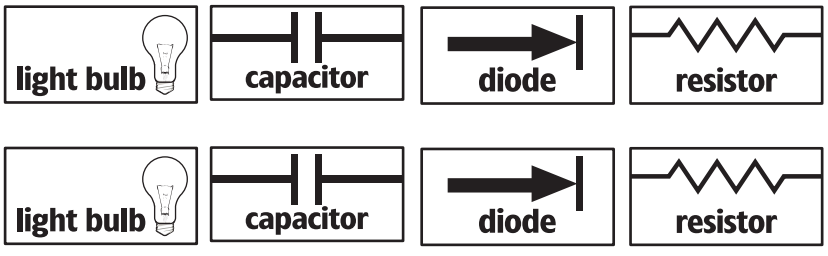
E L E C T R O M A G N E T I S M

Short Circuit! Game Tokens



SHORT CIRCUIT!

Ask an adult to help you cut out the game pieces and numbered slips of paper below. Remove the staples from the book to remove the game board. Each person draws a number and the person who draws the highest number will go first!



1	2	3	4	5	6

SHORT CIRCUIT!

In **SHORT CIRCUIT!** You will move through a circuit and try to be the first to reach the light bulb. Batteries and short circuits will speed you up but resistors and diodes could slow you down. Have fun!

Game play:
Before you begin, you must decide which path you will take when you get to the "junction" square. One path is shorter, but you could lose three turns. The other path is longer but safer.

Each player takes turns drawing numbers and moving forward. When you land on a square read it out loud and follow any instructions. If you land on a "short circuit" square you get to immediately travel through the short circuit path. You must draw an exact number to land on the light bulb and win the game. The first person to reach the light bulb wins!

START HERE!

CURRENT FLOWS THROUGH A CIRCUIT!

LOW RESISTANCE! LOSE 1 TURN

RESISTORS WHICH HAVE RESISTANCE SLOW CURRENT DOWN!

The higher the resistance, the more slowly current flows.

CAPACITOR! Lose 3 turns while the capacitor charges before moving ahead 7 spaces! CAPACITOR!

CAPACITATORS STORE ENERGY, THEN RELEASE IT QUICKLY!

When there is a short circuit, current can skip some resistors.

SHORT CIRCUIT! Take the short circuit to advance to the square below.

MEDIUM RESISTANCE! LOSE 2 TURNS

BATTERIES MAKE CURRENT FLOW FASTER.

A BATTERY GIVES YOU ENERGY! MOVE AGAIN!

Batteries store energy and release it slowly.

Blocked by a diode, lose one turn!

The arrow tells which way current is allowed to flow in a diode.

AT A JUNCTION, CURRENT CAN DECIDE WHICH WAY TO GO.

JUNCTION

Usually, some current chooses to go one way and some chooses to go the other way.

DIODES ONLY ALLOW CURRENT TO FLOW IN ONE DIRECTION!

LOW RESISTANCE! LOSE 1 TURN

The lower the resistance in a path, the more likely current is to choose that path.

HIGH RESISTANCE! LOSE 3 TURNS

Resistance is measured in Ohms, named after physicist Georg Ohm.

Have all the players say why they chose the path they did.

CAPACITOR! Lose 3 turns while the capacitor charges before moving ahead 7 spaces! CAPACITOR!

In 1895, Nikola Tesla built a power plant powered by Niagra Falls.

SHORT CIRCUIT! Take the short circuit to advance to the square below.

MEDIUM RESISTANCE! LOSE 2 TURNS

How many things can you think of that are powered by batteries?

Did you know your brain sends signals to your muscles using electricity?

The diode lets you through, move again!

ELECTRICITY JOKE!
Q: Why did the lightbulbs go out?
A: Because they liked each other!

A BATTERY GIVES YOU ENERGY! MOVE AGAIN!

HIGH RESISTANCE! LOSE 3 TURNS

Did you know that Thomas Edison invented the electric light bulb in 1879?

CONGRATULATIONS!

Feedback may be sent to outreach@aps.org

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APS physics

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