

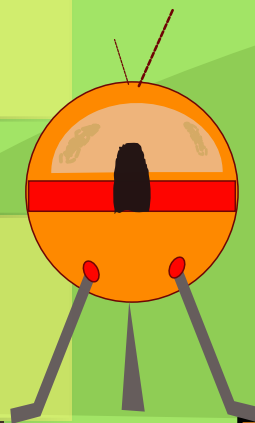
# FACT ZAP

Eat more  
natural colors

Elephants in  
hiding



Africa's rainforest elephants



Quiz  
Puzzles  
Vocabulary

Frog Leap  
Science

Space Junk  
Trivia

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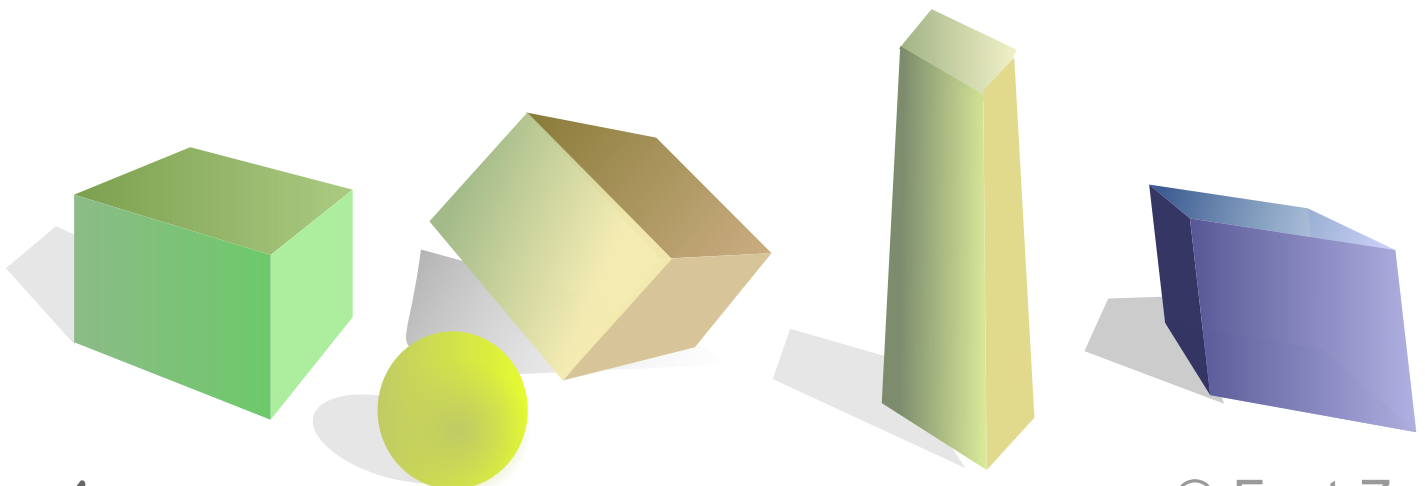
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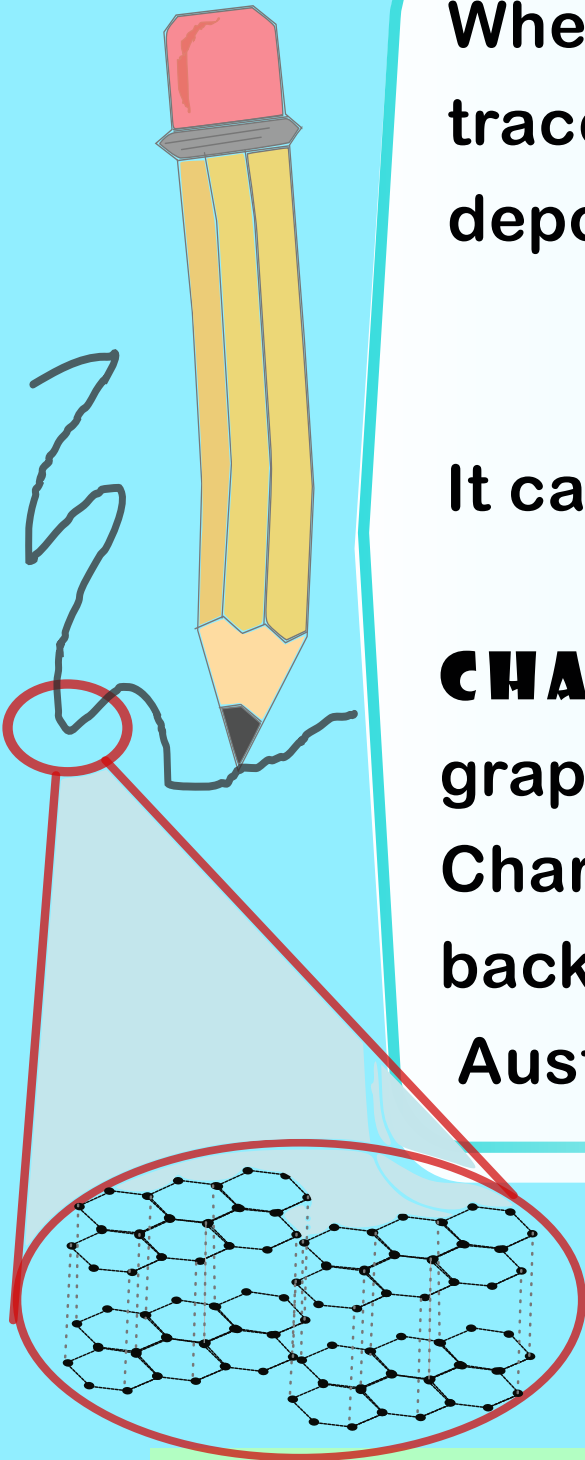
## Can pencil writings last forever ?

When you write with pencil, traces of **GRAPHITE** are deposited on paper.

Graphite is long lasting.  
It can last for hundreds of years.

**CHARCOAL** is crumbly than graphite.

Charcoal rock paintings, dating back 30,000 years can be found in Australia, Africa and Asia.



## GRAPHITE

It is a crystal form of carbon.

It has sheets of carbon atoms, stacked in layers.  
Sheets of carbon atoms stick on to paper when you write.

# Word Puzzle

## Guess the Word

Unscramble these letters  
to find the correct word.

➡ It is an action that can be done with  
*liquids* only.

U

R

P

O

Answer : \_ \_ \_ \_

➡ Atoms are made of protons & neutrons  
Protons and neutrons are made of ..?

A

Q

R

S

U

K

Answer : \_ \_ \_ \_ \_

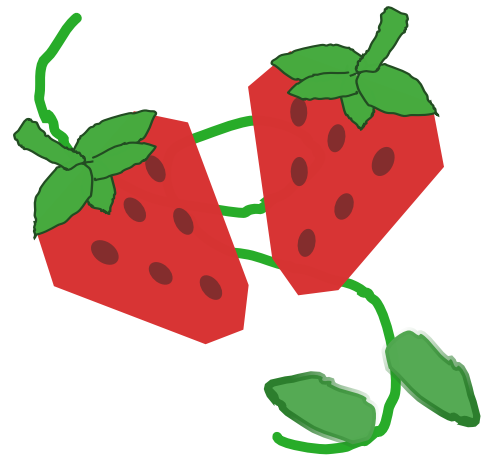
--> Answer at page 7

## Eat more natural colors

**FLAVONOIDS** are chemicals. Plants produce many chemicals, called phyto-chemicals.

Phyto-chemicals are tools used by plants to evolve and survive. These chemicals protect plants and help them make food. Few of them give color and texture to fruits and vegetables.

A cup of strawberries is a yummy snack for us. For scientists, it is a mix of vitamins, fibers, polyphenols and flavonoids.



### Strawberry Science

Flavonoids protect the strawberry plant from UV radiation. When we eat strawberries, these flavonoids prevent harmful cholesterol build up, increase blood flow and protect our heart health. Antho-cyanins are flavonoids that protect plants from blue and green light.

When we eat strawberries, this anthocyanin keeps blood healthy, cures inflammation and protect us from cancer, and diabetes.

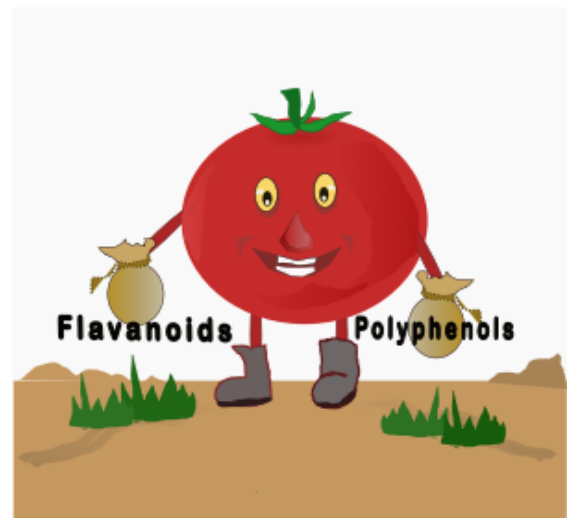
## **Turmeric Chemistry**

Turmeric has a group of chemicals called curcuminoids.

Curcumin is one of them. It can cure inflammation, prevent cancer and tumours. In plants, it gives turmeric its yellow color.

## **Chemicals in Tomato**

Tomato has phenolic acids, beta and alpha carotenes, vitamins C and A, Lycopene, etc. Lycopene is good for health. It strengthens bones and controls blood pressure.



In plants, Lycopene gives tomato fruits their deep red color. Vitamin C helps human body make Collagen, which in turn makes up our skin and tissues.

**PHYTO-CHEMISTS** spend a long time studying chemical compounds in plants. They extract chemical compounds and separate them. Each one is studied intensely to understand its role in plant health and human health. Over 10,000 flavonoids have been identified in the recent years.

### **Get them fresh !**

Study shows vitamins and flavanoid supplements are less effective than their natural sources. Fruits and vegetables have combinations of various chemical compounds in the right proportions. Eating them fresh is recommended for good health.



### **More natural colors**

Colors indicate flavanoids. Red tomatoes, red cabbage, yellow and red bell peppers, green and red hot peppers, Lettuce and



celery, onions are all rich in flavanoids.

Fruits like strawberries, blue berries, cherries, grapes, oranges, lemons, and cranberries are healthy and nutritious

Food items like breads, rice, and meat give us carbohydrates and proteins. We need it for strength and energy. On the contrary, fruits and vegetables have fibers and flavanoids. Flavanoids give us vitamins and nutrients. We need them to keep our body working seamlessly. It is important for a healthy and long life.

Do yourself a favour by choosing naturally colorful foods. **Eat healthy.., live healthy..!**

### Answers - Word Puzzle (Page 3)

1. P-O-U-R

You can pour liquids, not solids or gas.

2. Q-U-A-R-K-S

Quarks are sub-atomic particles that make up protons, neutrons and electrons.



# SCI WORDS

## Word Zap

### BUTTRESS

**BUTTRESS** (but-res) is a word related to old buildings.

" Big walls in castles and forts have buttress to support them. Buttress adds strength to walls. "

Buttress was made of wood, bricks or steel, and were triangular in shape. They were built against walls for additional strength. Beams and Arches were also called buttress, if they gave extra support for a wall.




#### ORIGIN

Buttress comes from Old French 'bouterez', meaning thrust or support.

'Ars-bouterez' in old french means supporting-arcs.

Image by Stefan Schwehofer from Pixabay



Man started physical exploration of space 67 years back.

Since then, **8.270** satellites and **6000** space crafts were launched into space.

Inactive satellites and old space crafts are left back in space, orbiting Earth. They become *space junk* or *space debris*. When they collide, they break into smaller pieces, forming more space debris.




Space junk travels 20 times faster than a bullet.



Oldest known debris is from a rocket launched in 1958.

International Space Station has dodged space debris more than 30 times.



There are 2040 discarded rocket parts and 2800 dead satellites orbiting Earth.



## Space Junk Trivia



# Rainforest Elephants

For a long time, we thought there were two types of elephants - **Asian** and **African**. Now, a third type of elephant species has been identified. It lives in the middle of Africa, in its dense rainforests called **African Forest Elephant**.

## Bush Elephant vs Forest Elephant

Common **African bush elephants** live in open grasslands. They roam in large groups. When it comes to protecting the herd, these huge elephants are aggressive.

**African forest elephants** rarely venture out of the forest in daylight. They prefer small herds.

Forest elephants are **KEYSTONE SPECIES**, which means they are important to the ecosystem. They eat fruits, barks and tubers. Undigested seeds come out in the dung. Dung is a good manure, helping seeds sprout and grow in to healthy plants.

Elephant dung decomposes into manure for plants and trees. Insects, worms and bugs depend on it for survival.

When elephants walk through the forest, they make clearings by trampling on grass, breaking bushes and branches. Small grass-eating animals use the elephant path for searching food.

## New species

Scientists found differences among African elephants while studying their DNA structures.



Africa's rainforest elephants

Differences in size, weight, behaviour, and DNA structures became evident. Years of study led to the conclusion that African bush elephants are a separate species.

In parts of the African rain forest, forest elephants are aggressive towards humans. Loss of their loved ones to poaching has made these gentle giants wary of humans.

## **Risky Tusks**

Tusks are incisor teeth protruding out in elephants. African forest elephants have straight and narrow tusks. Ivory sculptors like the straight tusks as it is perfect for carving big artefacts. Forest elephant tusks are made of hard ivory.

Historically, items like piano keys, chess sets, jewellery used by the rich were made of ivory. Due to conservation efforts, these items are no longer made of ivory. But in many societies, ivory is still a symbol of wealth. There is demand for jewellery and show pieces made from smuggled ivory.

## **Endangered ...**

We have lost 86% of forest elephants in the last 30 years. Female forest elephants can start reproduction only when they are 23 years old. African bush elephants can reproduce 11 years earlier, while they are only 12 years old.

Forest elephants can give birth once every 5 or 6 years. Bush elephants give birth more frequently, once every 3 years. So, it takes long to increase the population of forest elephants.

Illegal ivory hunting (also called poaching) is bringing down their numbers rapidly.

In 2021, African forest elephants were labelled **"critically endangered"**.

## QUIZ

Name the period in which reptiles ruled Earth.

Hint :

- \* Super continent, Pangea, split in to two in this era.
- \* It is made of 3 time periods, one of which is the Jurassic period.

Paleozoic

Mesozoic



## Chem - story

**NEODYMIUM** is used in  
lasers,  
DC motors,  
microphones,  
loud speakers,  
electric generators,  
computer hard disks



"Rare Earth Metals" are a group of 17 chemicals, including NEODYMIUM.

They are quite plentiful on Earth, but extracting them is not an easy task. They are found scattered and mixed with other elements.

**NEODYMIUM** magnets are strong enough to attract 1000 times their own weight. A lot of magnetic power is packed in to a small Nd magnet.

**NEODYMIUM** magnets are used in  
wind turbines,  
generators of aircrafts,  
motors for electric vehicles

*Discovery :*

Carl Auer von Welsbach,  
1885, Austria:

*Atomic Weight:* 60

*Melting Point:* 1021 C

4th member, Lanthanides



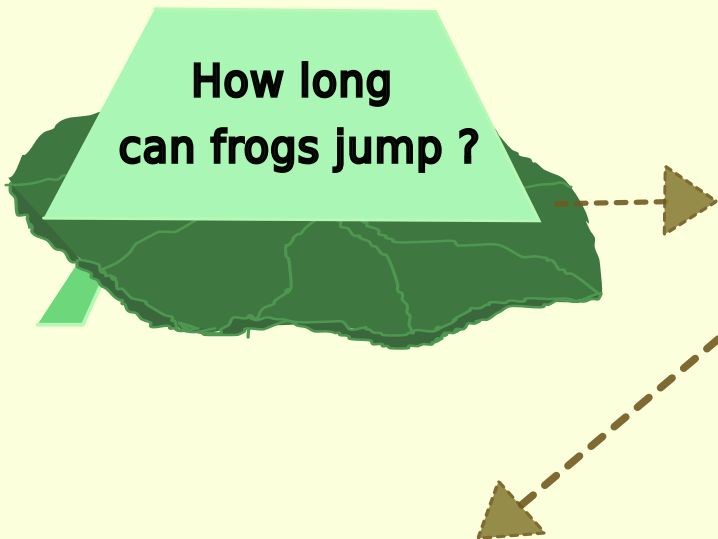
Most of the **NEODYMIUM** comes from mines in **China**. China's restrictions on exporting it to other countries has made industries world wide look for alternatives.

**Iron Nitride** and **Cerium** are under research. Early studies show they are potential replacements for Neodymium.

## Frog Leaps

- ⚡ Frogs are super jumpers. They can jump longer than the full length of their body.
- ⚡ Frogs have folded bones and joints in their legs. While jumping, they unfold and become straight, giving them extra long legs.
- ⚡ Tendons are strings attaching muscles to bones. In frogs, tendons are elastic. They can stretch and recoil helping them take off and land..





**How long  
can frogs jump ?**

**5  
times**

or

**2  
times**

longer than  
their body length

**Correct !  
Frogs can jump  
5 times their body length.**

**Nope! Frog jumps  
average 5 times  
their body length.**

***Some tree frogs  
jump 50 times  
their body length.***

⚡ Birds need force to start flying. Take off force needed by birds is similar to the take off force needed by frogs to start a jump.

⚡ Aerodynamic design of birds helps them land smooth with less force.

⚡ Frogs land with higher force. Their landing force is 3 times more than the take off force.

**Do you know what changes in future evolution will make a frog's body aerodynamic ?**

# Answer For quiz on page : 13

## Mesozoic Era

This is the era in which reptiles like dinosaurs and crocodiles ruled Earth

Mesozoic comes from greek words "meso" & "zoion" : **middle** (*meso*) and **animals** (*zoion*).

It means period of the middle animals

Mesozoic era lasted from 252 to 66 million years back. During this era, the super continent Pangea split into two, then in to smaller fragments. These fragments came together to make the continents we see today.

## ABOUT FACT-ZAP

Fact-Zap is a knowledge magazine. It is designed for students, teens and adult with focus on science, tech and nature.

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