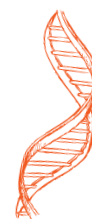


MAX EINSTEIN

THE GENIUS EXPERIMENT

JAMES PATTERSON
and Chris Grabenstein



NOTES FOR KS2 TEACHERS

INTRODUCTION

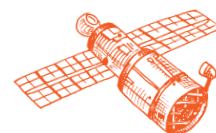
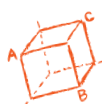
Max Einstein: The Genius Experiment is book 1 in a brand new series for readers aged 7+ written by James Patterson. It is the first and only children's series to be officially approved by the Albert Einstein Archives.

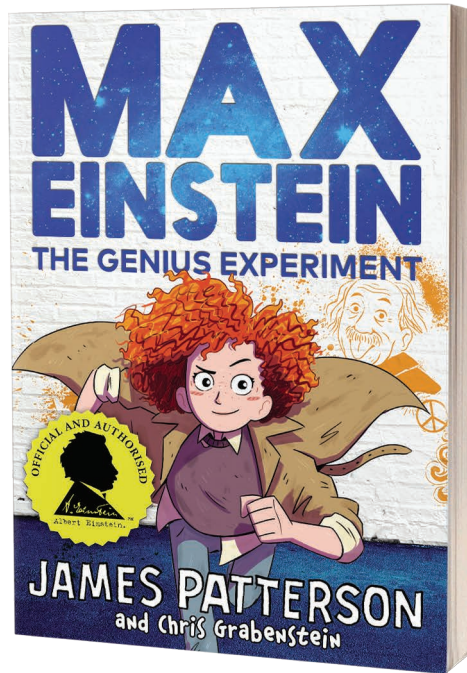


These teachers' notes are for use with Years 5–6. They provide support for using ***Max Einstein: The Genius Experiment*** as a class reader, providing reading questions focusing on **comprehension**, **inference**, and **retrieval** skills, as well as suggestions for cross-curricular activities.

$$V = \frac{I}{R}$$

These notes work primarily as an introduction to the themes and ideas within the book, giving suggestions for how to enjoy it across different subjects in order to generate a love of reading and STEM subjects in the classroom – from creating learning about the theory of relativity, to performing television interviews with the characters, to creating dialogue with Albert Einstein himself...



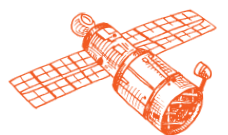
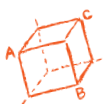
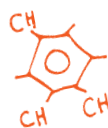


ABOUT THE BOOK

Twelve-year-old orphan Max Einstein is not your typical genius. Max hacks the computer system at NYU in order to attend college courses (even though she hates tests), builds homemade inventions to help the homeless, and plays speed chess in the park. Her not-so-normal life is crazy but predictable until...

Max is recruited by a mysterious organisation! Their mission: solve some of the world's toughest problems using science. She's helped by a diverse group of young geniuses from around the globe as they invent new ways to power the farthest reaches of the planet. But that's only if the sinister outfit known only as The Corporation doesn't get to her first...

$$V = \frac{I}{R}$$



DISCUSSION QUESTIONS

1. Read the quotation from Albert Einstein included at the beginning of the book: 'Imagination is more important than knowledge'. What do you think of this statement? Do you agree? Why/why not?



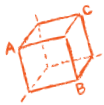
2. What do you find out about Max on page 1? List three things. What can you **infer** about her personality from this information?



3. Why do you think that the author, James Patterson, decided to make Max a female **protagonist**? Did you find this surprising? Why/why not? Why do you think it is significant that Max is a girl?

4. What is Max's idea for how the horse manure can be used? What does this idea reveal about Max's abilities and interests? How does Mr. Kennedy react to Max's ideas? (page 6)

5. In what ways is Max's life 'one great mystery'? How does she feel about this fact? (pages 20–21)

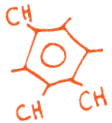


6. How might Albert Einstein himself be considered a character in the story *Max Einstein: The Genius Experiment*, even though he is not physically present? What is Max's **relationship** with him? Use pages 25 and 46 as a starting point.



7. Who are Philip Stark and Dr. Zimm? What are their **intentions** and **motivations**? (pages 30–32) What might these characters represent or **symbolise** in the story?

8. How important is the **setting** in the story? How does this change throughout the book, and what effect does this have on the characters and the reader? Which different locations does the author refer to?



9. What is the importance of the image of Albert Einstein and Max riding 'beside a sunbeam to the edge of the universe'? What does this image represent? How might it be considered a **metaphor**? (pages 50–51)



10. Who are the 'CMI' and who are 'the Corp'? (pages 57, 111–115)

11. Which new characters are you introduced to when Max reaches the CMI's headquarters in Chapters 21–23? Why have they been brought together? What can you **infer** about these characters from how they are described?



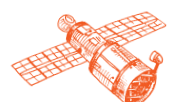
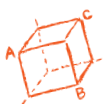
12. How is Max unique according to Isabel? Do you agree? What important qualities does Max possess? (pages 103–104) Can you find examples in the story of where Max uses these qualities?

$$V = \frac{I}{R}$$

13. How does the author, James Patterson, create a sense of **anticipation** or **tension** in Chapter 38 when 'the chosen one' is announced? Pick out key words, phrases and techniques that you think are effective on pages 171–175.

14. In what ways does Max use her scientific talent and ability to help others? Focus in particular on her decision to go to the Democratic Republic of Congo. Why does she choose to go here? What does she hope to achieve? (pages 188–198)

15. Who is the main villain or enemy in *Max Einstein: The Genius Experiment*? Is it a person or an organisation, or even an idea? What do you think is the most important **theme** or message in the story?



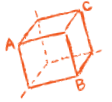


SUGGESTED ACTIVITIES



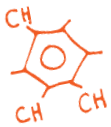
STEM

- Use descriptions in the book to find out about the following important scientific theories:
 - The theory of relativity (pages 23-24, 46)
 - Schrödinger's Cat (page 34)
 - $E=mc^2$ (page 24)
- The theory of the photoelectric effect (page 193)



- Choose one of the scientific theories above and carry out more research into it. Present your findings back to the class.

- Who was Albert Einstein? Using Max's description on page 13 as a starting point, create a biography of the famous scientist. Present your findings back to the class.
Can you see any similarities between Albert Einstein and Max?



- What do you know about the universe? Create an 'Ideas Map' in pairs of everything that you can think of, including information on the following: the sun, earth, gravity, black holes, galaxies, speed of light, dark matter. Try to create a few sentences using these words. Share them with the class.



- What is your favourite topic in science? What is your favourite scientific fact? Choose one of your favourite facts (or even one from the story itself) and create a step-by-step guide to help someone else understand it.

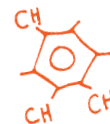


$$V = \frac{I}{R}$$

SUGGESTED ACTIVITIES (continued)

LITERACY

$$V = \frac{I}{R}$$



- Write a diary entry in character as Max in her bed at the beginning of the story, and at the end of the story when she walks into her new apartment. How has she changed? How has her outlook on the world changed?
- The story of Max and her CMI team will continue with a second book in the series. How do you think the first chapter of the next book will begin? Write an opening paragraph.
- Choose your favourite scene involving Max. Create a comic strip to present the action, including dialogue as well as the thoughts and feelings of the characters.
- Bring Albert Einstein into the present world. Imagine a conversation that you might have with him. What would he be interested to find out about the modern world? Write a piece of **dialogue** between you and Albert Einstein.

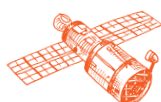
DRAMA + SPEAKING AND LISTENING

- Create a film trailer for **Max Einstein: The Genius Experiment**. What props will you use? Which scenes will you choose to show to the audience? What will be your persuasive tagline?
- Discuss the book in terms of the following **ideas** or **themes**: imagination/knowledge; art/science; generosity/greed; good/evil. Create a short piece of drama in groups, depicting one of these themes in relation to the story.
- Create television interviews with Max and Dr. Zimm at the end of the story. How can you show their feelings about what has happened? How can you convey their personalities to the audience?



ART & DESIGN

- Choose your favourite Albert Einstein quote from the novel, giving reasons for your choice. Using coloured pens or pencils and different craft materials, write your quote on a large piece of paper and decorate it to show what it means to you. Create a classroom display of all the favourite quotes in the room.
- Look at the illustration on page 110 where each character in Max's CMI team is given a symbol to represent their skills and abilities. What would your symbol be? What is your special skill or ability?
- The story of Max and her CMI team will continue with a second book in the series. What do you think their next adventure will be? Create a cover for the next book.



SUGGESTED ACTIVITIES (continued)

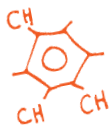
HISTORY

- Create a historical timeline from Albert Einstein's lifetime to the present day. What important things have occurred?
- If Albert Einstein were to return to earth today, what would be different for him? Create a list of things that have changed.



GEOGRAPHY

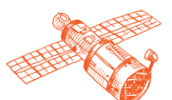
- Using the illustration on page 86 as a starting point, map Max's journey around the world in the story. Which different continents does she visit?
- There are three main locations in the story: New York (chapters 1–18, 71); Tel Aviv (chapters 19–45) and the Democratic Republic of Congo (chapters 46–70). Choose one of these locations and create a travel brochure for it, including information about its climate, any important human and physical features, population, religion, culture and history.
- In the story, Max decides to try to provide electricity in some of the remote villages in the Democratic Republic of Congo. What information about this area can you find from Chapter 42? In pairs, carry out some research into the current provision of electricity to rural areas in the Congo – can you see any similarities?
- Create a leaflet persuading people to join the campaign to provide electricity to remote communities in the Democratic Republic of Congo. Include images, clear instructions for how to help and persuasive language to encourage people to join the cause.
- Use Chapters 42–48 to gather information about solar power. What is it? How is it useful? How is it generated? Create a pamphlet describing what solar power is and outlining its uses.



SOCIAL, PERSONAL AND HEALTH EDUCATION | CITIZENSHIP

$$V = \frac{I}{R}$$

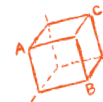
- What does it mean to be unique or to have a unique skill? Write a list of your own unique skills.
- Interview someone else in the class about their unique skills. Present what you learn about your classmate to the whole class.
- In pairs, discuss why it is important not to be held back by your gender. What jobs are traditionally associated with men and women, and how is this changing?
- Write a postcard to your future self in which you outline your ambitions.



THOUGHT EXPERIMENTS

Albert Einstein is famous for his thought experiments. A thought experiment is basically just giving yourself the freedom to think wildly and without limits to test a question. One of Einstein's most famous thought experiments was imagining he was riding a bicycle on a ray of light to "test" how the light might behave.

Obviously this isn't physically possible but by doing the thought experiment, he was able to let his imagination explore the theoretical possibilities of the behaviour of light. To incorporate thought experiments into the classroom you can adopt a Curiosity-Led Learning approach by following these steps:



STEP 1: Explore energy using one of the hands-on experiments below.

STEP 2: Predict, observe and discuss throughout the activity. What questions arise?

STEP 3: Take one question that has arisen from the discussion and reframe it to be a "what if?" question. This will be your thought experiment question.

An example might be "What if we could turn animal poo into energy?"

Imagine that the "What if?" question is a mouse trapped inside a box. Imagine opening the box and releasing the mouse. Rather than trying to trap the mouse or tell it where to go, just follow the mouse and see where it takes you, repeatedly asking "what if?". It really helps to draw pictures of the journey the mouse takes!

STEP 4: Where did the mouse end up? Share your thoughts and ideas!

THE MAX EINSTEIN CURIOSITY CHALLENGE

Max has sent out an SOS, she needs your help! There is too much Carbon Dioxide in our atmosphere. We need to reduce the carbon dioxide and stop producing so much. If we don't, food will become hard to get, animals will die and our planet will be seriously sick.

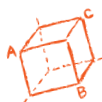
Max has asked you to try and think of different ways of generating energy.

EXPERIMENT OPTIONS INCLUDE:

1: SOLAR POWERED SCRIBBLE BOTS – explore electricity using solar power.

2: STATIC SLIME – make slime that reacts weirdly to static electricity.

3: SPARKY SCULPTURES – explore electricity.



The
Curiosity
Box

$$V = \frac{I}{R}$$

Experiment Lesson plans:

SOLAR POWERED SCRIBBLE BOTS

EXPLORE ELECTRICITY USING SOLAR POWER AND BUILD A ROBOT THAT DRAWS ON ITS OWN!

YOU WILL NEED:

*A strong paper cup • 4 felt tip/sharpie style pens • Tape (electrical tape works best)
Rubber band • A motor kit • Modelling clay • Solar power kit*

WHAT TO DO:

1. Turn the cup upside down and position the pens at equal distances around the cup with the felt tip pointing down. Tape the pens to the cup, so that the cup is raised off the ground with about 4 cm of pen between the cup and the ground – a bit like pen legs.
2. Test the motor: hold the wires from the motor on each end of the battery for a few seconds. It doesn't matter which wire connects with which end of the battery. The motor should spin. Disconnect the battery for a moment.
3. You will notice that the motor has a spoke poking out on the opposite side to where the wires attach. This is where you need to add a large blob of mouldable clay. You need to make sure that the blob is slightly off centre so that the scribble bot moves around. If it is perfectly centred, the bot will just vibrate on the spot.
4. Tape the motor with the clay blob on the side of the cup near the closed end of the cup. Make sure it is very secure. Tape the battery on the closed end of the cup, making sure that the ends of the battery are easy to access so that you can attach the wires and take them off easily.
5. Place your scribble bot on a piece of white paper and when you are ready reattach the wires to the battery using the tape to hold them in place.
6. Watch your scribble bot go! How does it move? What patterns does it make? What happens if you change the shape of the modelling clay?
7. Once you have tested your battery powered scribble bot you can swap the battery for a solar power pack. Attach the pack to the motor using the wires from the motor. You may need to make sure the solar power pack is charged up in some sunlight before your bot will move well. How long does this take? Does it work if you put the solar power pack under your classroom lights? Are there other sources of power you could try to give the motor energy?



Experiment Lesson plans:

STATIC SLIME

MAKE SLIME THAT REACTS WEIRDLY TO STATIC ELECTRICITY

YOU WILL NEED:

Cornflour • Vegetable oil • PVA glue • Balloons • Spoons • Cups

WHAT TO DO:

1. First make your glue-free goo. Put 2-3 tablespoons of cornflour in a cup. Add one tablespoon of vegetable oil at a time, mixing after each addition, until you have a white liquid that looks like double cream.
2. Blow up a balloon so that it is well inflated but not so much that it might pop. Rapidly rub the balloon on your head. You will know that your balloon is "charged up" when your hair starts to stand on end!
3. Take a spoonful of goo and slowly pour it back into the bowl while bringing the balloon close to the stream of goo. Does the goo behave differently when the balloon is close by?
4. Make a second batch of slime, this time using glue. Put one tablespoon of PVA glue into a clean cup.
5. Add 3 tablespoons of cornflour to the glue and mix well, until all the cornflour is mixed in.
6. Repeat the balloon test. Does this slime react in the same way? Compare the textures of the goo and the slime, what do you notice? Why do you think they behave differently?



Experiment Lesson plans:

SPARKY SCULPTURES

EXPLORE ELECTRICITY AND CREATE A DOUGH SCULPTURE THAT LIGHTS UP!

CONDUCTIVE DOUGH

100g flour
35g salt
3tsp cream of tartar
120ml water
1 tsp vegetable oil
Food colouring

1. Put all ingredients (except food colouring) into a saucepan and stir them together. Add food colouring to achieve the desired colour.
2. Gently heat the mixture on the hob, stirring vigorously all the time. This can take 5-10 minutes.
3. When the mixture thickens and forms a ball, take it off the heat.

4. Place it on a floured plate to cool for 10 minutes.
5. Knead the dough to make it soft and smooth. If it is too wet, add a little more flour, if it is too dry, add a little more water.
6. Store in a labelled, sealed bag or box.

INSULATING DOUGH

100g flour
100g sugar
3 tsp vegetable oil
60ml water
Food colouring
(different!)

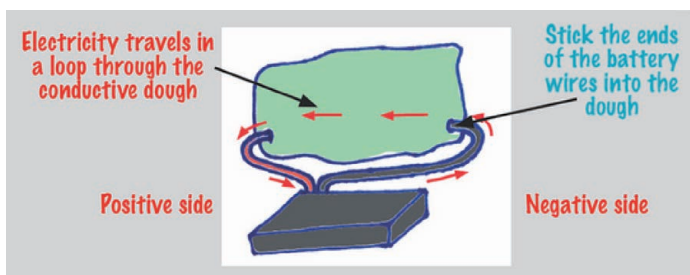
1. Mix the flour, sugar, food colouring and oil together in a bowl and gradually add 60ml water, a little at a time until it reaches the right consistency.

2. Knead the dough to make it soft and smooth. If it is too wet, add a little more flour, if it is too dry, add a little more water.
3. Store in a labelled sealed bag or box.

CIRCUIT BITS

LED bulbs • Battery pack and connectors

Electricity flows in a loop, starting from your battery pack. Electrons flow from the negative side (black wire) to the positive side (red wire). To make your circuit work, you need to make a path of conducting materials which allow the electricity to flow. DO NOT touch the two wires directly together. This will make a short circuit which could lead to the batteries overheating and exploding (and not in a fun way!).



Take a look at your LEDs. They have a positive and a negative side. The positive side has the longest leg and the negative leg is the shortest. Think of the long leg as being the tail of the "p" in positive – its longer than the "n" in negative. DO NOT connect them directly to your battery pack.

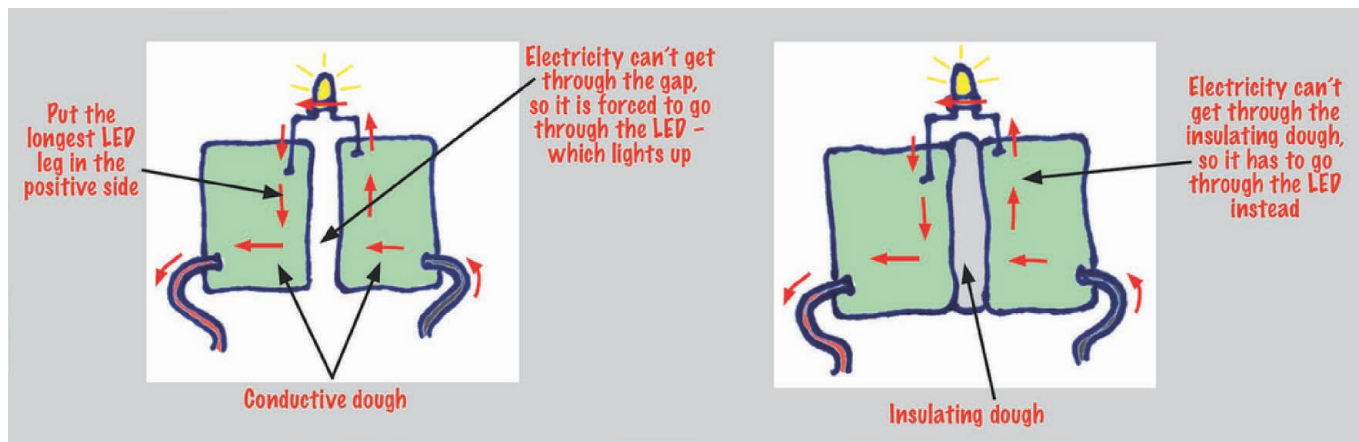
We have two batches of dough, they are different colours and behave differently too. One is made with salt, which can conduct electricity. The other is made with sugar, which does not conduct electricity.

Let's make a circuit with the dough. Choose one kind of dough, you are going to work out if it is the insulator or the conductor.

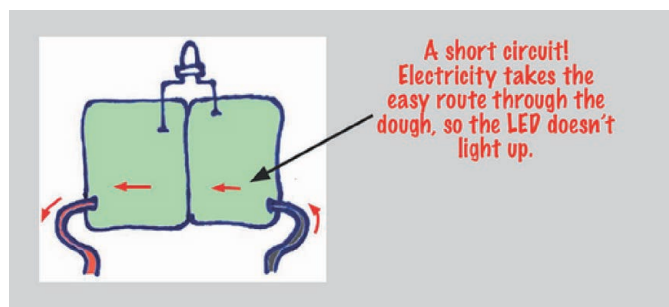


SPARKY SCULPTURES (continued)

Make sure you put the longest leg of the LED into the side where the positive (red) wire is connected and the shorter leg of the LED on the side where the black wire is connected. If your LED lights up, you have found the conductive dough! Test the other dough to be sure.



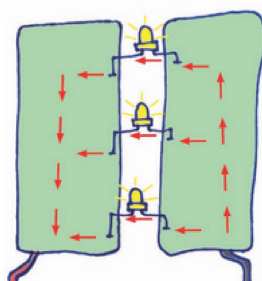
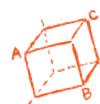
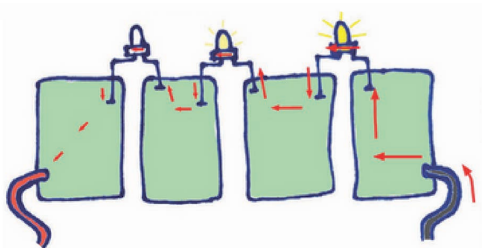
Now try to create a circuit where the insulating dough stops the electricity from travelling anywhere apart from through the LED.



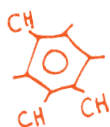
If your two pieces of conductive dough are touching at all, the electricity will flow through the dough, not the LED. This is called a short circuit and may lead to your batteries overheating.

Now try lighting more than one bulb. You can do this in two different ways.

In a series circuit, all the electricity takes the same route. Each LED and block of dough creates resistance, this means the lights get dimmer further along the circuit.

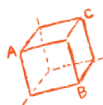
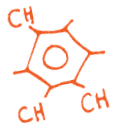
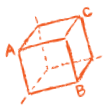


In a parallel circuit, the electricity can take several paths. This means each bulb gets the same amount of electricity and will have equal brightness.

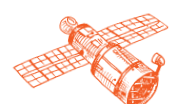
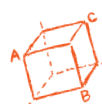
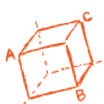


$$V = \frac{I}{R}$$

MORE ACTIVITIES AND EXPERIMENTS TO TRY!



$$V = \frac{I}{R}$$



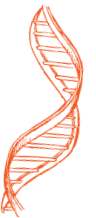
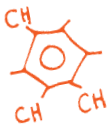
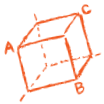
LAVA LAMP!

YOU WILL NEED:

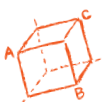
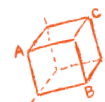
Clear plastic bottle • Food colouring • Water • Vegetable Oil • Fizzy tabs • Funnel

WHAT TO DO:

1. Fill 1/4 of the clear plastic bottle with water using the funnel
2. Add food colouring and swirl
3. Use the funnel again to add the vegetable oil, filling the bottle to 3/4 full
4. Swirl again and add fizzy tab (you may have to crumble it)
5. Use the lid to close the bottle and enjoy your very own lava lamp!



$$V = \frac{I}{R}$$



WORDSEARCH

Can you find all the missing words in the wordsearch below?

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

ATOM • CHESS • CONGO • ELECTRICITY • GALAXY
GENIUS • INVENTION • ISRAEL • LIGHT • MAX EINSTEIN
NEW YORK • PHYSICS • SCIENCE • SOLAR PANELS

A GENIUS MIND

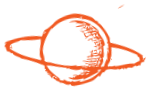
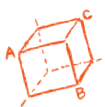
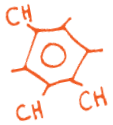
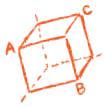
Can you think like Max and transform the word 'MIND' into 'TIME' by changing just one letter each time?

M	I	N	D
T	I	M	E

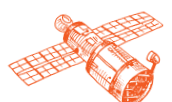
$$V = \frac{I}{R}$$

INVENTION CHALLENGE

Max loves to invent things to help those around her! If you could invent anything, what would it be? Draw yours in the space below!



$$V = \frac{I}{R}$$



WORDSEARCH ANSWERS

Can you find all the missing words in the wordsearch below?

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

ATOM • CHESS • CONGO • ELECTRICITY • GALAXY
GENIUS • INVENTION • ISRAEL • LIGHT • MAX EINSTEIN
NEW YORK • PHYSICS • SCIENCE • SOLAR PANELS

A GENIUS MIND ANSWERS

Can you think like Max and transform the word 'MIND' into 'TIME' by changing just one letter each time?

M	I	N	D
M	I	N	E
M	I	M	E
T	I	M	E

$$V = \frac{I}{R}$$