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TODAY'S EDITION

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STUDENT EDITION
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CLIMATE CHANGE: WHAT ARE THE ECONOMIC STAKES?

As the world gears up for COP26 climate talks in Glasgow starting next Sunday, policy makers feel it may be the world's last chance to cap global warming at the 1.5-2 degrees Celsius upper limit set out in the 2015 Paris Agreement. Apart from environmental concerns, the planet is likely to face huge financial losses, they warn...

HOW MUCH DOES CLIMATE CHANGE COST?

From floods and fires to conflict and migration, economic models struggle with the many possible knock-on effects from global warming. The ballpark IMF estimate is that **unchecked warming would shave 7% off world output by 2100.** The Network for Greening the Financial System (NFGS) group of world central banks puts it even higher – **13%.** In a Reuters poll of economists, **the median figure for the output loss in that scenario was 18%.**

WHAT DOES THAT MEAN FOR INDIVIDUAL LIVELIHOODS?

Climate change will drive up to **132 million more people into extreme poverty by 2030**, a World Bank paper last year concluded. Factors included lost farming income; lower outdoor labour productivity; rising food prices; increased disease; and economic losses from extreme weather.

WHICH COUNTRIES WILL BE AFFECTED?

The **developing world.** Much of the world's poor live in the tropical or low-lying regions are already suffering climate change fall-out like droughts or rising sea levels. Moreover, their countries rarely have the resources to mitigate such damage. The NFGS report projects output losses of above **15% for Asia and Africa, rising to 20% in the Sahel** (The eco-climatic and biogeographic realm of transition in Africa between the Sahara to the north and the Sudanian Savanna to the south) countries.

HOW MUCH WILL IT COST TO FIX IT?

Advocates of early action say the sooner you start the better. The widely-used NiGEM macroeconomic forecast model even suggests an early start would offer small net gains for output, thanks to the big investments needed in green infrastructure. The same model warns of output losses of up to 3% in last-minute transition scenarios

WHO LOSES OUT IN A 'NET ZERO' CARBON WORLD?

Primarily, **anyone with fossil fuel exposure.** A report by think tank Carbon Tracker in Sept estimated that over $1 trillion of business-as-usual investment by the oil and gas sector would no longer be viable in a genuinely low-carbon world. Moreover the IMF has called for the end of all fossil fuel subsidies - which it calculates at $5 tn annually

COULD THIS SPARK A FINANCIAL CRISIS?

The global financial system needs to be insulated against both the physical risks of climate change itself and the upheavals likely to happen during a transition to net zero. Central banks and national treasuries are calling on banks and other financial players to come clean about the exposure of their books to such risks.

ARE GREEN ADVANCES DECOUPLING EMISSIONS FROM GROWTH?

Genuinely **sustainable growth implies that economic activity can grow without adding more emissions.** But so far, any decoupling has either been largely relative or achieved by shifting dirty production from one territory to another, causing a rise in global emissions

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Learning second language boosts cognitive function: Study

A new study has revealed that learning a second language is an effective and enjoyable way to improve brain health. Researchers found that older adults who studied Spanish showed similar improvements in certain critical cognitive skills as did those who engaged in brain training activities that targeted those skills. This study is among the first to examine whether the process of learning a language can benefit brain health in similar ways as bilingualism.

Evidence suggests that bilingualism has a protective effect on brain health, with bilinguals developing dementia later in life than monolinguals. However, little is known about the cognitive impact of the process of learning a second language without becoming fully bilingual

INDIAN FORCES TO JOIN BANGLADESH VICTORY DAY CELEBRATIONS

An Indian Armed Forces contingent and bands of both Army and Navy will participate in the 'Bangladesh Victory Day Celebrations' in Dhaka on December 16, it was announced on Monday. The participation is seen as a reciprocal move, as 122-member strong contingent of the Bangladesh armed forces had participated in the Republic Day parade of India this year on January 26. The contingent comprised the personnel of the Bangladesh Army, Navy, and Air Force.

And the two newest IPL teams are... LUCKNOW AND AHMEDABAD

This after the IPL Governing Council and the BCCI top brass evaluated a total of nine bids for eight hours at a walk-in bid event held in Dubai on Monday. The 2022 edition will, therefore, comprise 10 teams, similar to the 2011 edition.

MEET THE OWNERS

■ The Sanjiv Goenka-led RP Sanjiv Goenka Group (**RPSG**) won the bid for **Lucknow**. The group previously owned the Rising Pune Supergiant team that played for two seasons (2016 and 2017). The group also owns the Atletico Mohun Bagan in the Indian Super League and have owned teams in table tennis and boxing previously

■ **CVC Capital**, which won the bid for **Ahmedabad**, is an international conglomerate, with offices throughout Europe, Asia and the Americas. They were previous stakeholders in Formula 1 and recently, took a minority-stake in Spain's La Liga.

WHAT THEY PAID

While RPSG paid ₹ 7,090 crore to buy the Lucknow franchise, CVC, a private equity fund, bought the Ahmedabad franchise for ₹ 5,625 crore. The RPSG bid was 250% more than BCCI's base price of ₹ 2,000 crore; for CVC, it was 160%.

ADELE IS NO 1 ONCE AGAIN, WITH 'EASY ON ME'

After a six-year wait, a new music by Adele was sure to be a hit. But how big, especially for a song like 'Easy on Me' – a classic piano torch ballad that ignores virtually all contemporary pop standards – was unclear. Turns out it was a really big hit. The song reached No 1 on Billboard's Hot 100 singles chart, with 54 million streams, 74,000 track downloads and 19,000 radio spins in the United States during its first full week out, according to MRC Data, Billboard's tracking arm.

'Easy on Me' is Adele's fifth song to reach No 1 on the Hot 100. Her next album, '30', is due on Nov 19

Beginning the journey of learning in an alphabetical order, Times NIE takes you through one concept from each subject every week

TEACHERS, IF YOU HAVE A CONCEPT THAT CAN CHANGE A CLASSROOM, SHARE IT ON toinie175@gmail.com **WITH YOUR PHOTOGRAPH**

CLASSROOMS TO EXPERIENCE ZONES

BIOLOGY

UMBRELLA BIRD

Where is it found?
The Umbrella bird is found throughout the sub-tropical belt of Central and South America where they spend the majority of their time hopping between branches high up in the tree canopy.

For most of the year, the Umbrella bird can be found inhabiting lowlands and mountain foothills, generally at altitudes less than 500 metres.

It is known as an altitudinal migrant as it migrates up and down the mountains rather than across the land

Why is it called altitudinal migrant?
This is so because during the breeding season, they migrate higher into the mountains where they gather in groups known as 'Lek' to find a mate. These breeding sites are in cloud forests that are between 800–2,000 metres above sea level.

What are its distinctive features?
1 The most distinctive feature of the Umbrella bird is the large crest on the top of its head. During mating, the males fan their crest out so that it nearly covers the whole of their head and they then begin to make rumbling sounds to attract a female. The long, curved feathers are then retracted, making the Umbrella bird more discreet.

2 All Umbrella bird species are similar in size and have coarse black feathers covering their bodies, but each subspecies does have its own fingerprint.

Types of Umbrella Bird
The Long-Wattled has a wattle on its throat; the Amazonian one tends to be the largest of the three; the Bare-Necked is easily distinguished by the reddish, featherless patch on its throat.

ACTIVITY TIME: GETTING INTO BIRDING? THESE APPS WILL HELP YOU

EBIRD is probably the best birding app for beginners. It's free, which is a big deal since this is a niche where there are plenty of expensive apps that may not be ideal for beginners. It lets you quickly identify and submit bird sightings. You might be very pleased to see a colourful bird that you'd never seen before, but if you're getting into birding, you want to learn to identify its species. You need to be able to notice features such as the bird's size, the colour of its head, its beak, and tail.

BIRDSEYE is also a rarity in the world of birding apps. Like EBird, it lets you identify birds in a similar fashion. This app is notable as it covers birds spotted anywhere in the world, as opposed to most other apps that are region specific.

BIRDNET uses the vocalizations of birds to identify them. It not only analyses bird vocalizations but also does so with astonishing degree of accuracy.

ECONOMICS

UNEMPLOYMENT

The number of people of working age without a job is usually expressed as an **UNEMPLOYMENT RATE**, a percentage of the workforce. **STRUCTURAL UNEMPLOYMENT** is the hardest sort of unemployment to cure because it is caused by the structure of an economy rather than by changes in the economic cycle. Contrast with **CYCLICAL UNEMPLOYMENT**, which can, in theory if not always in practice, be cut without sparking inflation by stimulating faster economic growth.
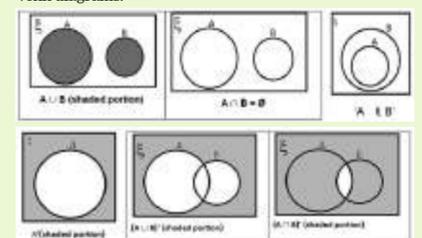
When unemployment rate rises and falls in step with the business cycle (boom and bust) it's cyclical unemployment. Another type of joblessness is structural unemployment

Structural unemployment can be reduced only by changing the economic structures causing it, for instance, by removing rules that limit labour market flexibility (one in which it is easy for firms to vary the amount of labour they use, including by changing the hours worked by each employee and by changing the number of employees).

LANGUAGE

UNABRIDGED

By Kartik Bajoria
Jaipur-based
Communication Skills
Educator & Writer

Many amateur or first-time writers struggle with this: 'How Should We Keep Our Length In Check?' To them, I have merely a one-word piece of advice – Unabridged. As a beginner, passionate, enthusiastic, spurred writer, when both your emotions as well as your creativity are at their peak, it is difficult to be 'checking yourself, censoring yourself, editing yourself'. What flows out of you, from the depths of your creative being and from your flight of imaginative fancy must be allowed to soar onto the page freely, unabated, UNABRIDGED! This is vital for a couple of reasons. First, if you try and curtail or place restrictions on your writing at this formative, nascent stage, you risk endangering its essence and its full vitality. Second, there will be enough and more opportunities where you will, per force, have to undertake not one but many rounds of self-editing, followed by editing by others (including professionals). In any or all of those stages, there will be enough of your writing that will be 'abridged.'

So why place the burden of this brutal task on oneself and on one's natural writing rhythm at the very outset? This applies to poetry, prose or any form of writing.

Try out an exercise. Write a little note about yourself in fifty words and another with no word limit and see which one captures you better! Write to us at toii175@gmail.com

MATHS

UNCUT

By Sandeep Srivastava
Educator since 20 yrs, he specialises in making Maths easy and fun

SET IS ONE WHOLE

We can see the world around us as a collection of 'many kinds of similar things'; we call such collections as sets.

Why set is important?
It's integral part of our lives, the group of best friends, the collection of our favourite things, the way we keep books (as a collection of discrete, many different kinds), the way shops/stores organise things are all examples of sets. A set is a group or collection of 'well-defined' objects or numbers, considered as an entity unto itself and are very simple to apply in math and life.

More specifically, set allows us to create a collection of things and then treat it as homogeneous in some ways for certain operations on a whole collection of things.

It helps in addressing large number of things together
The name 'Indian citizens' refers to identifiable 1.35 billion people, just as flowers in a garden imply all the flowers of a specific garden.

A beautiful reality of nature is ...
No two trees are alike. Or one human same as another. However, this does pose a serious problem in communication – how do we talk about trees around us if they are all unique in look and form? Or, talk about all the unique people around us? What we do is to define criteria for the trees to be identified as trees or human beings defined as humans.

We don't define trees seeing a particular tree (such as, 10 feet tall, one stem, 5 branches, 2,000 leaves, a particular kind of leaf and flower, etc.) or define humans by seeing a particular human (such as, 5 feet 2 inches tall, male, black eyes and hairs, etc.).

We develop broader, or generic, definitions of what we want to identify, e.g., we define trees as follow (i.e., when a plant is called/counted a tree):
a. Woody stem/trunk
b. Minimum height of 3 metre
c. Minimum stem circumference of 30 cm
d. A crown formed by branches, side stems, leaves

Thus, when we talk about trees, we are able to identify a lot of plants around us without naming each one of them in specific terms; trees is a name given to a collection of a type of plant as defined above (by us).

To top it all, many a times, we've to talk of things we don't even see or know of, e.g., all the sparrows in a city, all the migratory birds coming to the country from far away countries, all the football players and fans. In such cases, it really helps to create a collection of such things and call it as a group/collection.

How do we group things?
We group things according to some criteria, as we did for trees. Remember, things in a set are similar only with respect to the rule(s) for bringing the things together. But, defining a set doesn't necessarily mean that we physically collect the things together – set is a mathematical concept.

What are sets in Mathematics?
Sets, being very general in nature, allow us to develop mathematical theories by assuming our collection as the 'well-defined' mathematical object. They are important everywhere in mathematics from counting to probability to calculus and is the foundation because every field of mathematics uses or refers to sets in some way. Hence, they are important for building more complex mathematical concepts and structure like that of ordered pairs, relations or functions.

Sets make the display of a collection easier and briefer and that's why they are very useful!

Properties of a set
(1) The members/elements of the set (i.e., the things in the set) are distinct(Not repeated).
(2) The members of the set should be well-defined(Well-distinguishable)
(3) A set is a qualitative collection not quantitative record of the elements in a set. A set consisting of vowels in the word 'EVACUATION' is expressed as {E, A, U, I, O} irrespective of the fact that 'A' occurs twice.
(4) Sets can have infinite number of elements for example, the set of natural numbers.
(5) A change in order of writing the elements does not make any change in the set.

Representing sets in math
1. Description Method:
For example, B = {1, 4, 9, 16, 25} in descriptive form is "the set of all square numbers less than 26."

2. Roster or Tabular Method:

B = {1, 4, 9, 16, 25}

3. Rule method or Set-Builder method:
The rule, statement, formula, in the briefest possible way, is written inside a pair of curly braces.

For example, if P be the set of natural numbers less than 8, then in set-builder form it is written

as P = {x : x $\in$ N and x < 8} .It is read as "P is the set of x such that x is a natural number and x is less than 8."

Here, the symbol ':' is read as 'such that.'

Types of sets

Finite set:	Easily guessable.
Infinite set:	This too.
Null set:	A set consisting of no elements.
Equal sets:	'ALLOY' and 'LOYAL'.
Equivalent sets:	The same number of elements.
Overlapping sets:	At least one element common.
Disjoint sets:	Obvious.
Subset:	A is a subset of B if every element of A is also an element of B.

Proper subset: Set A is proper subset of set B if,
(i) all elements of A in B
(ii) at least one element in B which is not in A.

Power set: Collection of all subsets of a set A is the power set of A, including the empty/null set & the set itself.

Universal set: Contains all the elements under consideration in a situation. The basic difference between Universal set and Power set is that the former contains all the elements of all the sets written once, whereas the latter consists of all the subsets of a set.

Operations
Union of sets:
If A = {1,2,3} and B = {3,4,5,6}, then A $\cup$ B = {1, 2, 3, 4, 5, 6}.
Intersection of sets:
In the above example, A∩B = {3}.
Difference of two sets:
In the above example, A - B = {1,2}. B - A = {4,5,6}.
Complement of sets:
If $\cup$ = {1,2,3,4,5,6} and A = {1,2,3} then Ac= {4,5,6}.
These operations can be visually understood through Venn diagrams.

A ∪ B (shaded portion)	A ∩ B = B	A ⊂ B
A'(shaded portion)	(A ∩ B)' (shaded portion)	(A ∩ B)' (shaded portion)

CHEMISTRY

DID YOU KNOW? For many years, uranium was used primarily as a colourant for ceramic glazes and for tinting in early photography. Its radioactive properties were not recognised until 1866, and its potential for use as an energy source was not manifested until the mid-20th century. Uranium is now used to power commercial nuke reactors that produce electricity

URANIUM

What is it?
Uranium is a silvery-white metallic chemical element in the periodic table, with atomic number 92. It is assigned the chemical symbol U. A uranium atom has 92 protons and 92 electrons, of which 6 are valence electrons (a single electron or one of two or more electrons in the outer shell of an atom that is responsible for the chemical properties of the atom).

Where is it found?
Uranium occurs naturally in low concentrations in soil, rock and water, and is commercially extracted from uranium-bearing minerals such as uraninite. Uranium ore can be mined from open pits or underground excavations.

Who discovered it?
Uranium might have come to Earth from outer space. Uranium has been on our planet since Earth was formed about 4.55 billion years ago.It was discovered in 1789 by Martin Klaproth, German chemist. He named his discovery 'uran' after the planet Uranus. Uranium is a fissile element capable of fission reaction.

ATOMIC CANDY ACTIVITY

In this activity, students learn about radioactivity, the rate at which an isotope decays, and the concept of half-life. They will count and record the number of decayed 'atoms' and graph the results.

Learning Outcomes
■ Understand the concept of half life
■ Understand radioactive decay process
■ Create and interpret half-life (exponential) graphs
■ Understand the difference between a linear and exponential progression

Each group needs:
50 pieces of plain M&M candy or any other (with printing on one side)
1 resealable bag
Graph paper

PROCEDURE
■ Prepare bags ahead of time or have students:
■ Place 50 atoms of candium (pieces of candy) in a sealed bag.
■ Gently shake for 10 seconds.
■ Gently pour out candy and count the number of pieces with the print side up.
■ Record the data: Consider these atoms have 'decayed.'
■ Return only the pieces with the print side down to the bag and reseal it.
■ Consume the 'decayed atoms.'
■ Gently shake the sealed bag for 10 seconds.
■ Continue shaking, counting, and consuming until all the atoms have decayed.
■ Graph the number of undecayed atoms versus time, based on tabs Half-life-Total Time-Of Undecayed Atoms- of Decayed Atoms. Now the process is complete.

QUESTIONS
1. What is a half-life?
2. What was the half-life of element candium?
3. At the end of two half-lives, what fraction of the atoms had not decayed?
4. Describe the shape of the curve drawn in step 9.

ANSWERS TO EXTENSIONS
1. Half-life is the length of time required for one half of an isotope to decay.
2. The half-life of candium in this activity was 10 seconds.
3. At the end of two half-lives, 1/4 of the original sample remained and 3/4 of the sample had decayed into a new element.
4. The graph is a decreasing logarithmic curve. The shape of the graphs will be almost the same.

SOURCE: THE SCIENCE HOUSE, NORTH CAROLINA STATE UNIVERSITY)