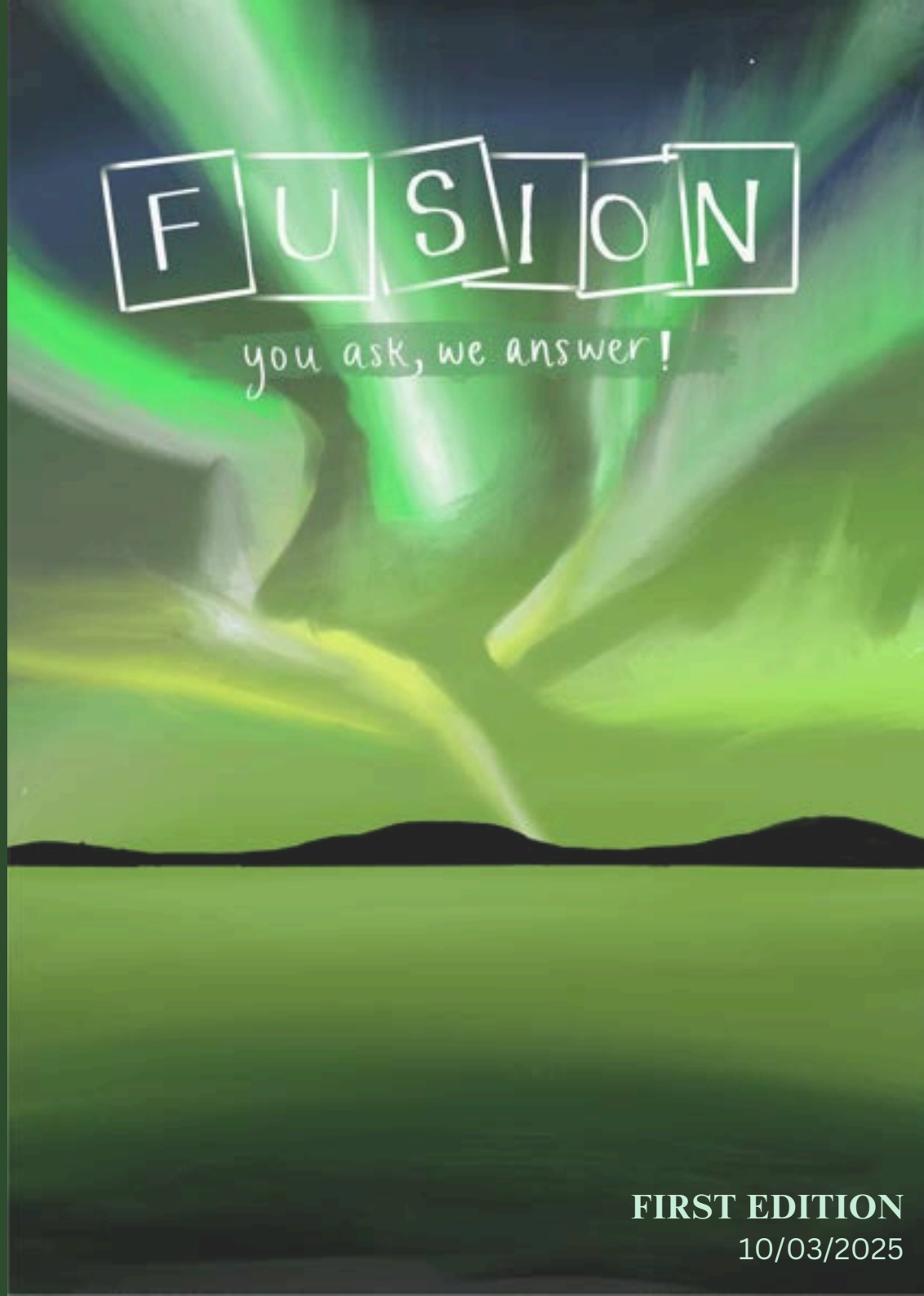


**FIRST EDITION**
10/03/2025

# From the editors

## WHO WE ARE

Hi everyone! We're a group of high school students at Sevenoaks School with a passion for the sciences. We want to share our passion and interest with everyone!

## OUR VISION

We want to expose younger students to the world of science by introducing them to simplified scientific literacy, providing long awaited answers to your exciting questions!

## (A THANK YOU)

We would like to thank our teacher, Ms Whitman, for helping us to organise this. Thank you to every person on our team for dedicating their time and energy to this. Thank you to you, our readers, for being interested in science and reading our journal. But most of all, thank you to science for being so cool!

## Meet the editors....


- Catherine C.
- Christopher C.
- Helena P.
- Jaxon P.
- Kim W.
- Magda P.
- Tom N.
- Zhewen W.





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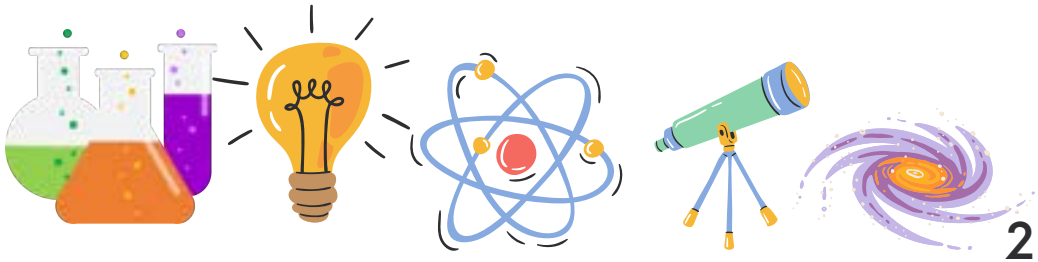


SCIENTIST SPOTLIGHT:

# Richard Feynman

## Who was he?

- Richard Feynman was a brilliant scientist who helped us understand how **tiny particles**, like electrons, work. He had a gift for explaining really tricky science in simple and fun ways.

## Why is he cool?

1. He loved to **ask questions** and figure things out, even as a kid.
   - Once, he fixed radios just by listening to the sounds they made!
2. He made **big discoveries** in **physics**, especially about how particles interact in tiny spaces.
   - He even won a Nobel Prize for his work!
3. **He was also a great teacher.** He used drawings, called Feynman diagrams, to show how particles move and interact.

## Some impressive things he did.....

1. **Admitted to MIT**
2. **Putnam Fellow**
3. **Princeton University perfect score in graduate school entrance exams**
4. **Attendees at Feynman's first seminar included Albert Einstein, Pauli, and John von Neumann**
5. **The Manhattan Project:**



## What we can learn from him:

**ALWAYS STAY CURIOUS.**
**ASK LOTS OF QUESTIONS.**
**DON'T BE AFRAID TO MAKE SCIENCE FUN!**

## Fun Facts!!!!!


- He played the bongo drums and loved music!
- He loved cracking codes and solving puzzles.
- Feynman was curious about everything—even ants and how they find food!

# CAN YOU SET A DIAMOND ON FIRE?

## What is a diamond?

Diamonds are one of the hardest known materials in the world. They are a rare material which makes them valuable. This is because diamonds are a limited resource that become harder and harder to find over time.

## How is a diamond formed?

Diamonds are formed from volcanic activity, under extreme conditions, requiring extremely high temperatures and pressure.

Some diamonds also contain bits of other materials and substances that interact with the atoms in the diamond, which is what makes diamonds look colourful. Coloured diamonds are even rarer and valuable as a result. Diamonds look very pretty as a result of the refraction, reflection and dispersion of light within it, which is basically the bending of light and how that changes the way we see the light emitted from the diamond. Nowadays, natural diamonds are very rare, and there are more people artificially creating them now

**900°C IS NEEDED FOR DIAMONDS TO IGNITE AND BURN IN AIR.**

**4500°C IS NEEDED FOR DIAMONDS TO START MELTING**

**AS A COMPARISON, ROOM TEMPERATURE IS ONLY 20°C!**



## So why is it hard to set a diamond on fire?

The carbon in a diamond is compacted very closely together, and have strong bonds that require a lot of energy to break (separate the carbon atoms and let them be exposed to oxygen)

- Lots of energy required mean high temperatures are needed when burning.

Requires oxygen to continue burning, so is also hard to light on fire.

## COMBUSTION REACTIONS

--> Combustion reactions are what this burning process is called. here is how it works:

- When carbon burns in oxygen, this reaction produces carbon dioxide and water. Many diamonds contain impurities, which are small amounts of other substances within its structure, making it difficult to burn diamond completely. This gives them a high melting point, which is the temperature needed for something to turn from solid to liquid.

# How are RAINBOWS formed?

(Rainbows form when both sunshine and raindrops are present in the sky)

## But how are they formed?

Because water is **denser** than air, the light from the sun passing from the air into the water slows down in speed and **refracts** (changes direction).

White light (from the sun) is constituted of various different wavelengths, or colours. The colors of the rainbow seen are ROY G BIV (**Red**, **Orange**, **Yellow**, **Green**, **Blue**, **Indigo**, **Violet**.)

Because every colour in the spectrum of visible light has a different wavelength, they will be refracted as they enter the raindrop by different amounts.

**THE COLOURS OF THE RAINBOW ARE ARRANGED FROM LARGEST WAVELENGTH (RED) TO SMALLEST WAVELENGTH (VIOLET).**

- Therefore, a color like indigo will be refracted more than red.

## In terms of angles....

If you think about it in terms of angles, indigo exits the raindrop at an angle of 40.7º, while red exits at an angle of 42.4º, as indigo is bent (refracted) more. Because they are effectively being bent by different amounts, they will all appear visible to the human eye. The process of white light separating into different colors is called **dispersion**.



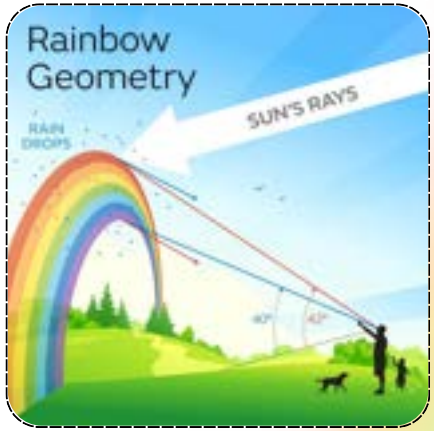
## Other relevant questions....

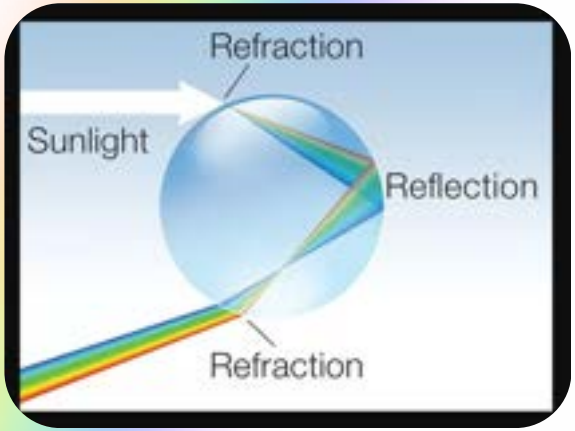
**Does the position of the sun affect the presence or shape of the rainbow?**

- **Presence**: Yes, the sun must be less than 42° in the sky for a rainbow to form.
- **Shape**: Yes, the lower the sun is in the sky, the more of an arc the rainbow will form

**Why is a rainbow a bow—or arc?**

- **A** rainbow is not actually an arc, but rather a complete circle. However, because we are on the ground, we can only see part of it. In the right conditions, one may see a fully circular rainbow from a plane.



# HOW DO WE TAN?

When we go outside and enjoy the sunshine, sometimes our skin changes colour and gets darker. This is what we call a "tan." But why does this happen?
---- Let's dive into the science of tanning! -----

## How Tanning Works

When we spend time in the sun, our skin cells receive signals that they need more protection. In response, they start to produce extra melanin. As melanin builds up, it spreads throughout the skin, causing it to darken. This darker color, or tan, helps protect our skin from getting too much UV radiation, which can damage our cells.

## The Role of Melanin

Our skin has a special pigment called melanin. Melanin is what gives our skin, hair, and eyes their color. People with more melanin have darker skin tones, while people with less melanin have lighter skin tones.

Melanin isn't just for color – it also helps protect our skin from the sun! When our skin is exposed to sunlight, especially ultraviolet (UV) rays (a type of invisible energy from the sun), melanin is produced to act like a shield for our skin cells

## What Are UV Rays?

UV rays are a type of energy that comes from the sun, and although we can't see them, they're powerful enough to affect our skin. When UV rays reach our skin, they cause changes in the skin cells, which can lead to sunburn, tanning, and even long-term effects like wrinkles. UV rays can also be dangerous for our skin if we get too much exposure over time.



## WHY DO WE TAN?

~~~ There are a few main reasons why our skin tans ~~~::

### 1. Protection

Melanin absorbs UV rays, keeping them from reaching deeper layers of our skin where they could cause harm. A tan is like a natural sunscreen that our bodies make to protect us from the sun's rays.

### 2. Repair

UV rays can sometimes cause damage to skin cells, and our body's reaction is to create more melanin as a way to prevent further harm. This is one of the reasons we might get a little sunburn before our skin starts to tan.

### 3. Response to Sunshine

Our skin doesn't make melanin unless it's exposed to sunlight. That's why our skin doesn't usually tan when we stay indoors or when it's cloudy outside.


~~~

# HOW DO WE TAN?

## (CONTINUED)

*Tanning helps our bodies make Vitamin D:*

### So, why is Vitamin D important?

1. IMPORTANT FOR STRONG BONES AS IT HELPS US ABSORB CALCIUM.

2. VITAMIN D ALSO SUPPORTS OUR IMMUNE SYSTEM, WHICH HELPS US FIGHT OFF ILLNESSES.

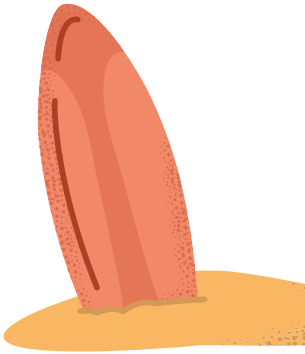
- While spending some time in the sun is a natural way to get vitamin D, you don't need to be outside too long to make enough. Most people only need about 10 to 15 minutes of sun exposure a few times a week.

### Why you should wear sunscreen everyday...

Even though a little bit of sun is healthy, too much can be harmful.

Sunscreen acts like a protective layer that blocks or absorbs UV rays before they reach your skin. This is important because UV rays can still reach you even when it's cloudy. Clouds only block some sunlight, but most UV rays can pass through, which means your skin can still be exposed and get damaged. That's why it's important to wear sunscreen every day, rain or shine, to protect your skin!





## FUN FACTS!

PEOPLE WITH LIGHTER SKIN CAN GET A TAN TOO, BUT THEY PRODUCE LESS MELANIN, SO IT MAY BE LIGHTER THAN THOSE WITH DARKER SKIN.

SPENDING TOO MUCH TIME IN THE SUN CAN CAUSE SUNBURN, WHICH HAPPENS WHEN UV RAYS HARM THE SKIN FASTER THAN IT CAN PROTECT ITSELF.

### Staying safe in the Sun

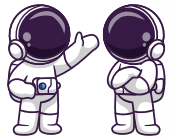
While a little sun can be healthy, too much sun can be harmful. Wearing sunscreen, hats, and sunglasses can help protect our skin from too much UV exposure. Remember that wearing sunscreen every day, even when it's cloudy, is a great way to protect your skin and keep it healthy.

Tanning is our body's way of keeping our skin safe. So, the next time you notice your skin getting a bit darker, you'll know it's your melanin working to protect you from the sun!

# Why can we not live on the moon?

## Have you ever dreamed of living on the moon?.

- Well, though it may seem that the distance is our only issue, there are many problems that stop us from actually residing there



## THE PROBLEMS:

### 1. The gravity

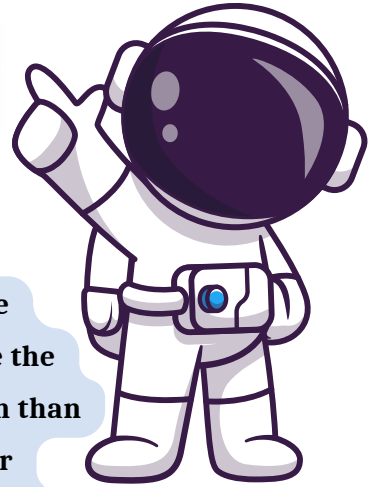
- **The earth is heavier than the moon, so it has a higher gravity which our bodies are used to. So, with lower gravity, our bodies need less strength to carry us. So we have less muscle and bones in the legs and it would be very hard to return to the earth.**

### 2. The Temperature

**The second constraint to this is the temperatures. The moon, which has less gravity, has a much thinner atmosphere* and therefore lets more heat energy from the sun reach the surface. The moon is also "Tidally locked."**

- **This means that it spins at the same speed as it orbits* the earth. So, it is always the same side of the moon that is facing the sun. That side is therefore always very hot and the other side is very cold. Humans, however, need temperatures in between to be able to survive.**





### 3. Radiation

**Have you heard of radiation*? Radiation is all the energy like light that we receive from things like the sun. There are, however, other forms of radiation than light that we cannot see and are dangerous to our bodies. They can burn or change our body at a tiny scale. Thankfully, our atmosphere protects us along with the magnetic field (like in a compass but bigger) from these dangerous rays but on the moon, we would be open to all risks.**

### 4. Dust on the moon

**The final danger to inhabiting the moon is dust. The dust there is very toxic. That means the small particles* of the dust will react if they touch our home or bodies and can cause sickness in our lungs because it is made of small metals like the aluminum foil in kitchens and the glass on windows. together, these are dangerous chemicals. So if they react with material, they can completely destroy it. If. Can you imagine if it opened an astronaut suit for example. They would make life there very dangerous.**

**SO, EVEN THOUGH WE WOULD LOVE TO LIVE ON THE MOON, IT IS STILL VERY COMPLICATED FOR US TODAY.... BUT MAYBE ONE DAY, SCIENCE WILL ALLOW US TO HAVE A HOME THERE TOO!**

# HOW DO CHAMELEONS Change Colour?

Have you ever seen a chameleon and wondered how it can change its color? Chameleons are amazing lizards that live in places like forests and deserts. They can switch colours to match their surroundings, stay safe, or show how they're feeling.

## But why do chameleons change colour?

### 1. To hide from predators

Predators are animals that might want to eat them. If a chameleon turns green among the leaves, it's harder for other animals to see it. They also change color to talk to other chameleons. A bright color might mean they are happy or want to find a friend, while darker colors might mean they are feeling upset or scared.

### 2. To stay comfortable

Chameleons can change their color based on the temperature. Darker colors absorb more heat, helping them warm up on a chilly day. Lighter colors reflect sunlight, keeping them cool when it's hot.

## How does it work?

Chameleons have special skin made up of tiny cells called chromatophores (color cells). These cells contain different colors like red, yellow, and brown. Underneath the chromatophores are other layers with colors like blue and black. By moving these layers up and down, chameleons can mix colors to create new ones. For example, if they move the blue layer up, their skin might look blue!



A third reason they change color is to represent emotions! This is what each color means:

| Colour | Mood | Purpose |
|---|---|---|
| **Bright green /light blue** | Calm/happy | This color also helps them blend into leaves and trees in their natural habitat. |
| **Dark green /brown** | Scared/trying to hide | This helps them camouflage and avoid attention from predators. |
| **Yellow /red** | Excited/angry | These are warning colours and a way of saying "stay away!" to other chameleons or animals. |
| **Bright red /orange /purple** | Defensive / ready to fight | Males use these colors to compete and show dominance. |
| **Pale colours /white** | Sleeping/resting | This is because they're relaxed and don't need to communicate or camouflage. |
| **Dark grey /black** | Stressed/cold | Dark colours help absorb heat, so they may turn black to war up. However, a dark colour may also mean the chameleon is not feeling well/is upset |

## Fun Facts!

FUN! Chameleons use their long, sticky tongues to catch insects (like flies and crickets) for food. While they're hunting, changing color helps them stay hidden until the perfect moment to catch their meal.

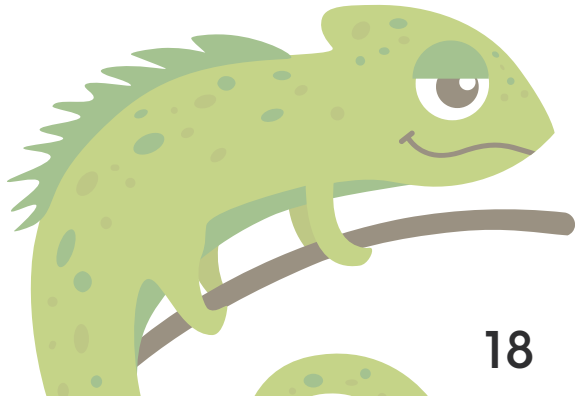
FUN! Not all chameleons change color. Some can only change slightly to match their environment.

FUN! Chameleons' eyes can look in two different directions at the same time!



Next time you see a chameleon, remember how incredible it is! From hiding to talking and staying comfortable, their color-changing magic helps them survive and thrive in their colorful world.

Chameleons show us how amazing nature can be. They teach us that sometimes, changing a little can make a big difference. So, the next time you face a challenge, think like a chameleon and find your own way to adapt and shine!



# RIDDLES!

## 1

There are 5 boys that are lining up for a ticket, in how many ways can those 5 boys be lined up to obtain the ticket?

## 4

A man stands on one side of a river, his dog on the other. The man calls his dog, who immediately crosses the river without getting wet and without using a bridge or a boat. How did the dog do it?

## 7

Suppose that 5 mice can eat 5 cats in 5 minutes, how long does it take for 100 mice to eat 100 cats?



## 2

In turbo high school, there are 40 people in a football team, 20 people in basketball team and 10 people on both teams, each person is in at least one of the two teams. If there are only these two teams in turbo high school, how many students does it have?

## 3

3. A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost?

## 5

Five apples are in a basket. How do you divide them among five girls so that each girl gets an entire apple (you can't cut an apple), but one apple must remain in the basket?

## 6

Which is heavier? A kilogram of feathers or a kilogram of rocks?

# JOKES!

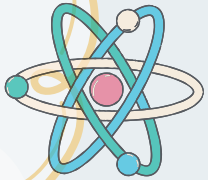
Why did the mushroom go to the party? Because he was a fungi!

Why did the biologist break up with the physicist? Because they didn't have chemistry!

What did one proton say to the other? Stay positive!

Why did the photon refuse to check a suitcase? Because it was traveling light!

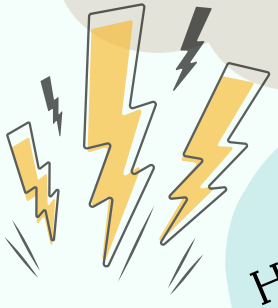

Why can't you trust an atom? Because they make up everything!





Why didn't the moon finish its meal? Because it was full!

What does a cloud wear under his trousers? THUNDERWEAR!



How does the ocean say hello? It waves!

What did the DNA say to the other DNA? Do these genes make me look fat?

Why did Mars break up with Venus? Because she needed space!

# GLOSSARY!

## CAN YOU SET A DIAMOND ON FIRE?

**Refraction** The bending of light as it passes through something

**Reflection** The bouncing of light or sound by an object. E.g. in a mirror.

**Melting Point** The temperature at which an object turns from solid to liquid

**Element** A substance that cannot be broken down into different ingredients.

**Combustion** Chemical reaction with oxygen and fuel perceived as a flame.

**Impurities** When a substance is contaminated with things that shouldn't be there.

## HOW ARE RAINBOWS FORMED?

**Refraction** The bending of light as it passes through something

**Dense** When the material is packed close together (E.g. A metal, for example iron, would be very dense, but cotton is less dense (not heavy for its size))

**Disperson** When white light separates into its various colors

**Wavelength** The distance from one tip of a wave to the tip of another.

**Wave** A form of transferring energy without transferring matter



## HOW DO WE TAN?

**Melanin** A natural pigment in our skin, hair, and eyes that gives them color and helps protect our skin from the sun's harmful rays.

**Pigment** A substance that gives color to things (like our skin, hair, and eyes)

**Ultraviolet (UV) Rays** Invisible energy from the sun that can cause changes in our skin, like tanning or sunburn. Too much UV exposure can harm our skin.

**Radiation** Energy that travels through space or substances. UV rays are a type of radiation from the sun.

**Skin cells** The tiny building blocks that make up our skin. These cells help protect our body and respond to sunlight by making more melanin.

**Sunburn** When the skin gets red, sore, and sometimes peels after too much time in the sun - when UV rays damage the skin faster than it can protect itself.

**Vitamin D** A vitamin that our bodies make when our skin is exposed to sunlight. It helps keep our bones strong and supports our immune system.

**Immune System** The part of the body that fights off germs and keeps us healthy.

**Calcium** A mineral that helps build strong bones and teeth. Vitamin D helps our body absorb calcium from food.

# GLOSSARY!

## HOW DO CHAMELEONS CHANGE COLOUR?

**Chromatophores** Tiny cells in a chameleon's skin that hold colors like red, yellow, and brown. They help the chameleon change its skin color.

**Predators** An animal that hunts and eats other animals.

**Reflect** To bounce light off a surface. Lighter colors reflect more sunlight to help keep a chameleon cool.

**Absorb** To take in or soak up something, like heat or light. Dark colors absorb more heat to help keep a chameleon warm.

**Dominance** When one animal shows it is stronger or more powerful than others, often to control a group or win a fight.



## Why can we not live on the moon?

**Atmosphere** The air wrapped around a planet like Earth

**Orbits** The curved path of an object around a star, planet or moon

**Particles** The small pieces of things that make up our world

**Radiation** Radiation is all the energy like light that we receive from things like the Sun..

# RIDDLES!

(ANSWERS)

1) The first boy in the line can be chosen in 5 ways, the second boy in 4 ways, the third boy in 3 ways... Hence the total number of different ways the boys can line up to get the ticket is 5*4*3*2*1=120 ways.

2) There are 40 people on the football team, 20 people on the basketball team, we know there are 10 people on both teams, therefore there are 40+20-10=50 people in the school.

This is because the people on both teams are counted twice — 40 people on the football team consists of:

people who only play football + people who play both sports = 40

while the 20 people on the basketball consists of:

People who only play basketball + people who play both sports = 20

Notice that we only need:

people who only play football + people who only play basketball + people who play both sports = 40+20-10.

3) Let the pen cost $x, the bat would cost $x+1, in total we would have 2x+1=1.1, thus x=0.05$.

4) The river is frozen.

5) Distribute the 4 apples to the 4 girls normally, the fifth girl gets to keep the apple inside the basket.

6) A kilogram of feather and a kilogram of iron weight both a kilogram.

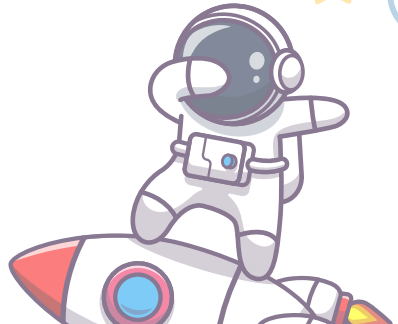
7) 5 minutes, a mouse eats a cat in 5 minutes, therefore 100 mice eats 100 cats in 5 minutes.



And finally....

# OUR SOURCES!

This is where got most of our information from. You can check them out if you want to learn more:

SCIENCE