GROW SMART

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DEAR GROWSMARTER

Welcome to the third edition of the Growsmart newspaper for 2021. As we continue to learn, you should be proud of what you've achieved thus far! The first and second edition warmed up our brainpower and now we're ready to kick it up a gear in true Growsmart fashion.

Keep your mind alert by jumping in with the mathematics questions and cracking the code on these pages.

Put your entrepreneurial hat on and learn how you can spot opportunity and maximise results on page 4. We'll even show you how to spot a great advertisement or an advertisement that just seems too good to be true…

Ever wondered how you can convince an audience? Take a look at the debating techniques on page 5 on how to use your vocal tools to sway your audience.

Head on over to page 6 for tips and tricks to protect yourself against malware.

Captivate your readers with the perfect ending for your creative writing piece on page 8 and take a look at mind-blowing facts of the human body. Slide on over to page 9 and see if you can spot the Drake or Jay-Z song.

Have you ever been part of a team? On page 11 we look at group behaviour of animals and how it helps them survive the wild.

Don't fear when a zombie apocalypse is near! On page 12 we show you how you can survive the end of the world with scientific survival tips that could be a real lifesaver.

Lastly, launch into science! Try our catapult experiment on page 12, at home.

Until next time,

The Growsmart Team

SUDOKU

	6		5	3			4	8
		8			2		3	1
	3						7	
			8		5			
		2	3			6		5
	7	1		9	4	8		3
	1					3		2
3			9	1				4
7								

Fill the grid with the numbers 1 to 9 so that each number is only used once in each row across, each column down and every 3 by 3 box. Do not guess the answer. Think logically about which numbers may appear, and especially which numbers may not appear in a block.

Source: mathinenglish.com

Answers: 1-6-7-5-3-9-2-4-8; 4-5-8-7-6-2-9-3-1; 2-3-9-1-4-8-5-7-6; 6-9-3-8-2-5-4-1-7; 8-4-2-3-7-1-6-9-5; 5-7-1-6-9-4-8-2-3; 9-1-6-4-8-7-3-5-2; 3-2-5-9-1-6-7-8-4; 7-8-4-2-5-3-1-6-9

MATHS

Calculate the following without written calculations.

1. 9 + 19 = _____
2. 16 + 17 = _____
3. 25 – 6 = _____
4. 35 + 15 = _____
5. 124 – 25 = _____
6. 11 + 11 – 1 = _____
7. 27 + 4 – 30 = _____
8. 20 x 3 = _____
9. 100 ÷ 2 = _____
10. 45 x 0 = _____
11. 90 + _____ = 100
12. 999 + 1 – 2 = _____
13. 30 x 3 x 10 = _____
14. 250 x 4 = _____
15. 144 – 43 = _____
16. 36 ÷ 4 = _____
17. 81 ÷ 9 = _____
18. 100 ÷ 5 = _____
19. 17 x 20 = _____
20. 90 x 2 = _____
21. 15 x 4 = _____
22. 10 x 10 x 20 = _____
23. 44 ÷ 4 = _____
24. 63 ÷ 9 = _____
25. 33 x 30 = _____
26. 280 ÷ _____ = 140
27. 49 ÷ 7 = _____
28. 500 ÷ 2 = _____
29. 10 000 ÷ 2 = _____
30. 120 + 1 200 = _____
31. 99 ÷ 11 = _____
32. ½ + ½ = _____
33. 103 – 4 = _____
34. ⅝ + ⅜ = _____
35. 19 + 101 = _____
36. 13 + 12 + 11 = _____
37. 177 = 150 + _____
38. 44 = 14 + _____
39. 91 – _____ = 10
40. 13 = 113 – _____
41. 25 – 13 – 12 = _____
42. 80 x 4 = _____
43. 15 x 20 = _____
44. 16 x 3 = _____
45. 77 x 0 = _____
46. 100 ÷ 10 = _____
47. 30 x _____ = 300
48. 1 000 + 11 = _____

Answers: 1. 28; 2. 33; 3. 19; 4. 50; 5. 99; 6. 21; 7. 1; 8. 60; 9. 50; 10.0; 11. 10; 12. 998; 13. 900; 14. 1 000; 15. 99; 16. 9; 17. 9; 18. 20; 19. 340; 20. 180; 21. 60; 22. 2 000; 23. 11; 24. 7; 25. 990; 26. 2; 27. 7; 28. 250; 29. 5 000; 30. 1 320; 31. 9; 32. 1; 33. 99; 34. 1 ⅛; 35. 120; 36. 36; 37. 27; 38. 30; 39. 81; 40. 100; 41. 0; 42. 320; 43. 300; 44. 48; 45. 0; 46. 10; 47. 10; 48. 1 011

CRACK THE CODE

Calculate the sums to find each letter in the code. Fill in the letter that fits with each answer below to solve the riddle.

11 – 6 =		A	10 – 6 =		J
8 + 2 =		E	6 + 5 =		K
9 + 9 =		I	6 + 2 =		L
8 – 8 =		O	5 – 3 =		M
3 + 3 =		U	15 – 9 =		N
12 – 9 =		Y	2 + 7 =		P
9 + 9 =		B	8 – 7 =		R
8 + 5 =		C	9 + 8 =		S
7 + 4 =		D	5 + 2 =		T
4 + 8 =		F	11 – 3 =		V
11 – 9 =		G	7 + 9 =		W
6 – 2 =		H	5 + 9 =		X

What do you call a dinosaur that does not give up?

			-				-				-								
7	1	3	-	7	1	3	-	7	1	3	-	13	10	1	5	7	0	9	17

Source: teacherspayteachers.com

ANSWER: Try–try–try–ceratops

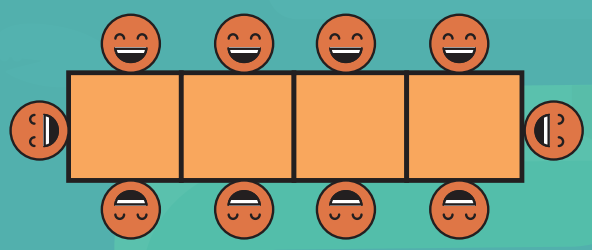
Calculate the following. You may use any strategy. Remember to apply BODMAS.

1. 250 + 750 + 1 001 _____
2. 21 000 ÷ 7 + 7 000 _____
3. 2 + 39 999 x 1 _____
4. 550 x 100 x 10 ÷ 1 000 ÷ 1 _____
5. 2 625 – 600 x 2 ÷ 600 _____
6. 3 333 + 77 + 7 700 _____
7. 15 000 + (1 800 – 1 200) x 2 _____
8. 610 x 40 ÷ 4 _____
9. 24 144 ÷ 12 + 3 111 _____
10. (3 000 – 230) ÷ 5 + 3 458 _____

Answers: 1. 2 001; 2. 10 000; 3. 40 001; 4. 550; 5. 2 623; 6. 11 110; 7. 16 200; 8. 6 100; 9. 5 123; 10. 4 012

Solve the following problems. You need to be able to explain your answer mathematically.

1. For your party, you make one long table by joining some small tables. Each small table can seat two friends, plus one friend at each end of the long table. How many friends can sit at your long table if you use 20 small tables?
A) 40 B) 42 C) 20 D) 22 E) 46



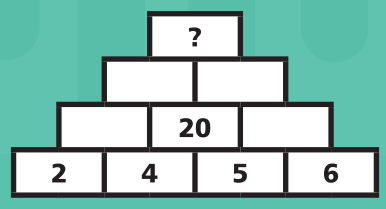
2. Michael has 15 marbles less than Monique. Together, they have 95 marbles. How many marbles does Monique have?
A) 80 B) 40 C) 55 D) 50 E) 110

3. This object is made by sticking six wooden cubes together. If you paint this object, how many faces must you paint?
A) 30 B) 27 C) 26 D) 25 E) 24

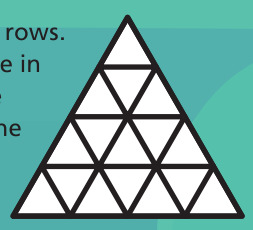
4. How many numbers divide exactly into 100?
A) 8 B) 6 C) 7 D) 10 E) 9

5. 102 marbles are divided among 7 children. How many more marbles are needed so that each child will receive the same number of marbles and none are left over?
A) 1 B) 2 C) 3 D) 4 E) 5

6. On this number wall, multiply the two numbers next to each other and write the product on the brick directly above those two numbers. Which number will appear on the top brick?
A) 960
B) 9 600
C) 960 000
D) 96
E) 96 000



7. This big triangle has four rows. There is one small triangle in the first row, three in the second row, and five in the third row. If this triangle had 50 rows, how many small triangles would there be in the 50th row?
A) 99 B) 101 C) 51 D) 151 E) 150



8. What is the first number in this pattern?
_; 2 100; 300; 60; 20
A) 3 900 B) 18 900 C) 2 900 D) 1 470 E) 4 580

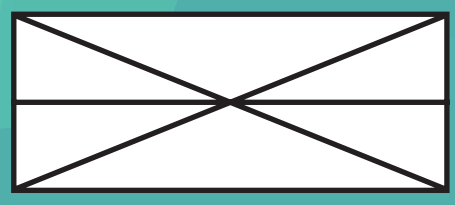
9. The sum of three consecutive numbers is 138. What is the biggest of these three numbers?
A) 51 B) 40 C) 53 D) 43 E) 47

10. You have ten blue socks, ten red socks and ten brown socks. All the socks are mixed up in a drawer in a dark room. How many socks must you take from the drawer to be sure that you have a pair of the same colour?
A) 11 B) 20 C) 21 D) 4 E) 22

11. A traffic light flashes green, then amber, then red, then green again, and so on. In 100 consecutive flashes, starting with green, how many of the flashes are green?
A) 34 B) 45 C) 33 D) 25 E) 19

12. A car travels at a constant speed of 120 kilometres per hour. How many kilometres does the car travel in 30 minutes?
A) 360 B) 150 C) 120 D) 15 E) 60

13. How many triangles are there in this figure?
A) 8 B) 10 C) 12 D) 14 E) 16



Answers: 1. B; 2. C; 3. C; 4. E; 5. C; 6. E; 7. A; 8. B; 9. E; 10. D; 11. A; 12. E; 13. C

ENTREPRENEURSHIP

THE SUGAR RUSH

Today is Fundiswa's favourite day of the month. Once a month, her grandmother takes her to a sweet factory, to buy stock for her mobile sweet shop, The Sugar Rush. Fundiswa is a well-known face in her neighbourhood – whenever she comes around with her bicycle and basket, children know sweet treats are on the way!

Last month, Fundiswa earned R350 with her mobile sweet shop. She needs to pay her grandmother R40 to cover the cost of petrol to go to the sweet factory. She also needs to set aside R60 to service her bicycle, so that her mobile shop can keep running. She is keeping R50 for herself, to compensate for the time that she spent buying and selling sweets. That leaves her with R200 to buy new stock. The last batch of sweets sold really well. She would need R150 to buy the exact same stock as last month. That means she has R50 left. She can buy another bag of sweets, and sell even more! But which sweets should she get?

Fundiswa starts to write down all of the sweets that she thinks would sell well. For R50, Fundiswa could buy a container of Rainbow Swirls or a box of Super Sour Sprays. The giant round rainbow lollipops caught her eye the last time she visited the sweet factory. It would really draw children to her mobile shop! But the liquid sweet sprays would be so much fun to play with. She could also buy a mixed bag of sweets for R50, or she could buy a larger quantity of the sweets she already stocks in her shop. How was she going to decide?

COST BENEFIT ANALYSIS

Fundiswa has a **scarcity** problem. She wants to buy more sweets than she can afford. Scarcity means not being able to have everything you want. It forces you to make decisions. As an entrepreneur, Fundiswa knows how to make decisions. She makes a **cost-benefit analysis**.

1. DEFINE THE PROBLEM

Fundiswa knows what the problem is, so the first point is easy! She writes on a piece of paper: "Which new sweets should I buy for my shop?"

2. LIST THE OPTIONS

Next, Fundiswa narrows down her choices. She really wants to add a new sweet to her selection. It would keep her current consumers excited, and it might even bring new consumers. She therefore decides against buying a larger quantity of the sweets she already has. The mixed bag of sweets would add something new to her shop, but every bag is different. It is too risky to buy a mixed bag if she does not know exactly what she is getting. That means her top two choices are the Rainbow Swirls and the Super Sour Sprays. She writes down her choices at the top of the paper.

3. EVALUATE THE OPTIONS

Now she has to evaluate her options. Underneath the Rainbow Swirls, Fundiswa writes down all the positive and negative points she can think of.

Positive points:

1. I have tasted a similar sweet before, so I know that it tastes good.
2. The Rainbow Swirls look really appetising and could help my shop stand out.
3. The consumers would like the giant size, because their sweet would last longer.

Negative points:

1. The Rainbow Swirls might be too similar to the lollipops I already stock in my shop.
2. If the sweet lasts too long, it may take my consumers longer before they return to buy another sweet.

Underneath the Super Sour Sprays, she writes down the positive and negative points again.

Positive points:

1. The Super Sour Sprays are very different from all of my other sweets.
2. It is also very different from the sweets my competitor sells.
3. It is fun to eat and fun to play with. More children might want to buy it - it offers more.

Negative points:

1. I have not tasted this sweet before, so I do not know how good it tastes.
2. Everyone might not like the sour flavour.

4. MAKE A DECISION!

Fundiswa studies her cost-benefit analysis. Each sweet has three positive points and two negative points. But the one sweet does appear to have stronger positive points than the other. Especially since her goal is to expand the range of sweets she has on offer. Do you know which sweet Fundiswa is going to buy? That is right, she is going to buy the Super Sour Sprays!

Since a container of sweets costs R50, Fundiswa could only afford one of the two sweets. She has to make a decision. The cost of this decision is her **opportunity cost**. It is the thing she has to give up to buy Super Sour Sprays. Fundiswa has to give up buying Rainbow Swirls as well.

BELIEVE IT OR NOT

Advertisements provide information about the goods or services that a company offers. This information could help consumers to make decisions about what to buy. But some advertisements seem too good to be true! How can you tell what to believe?

Advertisers use words and images to make their product look as good as possible, to encourage you to buy it. They are also competing for your attention with other companies offering similar products. In trying to show their product in the best light, advertisers may focus on the good qualities of their products. Negative images and statements about a product would not encourage you to buy it, so advertisers may choose to ignore the negative qualities of a product.

This could mean that the advertisement is slanted in favour of the advertiser. The government requires claims made in advertisements to be backed up with proof or evidence. This is done to protect consumers, and to make sure that competition among sellers is fair. Advertisers could still rely on opinions rather than facts, to be able to say positive things about a product without the need for evidence. Ultimately, it is the consumers' responsibility to separate fact from fiction in advertising.

So how do you know if an advertiser is using statements of fact or statements of opinion?

- **Facts** are statements that can be proven true or false. It makes a statement that is true for everyone.
- **Opinions** are statements that show what the person thinks or feels. It gives their view or judgement, but it is not necessarily based on fact. The opinion may only apply to the person who makes the statement.
- In general, facts will be more valuable.

What else can you do to be a smart consumer?

- Look for factual claims that can be proven.
- Beware of opinions in advertising.
- Read the fine print.
- Pay close attention to the words used in advertisements.
- Remember that advertisements may make more promises than the products can deliver.

Look at this list of statements made in advertisements. Is it fact or is it opinion?

1. This dessert is made with eggs. _____
2. Buy one shirt and get another one free. _____
3. This gum will give you the freshest breath ever. _____
4. This is the fastest bicycle ever made. _____
5. These rollerblades have been tested for safety. _____
6. This hamburger is cooked on a grill. _____
7. Buy this speaker and receive free headphones. _____
8. This movie will entertain you like never before. _____
9. You will be popular if you wear these jeans. _____
10. This car meets government safety standards. _____

Source: econedlink.org

Answers: 1. Fact; 2. Fact; 3. Opinion; 4. Opinion; 5. Fact; 6. Fact; 7. Fact; 8. Opinion; 9. Opinion; 10. Fact

RHETORICAL MODES

Rhetorical modes are patterns of organising and arranging information. It is used to create a specific reaction in the audience. Using rhetorical modes can help you as the rhetor, or speaker, to structure your argument in a manner that is more persuasive. Let's take a look at the different rhetorical modes, and how each mode intends to convince the audience of your argument!

NARRATION

- Narration tells a story or describes an event.
- It uses facts: what happened, where did it happen, when did it happen and who was there.
- It helps to put information into a logical order. A chronological order is often followed – the story is told in the order that it happened.
- **Purpose:** Narration aims to create certain emotions in the audience.

DESCRIPTION

- Description presents a person, place, object, event or action through words.
- It helps the audience to imagine what is being described.
- It uses expressive adjectives.
- It often describes something by using the five senses, to create a lifelike experience.
- **Purpose:** Description aims to provide the audience with details, to create an image in their minds.

ARGUMENTATION

- Argumentation raises your opinion about an issue. It proves or contests a point of view.
- It consists of presenting evidence.
- The audience is more likely to consider your points if your evidence is stronger.
- The reasoning behind the opinion shows why it is valid.
- **Purpose:** With argumentation, the speaker tries to get the audience to agree with them.

ILLUSTRATION

- Illustration uses evidence to help to explain an idea or statement.
- It is used to clarify a point or to give a specific example.
- It helps to make abstract ideas real.
- **Purpose:** Illustration helps the audience to understand more quickly.

DEFINITION

- Definition explains what a word or idea means, or what it does not mean, to your audience.
- This stretches beyond the dictionary definition of a word, because you may be redefining a common term, or explaining a term that is often used incorrectly.
- The audience can think about a concept in another way, if it is defined in a different way than what they thought it meant.
- **Purpose:** Definition helps the audience to see things from your point of view.

PROCESS ANALYSIS

- Process analysis explains how a particular event occurs, how something is done, or how something works.
- The procedure is explained in clear steps.
- **Purpose:** Process analysis helps to provide clear information, so that the audience can fully understand how something works. The better the audience understands, the more likely they will be persuaded.

DIVISION

- Divisions tackles a difficult concept by dividing it into smaller ones.
- It can provide the audience with insight of how to view a concept or idea.
- **Purpose:** Division helps the audience to understand a complex issue.

CAUSE AND EFFECT

- Cause and effect examines what caused a situation to happen, and what the consequences of it happening are.
- Causes help the audience to understand why something happened. Effects helps to understand the result of what happened.
- **Purpose:** Cause and effect helps to determine how concepts and events are related.

COMPARISON AND CONTRAST

- Comparison looks at the similarities between things. Contrast looks at the differences between things.
- The more different two things initially appear, the more interesting the similarities between them will become.
- **Purpose:** Comparison and contrast is used to show why something is superior to another. It can also show unexpected similarities. It can help the audience to understand a person, situation or idea in relation to one another.

Source: virtualspeech.com

YOUR VOCAL TOOLBOX

How you speak and sound makes a dramatic impact on your speech. It is not only about the content of what you say – how you use your voice is equally important. Use the tools in your vocal toolbox to help you speak in a way that sounds confident. Learn how to speak so that people want to listen!

1. REGISTER

A person who speaks in a lower register is seen as more authoritative. Politicians with deeper voices are more likely to be elected than politicians with higher voices. They seem to command more respect. When practising for your next speech, focus on lowering your register slightly, to speak in a slightly deeper voice. Try to speak from your chest, rather than from your nose.

2. TIMBRE

Timbre determines how warm, smooth and rich your voice sounds. A voice with good timbre is thought to be more attractive. It encourages your audience to be better listeners. Focus on speaking slowly, with regular pauses and deep breaths.

3. PROSODY

This is the rhythm and sound variations that make up the notes you speak. It is easily noticeable with people who speak in a monotone manner, where the sounds of the speaker's voice change very little. This can make it difficult to listen and focus on the speaker for long periods of time. On the opposite end of the spectrum, when people talk to babies or pets, they often use big variations in sound and rhythm.

4. PACE

An authoritative speaker usually has a slow, deliberate method of delivery. They believe that what they are saying is important, so they do not feel rushed by the audience. They use planned pauses to emphasise important points, and they speed up certain sentences to create excitement. They avoid using filler words, such as 'uhm' and 'ah'. When you are nervous, you tend to speed up what you say. You take short, shallow breaths, which impact the other vocal toolbox elements. The pace you use should match the content of what you are saying.

5. VOLUME

Speaking too loudly, especially in smaller settings, can be annoying. It may come across as rude, or trying to control the conversation. There are many leaders who speak surprisingly quietly. It is the content of what they say and the use of the other vocal toolbox techniques that ensure people listen to what they are saying. Make important parts of your speech louder than the rest to add impact. Try to mix louder parts with quieter sections for maximum impact.

Using these vocal techniques will help the audience to understand your message. You will be perceived as authoritative and knowledgeable, giving people a good reason to listen to you.

Source: virtualspeech.com

DO YOU KNOW THESE WORDS?

Abduct
Accompaniment
Adequate
Aerodynamics
Allegiance
Amphibious
Anaesthetic
Aqueduct
Arrhythmia
Aspersions
Beautify
Beneficiary
Bewildered
Blasphemy
Boutique
Breaststroke
Bureau
Callisthenics
Carnivorous
Catalogue
Cessation
Circumnavigate
Clairvoyant
Commensurate
Connoisseur
Cringe
Curriculum
Curvature
Debris
Defeasible
Deficiency
Differentiate
Distinguished
Ecstatic
Egocentric
Emaciated
Embourgeoisement
Encyclopaedia
Entourage
Equivalent
Euphoria
Exacerbate
Exorbitant
Factious
Fatigue
Fermentation
Fiefdom
Flamboyant
Fortification
Fungicide
Gastroenterology
Generosity
Gerrymandering
Graduate
Graffiti
Grammarian
Gruesome
Hallucinate
Hazardous
Hierarchy
Hyperbole
Hypochondriac
Identification
Ignominious
Inauspicious
Incongruous
Infectious
Iniquity
Insinuate
Jurisdiction
Justify
Juvenescence
Karaoke
Keyboard
Kidnap
Kindergarten
Lacklustre
Lineage
Liquescent
Loophole
Masquerade
Mediocrity
Memorabilia
Mischievously
Misogynist
Monstrosity
Museum
Naïve
Nought
Nutritious
Oath
Obscure
Obsequious
Occupation
Offensive
Ominous
Orchestra
Palaeontology
Pandemonium
Paralysis
Paranoia
Permeate
Philanthropist
Planetarium
Privatisation
Prosthetics
Pseudonym
Regurgitate
Relinquish
Reminisce
Repartee
Repercussion
Reverberate
Quadrant
Quartzite
Quintile
Questionnaire
Quiver
Scenario
Sedentary
Sovereign
Sphinx
Squalor
Statistician
Subsequently
Subservient
Succedaneum
Symmetry
Temptation
Terrorise
Torment
Transgress
Tribulation
Turquoise
Twelfth
Upholstery
Valour
Vaporise
Vendetta
Vicious
Vicissitude
Voluminous
Wabbit
Wainscot
Waitress
Wingover
Yield
Zeal
Zenith
Zigzag

WHAT IS MALWARE?

Not everyone online is who they say they are. It is easy for someone to hide behind a screen. Let's say you receive an email saying that you won a prize, there is a good chance it is someone pretending to be that company. If you click on this email, it could infect your device with malware, or the person could steal your personal information! **Malware** is software that is harmful to electronic devices like computers and mobile phones. Its name comes from the words "malicious" and "software." There are different types of malware.

VIRUSES

This is a damaging code or program that attaches itself to a host (such as a file or document) to harm your device. Your device can get infected through dangerous downloads, links or attachments.

ADWARE

This software uses false advertisements online to infect your computer and steal your information.

SPYWARE

This software installs itself on your device and can steal your passwords, email addresses and personal information.

WORMS

This software copies itself repeatedly to infect your device. It can spread copies to other devices as well, and does not need a host to cause damage.

TROJAN HORSE

This program appears to be helpful, but once it is downloaded it attacks your device.

RANSOMWARE

This software takes control of your computer and will not release your data until money is paid to get it back.

HOW MALWARE SPREADS

- You download free software from the Internet that secretly contains malware.
- You download legitimate software that is secretly bundled with malware.
- You visit a website that is infected.
- You click on a fake error message or pop-up that starts a malware download.
- You open an email attachment that contains malware.

MALWARE SAFETY

- Think twice before clicking links or downloading anything off the Internet.
- Be careful when opening email attachments or images.
- Do not trust pop-up advertisements or windows that ask you to download software.
- Use antivirus software.
- Limit your file-sharing.

HOW TO RECOGNISE SUSPICIOUS EMAILS

- You do not recognise the sender's name.
- The subject line looks like spam.
- It does not address you by name. It uses a vague introduction like "Dear customer".
- It offers something that's too good to be true.
- There are grammatical errors.
- It is asking for personal information like your full name, phone number or address.
- There is a suspicious link in the email. Do not click on it!

Every time you create a profile or account on the Internet, you leave personal information online. Once you place information on the Internet, it is out there forever! Make sure that your online information stays safe by protecting your username and password.

CREATE A USERNAME

When you create an online profile or account, you are usually required to choose a username. A good way to protect your identity is to create a unique username that is not your real name. This way, strangers online will not know who you are.

CREATE A PASSWORD

Password protection is a very important step in keeping your online account information safe. How do you create a strong password?

- Use at least 8 characters. 14 is best!
- Use a variety of numbers, lower- and upper-case letters, and symbols.
- Do not use predictable capitalisation. Instead of just capitalising the first letter, scatter capitalisation throughout the password.
- Do not use the same password for multiple accounts.
- Do not use your name or anyone else's name.
- Do not use words from the dictionary.
- Change your password every 10 weeks.

Here is a fun way to create a secure password:

1. Start with a sentence you will remember.
   Example: Hello, my name is John. I like dogs.
2. Take the first letter from each word.
   Example: HmniJlld
3. Every three letters, add in numbers that are memorable to you.
   Example: Let's say John's address is 734. This becomes Hmn7iJl3ld4
4. Lastly, add in a symbol.
   Example: Hm!n7iJl3ld4

This will create a secure password that is easy to remember. Do you think someone would be able to guess this password? It is very unlikely! Now practise creating your own password.

Source: pandasecurity.com

BIRTHDAYS AROUND THE WORLD

Your birthday marks one of the most important events on the calendar. It commemorates the day you were born, and reminds everyone just how lucky they are to have you in their life! Let's see how birthdays are celebrated in different countries around the world.

BIRTHDAY ACTIVITIES

- In Mexico, birthday guests strike an object made of starched paper with a stick. This is called a piñata. It is filled with sweets that fall out when the piñata is broken. It can take the form of a traditional donkey, cartoon characters and even politicians.
- In Jamaica, the birthday child is covered in flour. This is called being "antiqued". Brazilian children take it a step further, where they throw the birthday child not only with flour, but eggs as well.
- Canadian often get "greased" on their birthdays. This means their friends and relatives ambush them and smear butter on their noses. It is supposed to ward off bad luck.

BIRTHDAY FOOD

- In China, people eat extra-long egg noodles on their birthday. The long noodles symbolise a long and healthy life.
- Australians celebrate their birthday by eating a treat called fairy bread. It consists of buttered white bread with rainbow sprinkles on it.
- In South Korea, seaweed soup is served as a birthday breakfast. It is said to replenish nutrients, leading to a healthy life.

BIRTHDAY RULES

- In Italy, you are expected to open your birthday present right away, in front of the person who gave it to you. It is impolite to put the wrapped gift aside to open later.
- In Germany, the person celebrating their birthday must bake a cake for their friends, rather than the other way around.
- Vietnamese people do not celebrate individual birthdays. Instead, everyone celebrates together on Tet. This is the day that celebrates the Vietnamese New Year. Everyone turns a year older together on this day.

How to say Happy Birthday in 10 languages

1.	German:	Alles Gute zum Geburtstag!
2.	French:	Bon anniversaire!
3.	Spanish:	¡Feliz cumpleaños!
4.	Italian:	Buon compleanno!
5.	Portuguese:	Feliz Aniversário!
6.	Swedish:	Grattis på födelsedagen!
7.	Russian:	S dnem rozhdeniya!
8.	Mandarin:	Shéngrì kuàilè!
9.	IsiXhosa:	Ulonwabele usuku lwakho lokuzalwa!
10.	Afrikaans:	Gelukkige verjaarsdag!

Source: babbel.com

MATCH THE IDIOM

Match these idioms about technology with their correct meaning from the list.

1. Bells and whistles
2. Cog in the machine
3. Have a short fuse
4. Have it down to a science
5. It's not rocket science
6. Like clockwork
7. On the same wavelength
8. Pull the plug
9. Push someone's buttons
10. Reinvent the wheel
11. Run out of steam
12. Well-oiled machine

A. Draw a strong emotional reaction from someone.
B. Doing something very well.
C. Put an end to an activity.
D. Something that operates well.
E. Lose energy, enthusiasm or interest.
F. Not difficult to understand.
G. Lose your temper quickly.
H. Something happens predictably, without problems.
I. Fancy extras or gadgets.
J. Being one part of a large system or organisation.
K. Waste time doing something that has already been done well.
L. To be in agreement.

Source: myenglishpages.com

ANSWERS: 1. I; 2. J; 3. G; 4. B; 5. F; 6. H; 7. L; 8. C; 9. A; 10. K; 11. E; 12. D

SPINNING AROUND

Have you ever spun on a roundabout at the playground? How do you feel when you climb off? Your head spins and you feel dizzy! But did you know that the dizzy feeling happens whenever your ears send the wrong signal to your brain?

Ears do not only help you to hear. They also play a vital role in helping you to keep your balance. Your inner ear contains a gel-like fluid and tiny hair, called cilia. When you start to spin, the liquid inside your ear also starts to spin. The spinning liquid then bends the hair inside your inner ear.

Every tiny hair is attached to a nerve cell. The nerve cells carry signals to the brain, telling it about the type of movement that has taken place. Your brain uses these signals to understand the position of your body. When you stop spinning, the fluid inside your ear does not stop spinning immediately. The fluid keeps moving and the cilia keep bending, and signals are still sent to your brain. That is why it may feel like you are still spinning, even when your body has stopped. But your brain is not tricked for long! It will regain your balance in a few minutes.

DIZZYING FACTS

- Proprioception is your body's ability to sense its position and movements. It tells you where your body parts are in relation to your environment. For instance, if you raise your hand, your brain will know where your hand is without looking in a mirror.
- The vestibular sense is your body's ability to sense balance and its position in space. It tells you in which direction you are facing, if you are moving and how fast you are moving. For instance, if you are hanging upside down, your brain can sense this direction without relying on your vision.
- Proprioception and the vestibular system are often called your body's sixth and seventh sense! These senses are very important in controlling body movement.
- Activities like spinning, swinging, rolling and hanging upside down helps your brain to learn to balance. When your body moves, the brain notes how it feels to be in and out of balance. Using this information, it plans how it would maintain your balance in different situations. That is why children love to do these things – your brain needs these movements to establish its sense of balance. What a good excuse to go and play!

Source: mocomi.com

STORY Endings

You are writing your latest story, and the plot will keep readers glued to the page! But how will you write an ending to the story that readers will remember? Explore the different ways in which you can finish your creative writing.

Circular Ending

The story circles back to the beginning. Sometimes an author will end with the same idea or similar words as the beginning of the story. The ending does a full circle and connects the events of the end of the story back to the events from the beginning of the story.

Surprise Ending

The story takes you where you did not expect it to go. Sometimes this ending is called a twist ending, because the story takes an exciting turn. The author shocks the reader with an ending they never would have expected to happen.

Lesson or Moral Ending

The main character in the story grows, changes, or learns something at the end of the story.

Capturing Emotion Ending

The story ends leaving the reader feeling emotional. A good writer tugs at the heart strings of the reader.

Reflection Ending

The narrator of the story steps back and reflects on what happened. The narrator often looks back on an experience and determines the importance thereof, or what was learned.

Cliffhanger Ending

The story ends by leaving the reader hanging or wanting more. The ending is open-ended and leaves the reader with more questions. Writers use this strategy to tease readers, or to excite them into reading more, such as the next chapter or the next book in a series.

Question Ending

The story ends with a question to keep the reader thinking. The question usually involves the reader. Writers use this strategy to make their writing memorable.

Image Ending

The story ends with an important scene that the writer shows the reader through vivid details. By showing and not telling, the writer touches the reader's emotions and conveys a mood.

Humour Ending

The story ends with a funny thought or something that makes the reader laugh. This helps to make the ending more memorable to the reader.

Dialogue Ending

The story ends with an important conversation between characters, or a quote. By ending with a quote, the writer captivates the audience by making the characters more realistic and revealing their personalities.

Forecast Ending

The author ends the story with a glimpse into the future. It hints at what will happen to the characters in the future.

Aha! Ending

The story ends with everything coming together for the reader, and all of their questions are answered.

Source: youngteacherlove.com

HEAD TO TOE

The human body is incredible! These anatomy facts are sure to blow your mind.

1. Your brain is sometimes more active when you sleep than when you are awake.
2. Messages from your brain travel along your nerves at up to 320 kilometres per hour.
3. Vision uses one third of all your brainpower.
4. Your eyes can see about ten million different colours.
5. Your eyes process more than 120 million bits of information every second.
6. Your eyes produce a teaspoon of tears every hour.
7. Scientists estimate that the nose can recognise a trillion different scents.
8. Scents smell better through your right nostril than your left.
9. Your tongue grows new taste buds about every two weeks.
10. Your mouth produces about one litre of saliva each day.
11. Human teeth are just as strong as shark teeth.
12. An average adult's skin weighs about 5 kilograms.
13. You lose about 4 kilograms of skin cells every year.
14. Humans are the only species known to blush.
15. Fingernails take six months to grow from base to tip.
16. The average person has 67 different species of bacteria in their belly button.
17. All of the blood in your body travels through your heart once a minute.
18. Laid end to end, an adult's blood vessels could circle Earth's equator four times.
19. Human thigh bones are stronger than concrete.
20. About one quarter of the body's bones are in the feet – that is 52 out of 206 bones.
21. Bodies give off a tiny amount of light that is too weak for the eye to see.
22. Your left lung is about 10 percent smaller than your right one.

Source: natgeokids.com

TRUE COLOURS

Pick a colour from the blocks below to complete the idioms! Each colour must be used once. The meanings of the idioms should give you some clues.

red	yellow	green	blue	purple
white	grey	black	silver	gold

1.	_____ area	Something that is not clearly defined
2.	_____ blood	Someone from a noble or aristocratic family
3.	_____ elephant	An expensive possession that is useless
4.	_____ fingers	Skilled at making plants grow
5.	_____ opportunity	Ideal moment to do something
6.	_____ prose	Writing that is needlessly complicated
7.	_____ screen	The film industry
8.	_____ sheep	A disreputable member of a family or group
9.	_____ streak	Someone with cowardice in their character
10.	_____ tape	A set of rules that stop progress

Source: myenglishteacher.eu

Answers: 1. grey; 2. blue; 3. white; 4. green; 5. golden; 6. purple; 7. silver; 8. black; 9. yellow; 10. Red

THE PREFECT

Petra is clinging to the edge of her seat. This is the moment she has been waiting for. School assembly is drawing to a close, which means there is only one announcement left to be made: the new school prefects. Petra could already picture herself wearing that gold prefect's badge on her school blazer, telling classmates what to do…

"…and lastly, Violetta!" The principal's voice yanked Petra back to reality. What? How could she not be chosen? She is such a stickler for rules! She participates in so many school clubs! Petra could feel a lump in her throat as all the newly elected prefects made their way to the stage. She should have been up there with them! Petra applauded the new prefects with a forced smile.

After the assembly came to an end, Petra darted to the school library. She could not face seeing her friends. She just knew if they started to console her, she would burst into tears.

At the smell of the books and the quiet sounds of the library, Petra finally started to feel calm again. The library was her sanctuary, especially on days like today. There was Ms Wordsmith, the school librarian, organising books as always.

"Oh, hello, Petra!" Ms Wordsmith exclaimed. She saw Petra's solemn expression and spoke in a softer tone. "I am so sorry that you were not elected to be a school prefect. I know you worked very hard to become one."

Petra sniffed and tried to sound indifferent. "It's nothing, Ms Wordsmith. It's not that important."

"You are allowed to feel disappointed, Petra. This was something that you really wanted, and it did not happen. It is understandable that you would be sad."

Petra could not maintain a brave face any longer. Her nose began to quiver, and big tears spilled down her cheeks. Ms Wordsmith put a comforting hand on Petra's shoulder.

"I am sure you would have made an excellent prefect, Petra. You always apply yourself to whatever it is that you are doing. I know this is not as exciting, but you could always become a library prefect, you know. We don't really have a lot of volunteers."

Petra looked up. Her eyes started to sparkle again. "A library prefect? That would be wonderful! Oh, thank you, Ms Wordsmith!"

That afternoon, Petra raced home as fast as her legs could carry her. "Mom! Dad!" She burst into the kitchen.

"Slow down!" Gemma exclaimed. "What on earth is going on? Did the school select you to be a prefect?"

Petra shook her head. "No, I was not chosen. But Ms Wordsmith said I could be a library prefect! They always need more help, and I get to organise the reading competition! Whoever reads the most pages in a month will win a prize! And I have so many other ideas as well. I want to start a book drive with local businesses; oh, and start a group where learners can recommend books to one another, and – oh…" Petra was completely out of breath.

Vuyo laughed. "One step at a time! Firstly, congratulations on becoming a library prefect! But you also worked so hard to become a school prefect – are you not feeling disappointed?"

Petra nodded. "Honestly, I am disappointed and a little sad. Being a library prefect is not what I had in mind, but it might suit me. You know how much I love books!"

Gemma hugged Petra and beamed at her proudly. "You know, Petra, being a school prefect comes with a lot of respect and admiration. But sometimes, serving where you are needed could be even more rewarding!"

FIGURATIVE LANGUAGE: PERSONIFICATION

Personification is used when a writer gives human characteristics to an object. It often gives objects emotions, speech, gestures or desires that those objects do not really have. This literary device can make writing more descriptive.

In the sentences below, underline the object that is personified. Circle the human qualities given to the object that show personification.

1. The full moon led her through the dark forest.
2. The last slice of pizza is calling my name.
3. The old car coughed and grumbled up the hill.
4. The sun played hide and seek behind the clouds.
5. The swimming pool invited them to jump in.
6. The candle flame danced in the dark.
7. The camera loves him.
8. The party died as soon as the music stopped playing.
9. The sunflowers nodded their yellow heads as people passed by.
10. The alarm clock springs to life early every morning.

Now it is your turn! Personify the following objects in a sentence:

- thunder _____
- city _____
- kettle _____

Source: teacherspayteachers.com

ANSWERS: 1. full moon, led; 2. slice of pizza, calling my name; 3. car, coughed and grumbled; 4. sun, played hide and seek; 5. swimming pool, invited; 6. candle flame, danced; 7. camera, loves; 8. party, died; 9. sunflowers, nodded; 10. alarm clock, springs to life

HIP-HOP OR SHAKESPEARE?

Are you a linguaphile or a melomaniac? Can you pick the classic literature from the modern songs? A linguaphile is a person who loves languages and words, while a melomaniac loves music. Put your skills to the test! Write down which of the quotes below are written by Shakespeare, and which are lyrics by hip hop artists.

1. "Jealousy is just love and hate at the same time."
2. "They do not love that do not show their love."
3. "Our praises are our wages."
4. "Still, the best of us build and reach monetary gains."
5. "It is not in the stars to hold our destiny but in ourselves."
6. "If I told you that a flower bloomed in a dark room, would you trust it?"
7. "In time we hate that which we often fear."
8. "Jump regardless of the consequence, cause even on the night of the apocalypse, everybody's an optimist."
9. "The thin line between savants and savages; your life could depend on the laws of averages."
10. "Our doubts are traitors, and make us lose the good we oft might win."
11. "Some rise by sin, and some by virtue fall."
12. "And every day on the evening news, they feed you fear for free."
13. "We know what we are, but know not what we may be."
14. "Life without knowledge is death in disguise."
15. "I know my shoulder blades are shattered wings that carry me home."

ANSWERS: 1. Drake; 2. Shakespeare; 3. Shakespeare; 4. Tupac; 5. Shakespeare; 6. Kendrick Lamar; 7. Shakespeare; 8. Tonedeff; 9. Black Thought; 10. Shakespeare; 11. Shakespeare; 12. Killer Mike; 13. Shakespeare; 14. Jay-Z; 15. Noname

MAKING WAVES

Electromagnetic radiation is a type of wave that transfers energy. The electromagnetic spectrum covers a specific range of these energy waves.

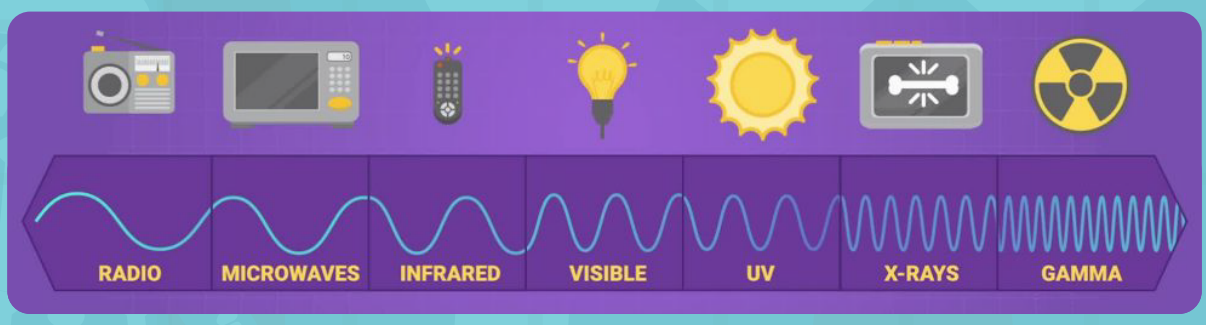
WAVE PROPERTIES

A wave is a repeating pattern that transports energy from place to place. Examples of waves include sound waves, water waves, and electromagnetic waves. All waves can be described by their amplitude, frequency, and wavelength.

- **Amplitude** measures the wave's height. Waves with more energy have higher amplitudes. For example, loud sound waves have a higher amplitude than quiet sound waves.
- **Frequency** measures how many waves pass a fixed point in one second. For example, a wave that passes a point three times in 1 second has a frequency of 3. High frequency waves have more energy than low frequency waves.
- **Wavelength** measures the distance between wave peaks. The closer the peaks are to each other, the more energy the waves have.
- Wavelength and frequency are related to each other. When the wavelength is shorter, more waves pass per second, so the frequency is higher. When the wavelength is longer, fewer waves pass per second, so the frequency is lower.

ELECTROMAGNETIC SPECTRUM

Electromagnetic waves are created when charged particles move. These waves have a range of different wavelengths. The wavelengths change without stopping, from longer to shorter wavelengths. To make it easier, scientists divide wavelengths into seven sections. This is called the electromagnetic spectrum. It starts with the very long wavelengths of radio waves, and ends with the very short wavelengths of gamma rays.



RADIO WAVES

Radio waves have the longest wavelengths and the lowest energy. It is used to send radio signals, Wi-Fi signals, phone calls and text messages. Radio waves can pass through walls into buildings.

MICROWAVES

Microwaves have shorter wavelengths than radio waves. Microwave ovens use microwaves to heat food. The wavelengths of microwaves cause water molecules in the food to vibrate faster, which causes the water in the food to heat up. If you microwave things without much water in them, like plastic or ceramic containers, they will not warm up as much.

INFRARED WAVES

Any matter that is warmer than absolute zero gives off infrared waves. Absolute zero temperature is -273.15° Celsius, or 0 Kelvin. Infrared waves, like those given off by the heat of your body, can be detected by thermal imaging cameras. Firefighters can use these cameras to find people inside a smoke-filled room, by looking at the picture the infrared cameras form. A television remote also uses infrared waves to send signals that control the television. Some snake species use infrared radiation to find their prey.

VISIBLE LIGHT

The next section of the electromagnetic spectrum is made up of the light you can see. Visible light is on the same spectrum as radio waves and microwaves; it just has a shorter wavelength. White light is a mixture of all the wavelengths of visible light. You can use a prism to separate white light into those different wavelengths, to see all the colours that make up the white light. Water droplets in the sky do this whenever you see a rainbow. Red has the longest wavelength of all the visible colours, and violet has the shortest.

ULTRAVIOLET WAVES

Ultraviolet (UV) light has a wavelength that is even shorter than visible light. Longer UV wavelengths can make some objects glow. The molecules in these objects absorb UV light, and then release some of this energy as visible light. Think of toys that can glow in the dark! The sun produces nearly all types of light, including UV light. Although the atmosphere filters out most of the short wavelengths of the sun's UV light, enough still passes through to be dangerous to living things. Sunscreen absorbs UV radiation so that it does not damage your skin cells. Bees also use ultraviolet waves to see patterns on flowers.

X-RAYS

X-rays have a wavelength that is shorter than ultraviolet light. X-rays can pass through your body, but they get absorbed by bones. That is why they are useful to create images of your bones and other body structures.

GAMMA WAVES

The waves with the shortest wavelength and highest energy are gamma rays. Gamma rays are produced by radioactive materials. Gamma rays are so powerful, they can pass through most materials. It takes something like a thick layer of lead to stop them.

Source: generationgenius.com

SCREAMING BALLOON

This experiment shows you how sounds are made!

YOU WILL NEED:

- Balloons
- A hex nut
- A marble or coin

INSTRUCTIONS:

1. Squeeze the hex nut into a balloon.
2. Blow up the balloon with the hex nut inside it. Tie the balloon.
3. Hold the balloon upside down. Place your fingers on the neck of the balloon, rather than holding on to the tied piece.
4. Slowly start to swirl the balloon in smooth, circular motions. The hex nut may bounce around at first, but it will soon begin to roll inside the balloon, until it starts to spin.
5. Are you hearing a strange sound? Stop spinning the balloon. Use your other hand to stabilise it.
6. The hex nut will continue to spin for a while.

VARIABLES:

- Spin the balloon faster and slower.
- Repeat the experiment with a smooth marble or coin inside the balloon, instead of a hex nut.
- Repeat the experiment with a balloon that is more or less inflated.
- Change the size of the balloon or the size of the hex nut.
- How do the variables affect the amplitude or pitch of the sound? The amplitude refers to how loud or soft the sound is. The pitch refers to how high or low the noise sounds.

HOW DOES IT WORK?

When you swirl the balloon, you apply force to it. The hex nut wants to continue to move in a straight line because of this force. However, the shape of the balloon forces the hex nut to move in a circular path. This is called **centripetal force**, or centre-seeking force. It is the inward force on an object that causes it to move in a circular path.

Friction is another force to consider. There is very little friction between the edge of the hex nut and the balloon. More friction would cause the hex nut to slow down and stop.

Every sound you hear is caused by a **vibration**. When someone speaks, their throat vibrates. When you bang a drum, the skin of the drum vibrates. That is what makes the sound. The screech that you are hearing is the balloon itself vibrating. The angles on the nut scrape across the surface of the balloon and cause it to vibrate, making a strange noise! The round coin or marble does not have angles. This decreases the intensity of the vibrations, causing it to sound a lot softer.

If you spin the balloon faster, the vibrations of the nut scraping the balloon follow faster on one another. This increases the **frequency** of the vibrations, which cause the pitch to be higher.

Source: sublimescience.com

FOREST OF THE OCEAN

Just this year, the Cape kelp forests were titled one of Bloomberg's seven wonders of the world! The Cape kelp forest is an underwater wonder. It is the only forest of giant bamboo kelp on the planet. This enormous habitat borders the shores of Cape Town and stretches north for more than 1 000 km into Namibia. In contrast to many kelp forests that are shrinking, shifting or even disappearing, the Cape kelp forest is thought to be growing. This ecosystem provides shelter, nursing grounds and feeding grounds for thousands of species. Many of these species are endemic to the region, which means they can only be found here.

WHY KELP FORESTS ARE VITAL

- Kelp forests reduce CO_2 in the water. This also reduces the local acid levels of the ocean. Kelp forests play a critical role in maintaining a stable climate.
- Kelp forests form one the ocean's most diverse ecosystems. Many fish species use kelp forests as nurseries for their young, while seabirds and marine mammals like sea lions, sea otters and even grey whales use them as shelter from predators and storms.
- Kelp forests protect our coastline from storm surges and rising seas, lowering coastal erosion.

KELP FACTS

- Kelp are not plants, but rather extremely large brown algae. Many different species of kelp make up kelp forests.
- Some kelp species can measure up to 45 metres long. In ideal living conditions, kelp can grow 45 cm a day.
- Giant kelp is harvested from kelp forests and used as a binding agent in products like ice cream, cereal, yogurt, toothpaste, lotion and more.

Source: seachangeproject.com

QUIZZICAL

How many of these general knowledge questions can you answer?

1. What is the first letter of the Greek alphabet?
2. Which sport uses the biggest pitch?
3. What is the most common non-contagious disease?
4. Which ocean is the smallest in the world?
5. Which instrument did jazz musician Miles Davis play?
6. What does the Roman numeral C represent?
7. How many noses does a slug have?
8. What was the lifespan of a Tyrannosaurus Rex?
9. Which mammal lives the longest, for up to 200 years?
10. What do you call a group of giraffes?
11. Which dinosaur had 15 horns?
12. Are worker bees male or female?
13. What is a group of stars that form a picture called?
14. Stratus, cirrus, cumulus and nimbus are types of what?

Sources: signupgenius.com

Answers: 1. Alpha; 2. Polo; 3. Tooth decay; 4. Arctic Ocean; 5. Trumpet; 6. 100; 7. Four; 8. 20 – 30 years; 9. Bowhead whale; 10. A tower; 11. Kosmoceratops; 12. Female; 13. Constellation; 14. Clouds

BIRDS OF A FEATHER

Have you ever been part of a team? Maybe you played in a sports team, or you were a member of the debating team. You could have participated in a group project at school, or formed a team to help clean up your neighbourhood. As humans, we live in groups and we work together to help one another. Animals do this as well! **Group behaviour** is how animals act with each other to help them survive.

GROUPS HAVE FEW ANIMALS OR THOUSANDS

Animals can form groups that are large or small. An African lion pride consists of about thirteen lions. By forming a group, they can hunt more effectively. Wolves also form small packs of five to eleven individual wolves. Wolf packs hunt together and defend themselves against intruders. Wildebeest can be found in large groups of over 1 million in eastern Africa. Wildebeest are very vulnerable to predators, so they live in large herds. When a predator gets near, they make an alarm call to warn the other members of the herd. Wildebeest are part of a great migration. They travel from the Serengeti in Tanzania to grasslands in Kenya. Travelling in large herds is the safest way to make this 800-kilometre journey.

GROUPS HELP ANIMALS DEFEND THEMSELVES

More individual animals in a group means more can look out for danger. Meerkats stand up to look around for predators that might attack the group. One meerkat in the group stands watch and alerts the other members of the group if a predator is spotted. They dig burrows with many different rooms and exits, so that they can escape and hide from predators. All the members of the group also help to take care of the babies.

GROUPS HELP ANIMALS TO GATHER FOOD

Honey bees are very organised. Worker bees supply the colony with food, by collecting nectar from plants. Worker bees communicate with each other by doing a waggle dance. This dance directs other members of their hive to flowers. When they return to the hive, worker bees share their food with the other bees, and they feed the bee larvae. Without working as a group, they could not build such an effective colony.

GROUPS HELP ANIMALS TO FIND MATES

Colonies of flamingos can range from fifty to thousands of members. They form groups because they share the same food source – algae and shrimp. One of the benefits of living together is that they do not need to travel far to find mates. This helps them to survive – if they had to travel far, they could get eaten.

MORE ANIMAL GROUP BEHAVIOUR

- Leafcutter ants chop off leaves and carry them back to their colony. The leaves are used as fertiliser to grow fungus, which is shared with the whole colony.
- Migrating birds fly in a V-formation to help them conserve energy. Each goose flies slightly above the one in front of it. This reduces wind resistance.
- Eighty percent of fish species swim in schools, because it is a very effective defence against predators.

What can you learn from animal group behaviour to make your own team even stronger together?

Source: generationgenius.com

BUILD A CATAPULT

Do you still remember what the six simple machines are? That is right! They are the wheel and axle, the lever, the inclined plane, the pulley, the screw, and the wedge. This experiment will show you how to use one of these six simple machines, a lever, to build a complex machine – a catapult! First you will create a basic catapult, and then you can test variations on the design. Which design can shoot a ball the furthest?

YOU WILL NEED:

- Wooden lolly sticks
- Elastic bands
- Rubber balls
- Glue
- A plastic spoon

INSTRUCTIONS:

1. Stack five lolly sticks on top of each other. Twist an elastic band around each end of the stack to hold it in place.
2. Place one stick above and one stick below the stack of five sticks, to form a cross shape.
3. Tie an elastic band around the middle of the cross.
4. On one end of the two single sticks, twist another elastic band around the bottom of the sticks, to tie the two sticks together.
5. The top stick should now form a lever, with one end of the top stick pressed down and tied to the bottom stick. The other end of the top stick will be raised as a result.
6. Tape the spoon to the raised end of the top stick. It should form a bowl at the end of the stick.
7. Place the rubber ball inside the spoon.
8. Hold the tied ends of the five sticks in place. Press down on the raised side of the lever with the spoon. Release the catapult and see how far your ball can travel!

VARIABLES:

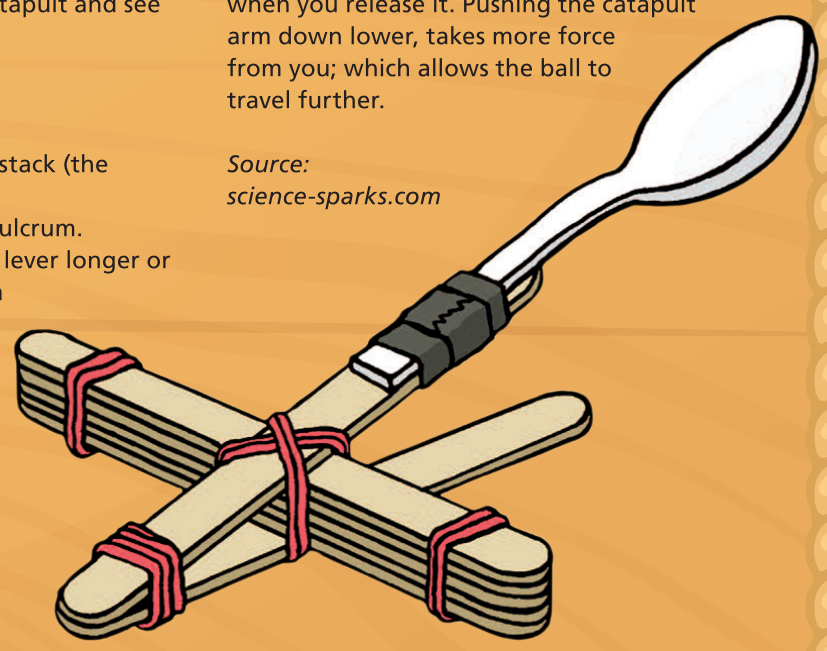
- Add more sticks to the central stack (the fulcrum).
- Remove some sticks from the fulcrum.
- Make the throwing arm of the lever longer or shorter, by moving the fulcrum closer or further from the bowl of the catapult.
- Throw a heavier or lighter material, such as a rolled-up ball of paper.

HOW IT WORKS:

Newton's First Law says that an object stays at rest, until force is applied to the object. When you push the lever of the catapult down, potential energy is stored. When you release the lever, the potential energy changes to kinetic energy. This energy of motion is transferred to the ball, which then flies through the air.

The more you push the catapult arm down, the more potential energy you are storing. This means more kinetic energy is transferred to the ball when you release it. Pushing the catapult arm down lower, takes more force from you; which allows the ball to travel further.

Source: science-sparks.com



THE END OF THE WORLD!

Imagine you find yourself in a post-apocalyptic wasteland. Could you survive? It is unlikely to happen, but it is a fun way to picture all the different skills you would need to survive. Where would you go? What would you take with you? Would you have the skills needed to rebuild civilisation? These scientific survival tips could be a real lifesaver!

1. LEARN SURVIVAL SKILLS

There are many everyday objects that could help you in an emergency situation. A plastic bottle can be used to sterilise drinking water. Simply fill your bottle, and leave it out in the sunshine. The sun's UV rays will pass right through the water and kill any germs that are in there.
You can even make a gas-fire stove out of tin cans. It uses the same process of gasification that was used to power cars across Europe during the Second World War.

2. CHOOSE A HIDEOUT

Firstly, get out of the city. Many of us live in cities, as it is so convenient and full of shops. However, if civilisation collapsed and you had to do things for yourself, the city is one of the worst places to be. What if there is no electricity or running water, and you can't grow your own food because everything is covered in roads and buildings? Try to escape to a rural area! Find a spot near a river with fresh water you can drink, and start learning how to grow your own food.

3. PACK A SURVIVAL KIT

Imagine you have a four-minute warning to get out of the house. Grab some fresh water and plastic bottles for sterilising water, cans of food, a knife and some rope for tying things. If you cannot find any rope, you could even use your headphone cords instead! It is all about being clever, ingenious and using things in new ways.

4. USE YOUR MOBILE PHONE

These days we cannot live without our mobile phones, but if civilisation collapsed, they would not be of much use. However, there is one feature on your mobile phone that will continue working, and that is the GPS.
Astrobiologists estimate that the satellites should retain power for about six months, should they be abandoned. While you won't be able to phone for help, the map function will continue to work, as it relies on satellite signals and not the mobile phone network. That goes for your smartphone compass too!

5. GATHER A USEFUL GROUP

Who would you take with you during an apocalypse? Who would be most useful? Do you know anyone who has the skills to grow their own food? Or someone who is good with their hands, like a carpenter or metal worker, or good at fixing things, like a car mechanic? These are the people that will be most useful when you are trying to rebuild society.

6. BE A SUPER SCAVENGER

The biggest key to surviving is learning how to scavenge and forage for the things you need. One of the best things to get your hands on is a car battery and alternator. Learn how to use them to make a simple windmill or a watermill to generate energy.
If you need a compass, an analogue wristwatch will do the job. Point the minute hand towards the sun – halfway between the number 12 and the hour hand will show where south is!

7. WHAT ABOUT ZOMBIES?

Although this will never happen, one of the safest locations during a zombie apocalypse would be a prison. With high walls and barbed wire fences, they're great at keeping people in, but of course, they are also great at keeping people out. Find a prison with its own water supply and a stockpile of food, dig up the parking lot to plant crops, and you have an extremely safe refuge!

CAREER PATHS

An astrobiologist is someone who studies how life can survive in different environments. It includes the diversity of life on earth, as well as searching for habitable environments in the rest of the universe. If this is a career you are interested in, you would need a good understanding of biology, physics, chemistry, geology and astronomy.

Source: natgeokids.com