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STUDENT EDITION
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Geography/
EVS

GANGA: NGT says stop untreated sewage disposal into river



The National Green Tribunal (NGT) recently directed the Uttarakhand chief secretary to look into a complaint alleging discharge of untreated waste into the river Ganga in Rishikesh and ensure adequate arrangements for setting up requisite sewage treatment plants in the state.



LESSON PLAN

Part one (around 20 minutes)
To begin the lesson, ask students to research facts about Ganga and jot them down on the board based on four elements: a) Ancient India and Ganga b) Historical aspects: Emperors around towns on the banks of Ganga c) Geographical relevance d) Environmental relevance.

Part two (around 40 minutes)
Give/show students extracts from a New Yorker article by George Black ('What It Takes to Clean the Ganges'); a National Geography Live video with Pete McBride ('Chasing Rivers, Part 2: The Ganges') and <https://timesofindia.indiatimes.com/videos/news/organic-farming-afforestation-efforts-improve-ganga-health-in-uttarakhand/video/91720650.cms>
This will familiarise students with the course of the river and its religious significance to Hindus. It also provides background knowledge on the environmental condition of the river and some of the activities responsible for the situation.

ACTIVITY: Research the development of the closest major waterway to your location in terms of economic, cultural, and environmental patterns. Make a presentation
TEACHER PROMPT: I. RIVER GANGA...
Ask students to think of all that discussed and create a monologue on the above topic, personifying Ganga

Ganga and its references in ancient texts

1 The Vedic Age (1500 - 500 BCE) was a period in the history of the Indian subcontinent beginning toward the end of the Indus Valley Civilization and before the second urbanisation in central Indo-Gangetic Plain. It is named after the four Vedas, the oldest scriptures of Hinduism. The Indus Valley Civilization was based on the rivers Indus and Saraswati. The Rig Veda, one of the oldest texts in any Indo-European language, thus lays more emphasis on Indus and Saraswati, though the Ganges is also mentioned.

2 The decline of the Indus Valley Civilization in the early 2nd millennium BC, marks a point where the centre of the Indian civilization moved from the Indus basin to the Ganges basin. So, the later three Vedas give much more importance to the Ganges. The story of Ganga, where she is brought to earth by Bhagirathi, is told in ancient Indian texts including the Ramayana, the Mahabharata and several Puranas.

3 River Ganges has two source streams, the Bhagirathi and the Alaknanda. The Bhagirathi is formed at the foot of Gangotri Glacier, at Gomukh, in Uttarakhand. The Alaknanda is formed by the snow-melt of peaks such as Nanda Devi, Trisul and Kamet. The term Panch Prayag ('five confluences') is used to denote the five sacred river confluences with Alaknanda in Uttarakhand.

LESSONS FROM THE WORLD

As students, while it is important to know about what's happening around the world, what is more essential is to have an in-depth perspective of events that will help you build your skill sets. Be it political, social, economic, climatic events, Times NIE presents you handpicked, curated news that will be of help to you in the classroom and give you an edge over others

History

PLATINUM FEST: Queen marks 70th year on throne

Queen Elizabeth II's Platinum Jubilee celebrations will be only the ninth such celebration by a British monarch since King George III in 1809. Both she and Queen Victoria, who ruled from 1837 to 1901, have had silver, golden and diamond events to mark their 25th, 50th and 60th years as monarch. But Elizabeth is the only one to celebrate her 70th year on the throne.

QUEEN OF ENGLAND

1 Elizabeth Alexandra Mary Windsor is born on April 21, 1926 in Mayfair, central London.

2 She is the first child of the Duke and Duchess of York, who becomes King George VI and Queen Elizabeth, the Queen Mother.

3 As Nazi Germany bombs the British capital, Elizabeth and her younger sister, Princess Margaret, move to Windsor Castle, for their safety. During World War II, she trains as a military vehicle mechanic.

4 Princess Elizabeth marries Prince Philip at Westminster Abbey. Their first child, Prince Charles, is born in 1948. A daughter, Anne, arrives in 1950, followed by Andrew in 1960 and Edward in 1964.

5 Princess Elizabeth, then aged 25, is visiting Kenya with Philip when her father dies aged 56 on February 6, 1952. She cuts short the trip and rushes back to Britain. She is crowned at Westminster Abbey on June 2, 1953.

6 The ceremony is watched across the world. The queen reaffirms the vow of lifelong service to Britain and the Commonwealth she had made in a speech aged 21 in 1947.

7 Prince Charles separates from Princess Diana, and Andrew splits from his wife, Sarah.

8 Diana's death in a car crash on August 31, 1997 rocks the royal family, provoking rare criticism of the Queen.

9 Celebrations for the Queen's 50 years on the throne come in the same year as the deaths of her mother and younger sister Margaret.

10 The Covid forces the ageing queen into self-isolation at Windsor. Prince Philip dies aged 99 in April 2021. The Queen's own health deteriorates and she is forced to cut back her duties.



Queen (c) with mother and sister



LESSON PLAN

TEACHER PROMPT



- Talk about British History and monarchy
- Discuss imperialism
- Ask students to note down important dates and make a timeline of events when the Queen visited India

Word This Week



■ Congress leader Shashi Tharoor on Sunday took a dig at the Ministry of Railways with a difficult-to-pronounce head-scratcher - quomodocunquize. The man of many words, who is known for throwing in rarely-used English words into Twitter lexicon, helpfully shared the meaning too. "To make money by any means possible," the meaning posted by the Congress leader read. In a tweet, Tharoor said, "Obscure Words Dept: Must the Indian Railways quomodocunquize?"

POP QUIZ

Which is the world's fourth-largest country by area?

- Clue 1: India imports 8% of its crude oil from this country.
- Clue 2: It's home to the world's largest freshwater lake.
- Clue 3: It does not have any official language.

Answer: USA



Clue 4: It has a land area of over 9.37 million sq km and is home to Lake Superior

When a picture speaks...



PLAYING WITH ART: Ahead of the Champions League final, artists prepare street art celebrating the defining moments of what has been an unforgettable season outside the Stade de France in Paris.

Play with picture captions. Try penning down some

Current Affairs

Nikhat: How she fought her way to top



Fresh from her exploits at the World Boxing Championship, Nikhat Zareen has now firmly set her sights on being the first among equals at the Paris Olympics with a top podium finish during the 2024 edition of the quadrennial extravaganza. Zareen clinched the coveted gold in the flyweight (52kg) division with a facile 5-0 win over Thailand's Jitpong Jutamas in the final of the Women's World Championship in Istanbul on May 19, thus becoming only the fifth Indian boxer to be crowned world champion.

For Zareen, this medal has come after years of hard work and toil. "I have just won a gold medal in World Championship but it is just a stepping stone for me. It is just a start I have just started and now the responsibility is even more as expectations have increased," says she.



LESSON PLAN

TEACHER PROMPT

■ Ask students to make a book of girls/women who have inspired them in life. Ask them why they were inspired and what makes them a hero.

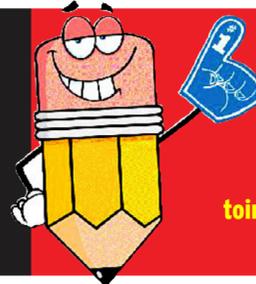
TALK ABOUT LESSONS LEARNT FROM NIKHAT

■ Nikhat in a recent interview said that parents should be supportive of their daughters and encourage them to pursue the profession or career they desire. Ask students to write down qualities they admire in Nikhat Zareen.





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

GEOGRAPHY

VOLCANO



Openings of the Earth's surface

When a volcano erupts lava, ash and gas is expelled from the Earth's surface. The hole at the top is known as the **VOLCANIC CRATER**.

AN ACTIVE VOLCANO is one that has erupted within the last 10,000 years or it has some type of activity going on such as gases being released or earthquakes around it.

A DORMANT VOLCANO is one that hasn't erupted in the last 10,000 years, however there is a chance it will erupt at some point.

AN EXTINCT VOLCANO is one that hasn't erupted in the last 10,000 years and is unlikely to erupt in the future.

INTERESTING FACTS

- Volcanoes hold very hot liquid called magma. Magma is molten rock, which glows bright orange and is held in a chamber within the volcano.
- Once a volcano erupts, the magma comes out of the crater.
- The expelled substance is called lava. Once the lava cools down, it solidifies to rocks.



MAKE YOUR VOLCANO!

WHAT YOU'LL NEED

- 2 plastic cups
- 1 paper plate
- Roll of silver foil
- Glug of red food colouring
- 50 ml vinegar
- 50 ml washing up liquid
- 3 tablespoons bicarbonate of soda; lump of blue tack
- And a parent to help out!

HOW DO YOU DO IT

- Attach the plastic cup to the plate using blue tack - you can use scissors to adjust the height of the cup, depending on how big you want your volcano to be.
- Cover the plate and cup with a sheet of foil - don't forget to make a hole above the cup for



the caldera. Mix together roughly equal amounts of vinegar and washing up liquid, and add red food dye to give the experiment that molten lava look.

Pour the mixture into the cup, filling it to about halfway or slightly over it. Pour in two or three teaspoons of bicarbonate of soda. Stand back and watch your eruption unfold....

Tip - try adding different combinations of vinegar and baking soda to create different and bigger eruptions.

SCIENCE

VIRUS



These germs need to be inside living cells to grow and reproduce. Most viruses can't survive very long if they're not inside a living thing like a plant, animal, or person. Whatever a virus lives in is called its host. When viruses get inside people's bodies, they can spread and make people sick. Viruses cause chickenpox, measles, flu and many other diseases.

TEACHING CORONA IN INNOVATIVE WAYS

MATHS BEHIND PANDEMIC

Frank Wang, a math teacher at Oklahoma School of Science and Mathematics, began teaching kids the math of epidemics. "Where teaching about exponential growth might have them scratching their heads in the classroom, now we can show that these models are being used in hospitals to calculate things like: how many ventilators, or how many hospital beds, will they need?" For example, Wang says, "Forty million people visit Nevada. They stay a couple days and then go back home. Calculate the incubation period or mortality rate."



LANGUAGE

VARIETY

By Kartik Bajoria
Jaipur-based
Communication Skills
Educator & Writer



You might have heard the adage, variety is the spice of life! It most certainly is, be it clothing, holidays, friends or food. As it turns out, even in language and writing, it is good to have variety.

Having said that, variety doesn't necessarily or always equate to flowery, complex, difficult words or vocabulary. Variety simply means that rather than repeating the same word, replace it with a synonym or a phrase. **LET US LOOK AT AN EXAMPLE:** If you have a sentence that says, "The school had ordered the most cutting-edge computers, making it the only school in the entire state to have such advanced systems, a fact that the head



of the school was particularly proud of." The usage of 'school' thrice in the same sentence could definitely do with some variety, and perhaps the same sentence would read and sound better if it were to say, "The school had ordered the most cutting-edge computers, making it the only one in the entire state to have such advanced systems, a fact that the head of the institution was particularly proud of." Hence, variety adds value to writing skills and adds depth to language.



HISTORY

VANSHAVALI

Onkar Singh Rathore writes for Times NIE about interesting events and terms from History that students must know about. The author is interning at the History Diaries - an initiative to revamp the current pedagogical system of History through tours, drama in schools

The genealogical records of the Kings and the different aristocratic families maintained from the beginning of record-keeping to date are often called as Vanshavali.

MATHS

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



VECTORS

The importance of algebra

Mathematics is the language for abstraction of real world and scientific situations, entities, relationships, and events. ALGEBRA is that branch of mathematics which showcases its abstractive power; it generalises arithmetical situations to create expressions using the four basic operations. 'M (marks for the first term)' = 20% F (first class test) + 30% P (project work) + 50% E (term exam), is a generalised arithmetical expression for calculating marks of a subject in a term.

Algebra structures any real world situation/relationships of two or more things/objects in a way that its arithmetic expression (called equation) has only one (rigid) interpretation (each equation represents one unique reality/situation/relationship).

Linear algebra - the simplest, yet most powerful algebra

The relationships expressed by algebra can be equations that could be linear, simultaneous linear equations, quadratic, cubic, and so on (we already know these). The complexity of expressing and 'solving' equations rapidly multiplies as we move from linear to quadratic to cubic, etc. Linear algebra is the mathematical world of system of linear equations - the simplest set of equations.

The world of linear algebra

Google search became very popular within years of its launch, and remains so; it uses linear algebra for ranking the pages displayed after a search. Higher competence in knowing and applying linear algebra tools is at the foundation of the ability to use 'big data' to inventively address the most diverse set of scientific, technological, social, economic (and political/governance) goals and challenges.

The importance of linear algebra

It's linear algebra that gives wings to all of us to imagine, interact and manipulate n-dimensional situations (scientific, technological, social, etc.), read each of the dimensions as being different variables that together define the situations. Ironically, linear algebra most easily takes us beyond

the limits of 4-dimensional world!
Linear algebra and (artificial) intelligence

To most effectively understand and model more and more data, we often increase the number of variables while gathering the data; more intelligence demands more variables. As a result, linear algebra is becoming more powerful and useful for building increasingly intelligent devices and systems.

Mathematical world of linear algebra

The simple tools linear algebra uses are linear equations, vectors and matrices. Vector matrix is one of the most powerful concepts of linear algebra.

Welcome vectors

We know that mathematics is the language of things/situations which are quantifiable. And there are two kinds of quantifiable things - scalar (just the magnitude is enough to fully describe it), and vector (magnitude as well as direction is needed).

Getting a feel of vectors

A vector is what is needed to 'carry' the point A to the point B; the Latin word vector means 'carrier' (so, vector is a very common term in biology; means 'carriers of diseases', such as mosquitoes) virus.

Vectors are geometrical objects which need magnitude and direction to be comprehensively measured, understood, expressed, and used in mathematical operations. For example, if you want to know about the motion of an object, you need to consider its speed and direction. One way to handle these two ideas is to handle them separately, but using vectors, you could save time and labour by handling them as a single concept.

When geometrically represented, a vector is a line segment. It has a starting point and an ending point with both a fixed length and direction.

The simplest way to understand a vector is to think of it as a line on a road map. For example, in the diagram given below the vector is of length 3 units and at an angle of 30 degrees.

A vector represented by line segment PQ starts at P and extends in the direction of Q. The notation \vec{PQ} or \vec{PQ} is used for vectors.

A vector with fixed initial and ter-

minal point is called a bound vector. When only the magnitude and direction of the vector matter, then the particular initial point is of no importance, and the vector is called a free vector. A vector with magnitude 4 and direction as positive x-axis can be any of these vectors.

Two vectors are the same if they have the same magnitude and direction.

Machine learning and vectors

In machine learning software, a vector is an ordered set of data - of one or more values called scalars. Vectors are built from components, which are ordinary numbers. You can think of a vector as a list of numbers, and vector algebra as operations performed on the numbers in the list.

Vectors in Cartesian space

In the Cartesian coordinate system, a bound vector can be represented by identifying the coordinates of its initial and terminal point. For instance, the points $A = (1, 0)$ and $B = (0, 1)$ in xy-coordinate determine the bound vector pointing from the point $x = 1$ on the x-axis to the point $y = 1$ on the y-axis.

We see that the ordered pair denoted (x, y) defines any vector uniquely as $\langle x, y \rangle$. The coordinate x is the scalar horizontal component and coordinate y is the scalar vertical component of the vector.

In the picture below, the blue vector is the position vector and all the red vectors are free vectors having the same magnitude and direction as that of the position vector.

Coordinates make algebra easy

This coordinate representation of free vectors allows their algebraic features to be expressed in a convenient numerical fashion. For example, the sum of the two (free) vectors $(1, 2)$ and $(-2, 0)$ (both in black) is the (free) vector $(1, 2) + (-2, 0) = (1 - 2, 2 + 0) = (-1, 2)$ (in red).

Scalar and vector

AB has horizontal scalar component as $a_2 - a_1$ and vertical scalar component as $b_2 - b_1$. Thus, joining the origin with the point with coordinates $(a_2 - a_1, b_2 - b_1)$ will give us the position vector \vec{OP} equivalent to the original vector \vec{AB} , since \vec{OP} and \vec{AB} have same magnitude OP & AB direction.

INDIAN PURANAS are considered to be the most reliable source of genealogical records because they have genealogical lists from the beginning of time, from the first kings and their origin which is traced back to the Sun and Moon to the dynasties of Kali era i.e. Sisungas, Nandas, Mauryas, Shungas, Andhras and Guptas.

THE MAURYA DYNASTY is mentioned with detailed information in Vishnu Purana. The Matsya Purana is a reliable source for Andhra Dynasty, while one can find the explicit genealogy of the Guptas in Vayu Purana.

ROYAL INSCRIPTIONS naturally tend to exaggerate the achievements but they also provide the genealogy of the rulers which



DID YOU KNOW?

The Indian Puranas are considered to be the most reliable source of genealogical records because they have genealogical lists from the beginning of time

can be considered reliable. **THE CAVE 16 INSCRIPTIONS AT AJANTA** devoted the first 20 verses to the donor's genealogy i.e. to the ruler Harishena. The Ghatotkacha cave inscription of Varahdeva gives a detailed genealogical record of the donor's family. The Junagarh rock in-

scription of King Rudradaman also has a brief genealogy of the ruler. Sometimes Prashasti also throws light on the lineage. **KALHAN'S RAJATARANGINI** literally 'The River of Kings' is also one of the credible sources which covers early to 12th century history of the Kashmir region.

