



This theme for this issue's crossword is **Evolution**.

Science Games

General Science Visual Quiz

This week's quiz involves answering questions based on visual cues.

Themed Crossword

This theme for this issue is **Evolution**. Send us your crosswords if you want to be featured!

Linked List

Link each term with the next, and complete the science word chain!

General Science Quiz



Q1. In this picture taken at Ehrenfest's home, Einstein and Bohr can be seen debating about one of the most mysterious aspects of quantum mechanics. Can you guess the topic of their debate, which later became part of the well-known Bohr-Einstein debates.

- (a) Whether quantum mechanics can be unified with gravity
- (b) Whether the Copenhagen interpretation of quantum mechanics was a valid description of nature
- (c) Whether quantum systems can be chaotic
- (d) Whether a classical system can transition into a quantum system



Q3. This image shows the successful completion of a very important mission for India's development and defense strategy. The three persons are the then chief of the organisations who headed the mission: Dr. K Santhanam (technical advisor of DRDO), Dr. Rajagopala Chidambaram (head of DAE) and Dr. A P J Abdul Kalam (head of DRDO). Do you know what the mission was?

- (a) India's second nuclear bomb test
- (b) India's first satellite test
- (c) India's first missile test
- (d) India's first nuclear submarine test



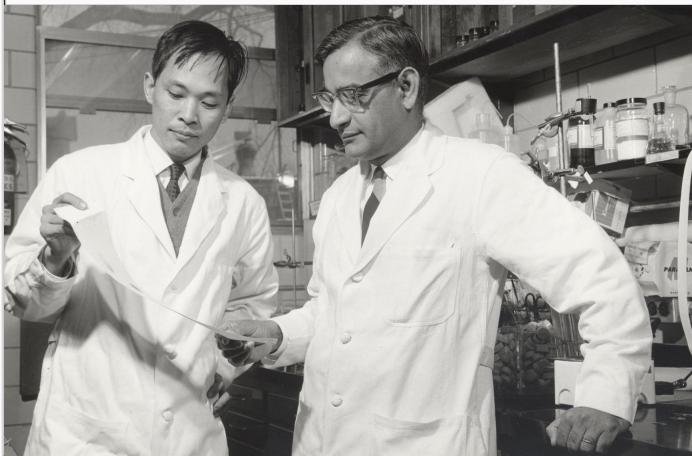
Q2. The above picture is of the announcement of a fundamental experimental discovery in physics, which was predicted theoretically by the two scientists in the picture, almost half a decade before. They were awarded with the Nobel prize a year after the experiment. What is the discovery being reported here?

- (a) Discovery of gravitational waves
- (b) Successful run of a quantum computer
- (c) Discovery of water on moon's surface
- (d) Discovery of the Higgs boson



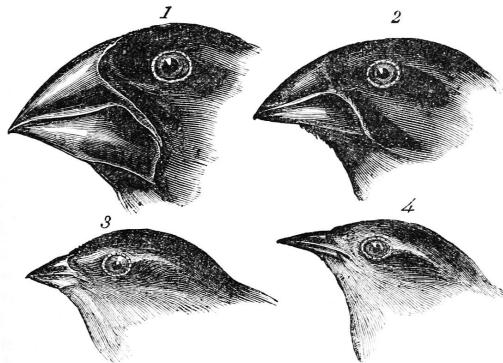
Q4. This is the picture of a very prestigious conference that occurred in 2024. It is one of the oldest conferences and was started by scientists to discuss important and timely topics of natural science. The 1927 edition of this conference involved the coming together of several top physicists of that time, including Einstein, Lorentz, De Broglie and Poincare. Incidentally, the only woman physicist there was Marie Curie. Name the conference.

- (a) International Conference on Theoretical Physics
- (b) The Solvay Conference
- (c) International Conference on Quantum Physics
- (d) Planck Roundtable Conference



Q5. The man on the right in the above image is an Indian American scientist who worked on molecular genetics. His main contribution was to demonstrate the role of nucleotide in protein synthesis, for which he got the nobel prize. He was the first scientist to chemically synthesize oligonucleotides. After years of work, he became the first to complete the total synthesis of a functional gene outside a living organism in 1972. Who is he?

- (a) MS Swaminathan
- (b) Venkat Ramakrishnan
- (c) Manjul Bhargava
- (d) Hargobind Khorana

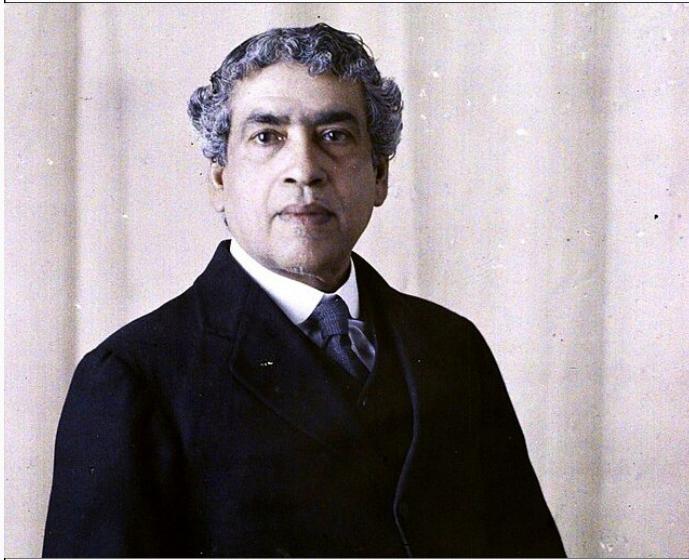


Q6. This picture is familiar to all of the students of evolutionary biology. The diversity of the beaks in these intimately associated birds amazed Darwin and he said- It is very remarkable that a nearly perfect gradation of structure in this one group can be traced in the form of the beak, from one exceeding in dimensions that of the largest gros-beak, to another differing but little from that of a warbler. The genus of the bird with the biggest beak and that with the smallest respectively are

- (a) Geospiza, Certhidea
- (b) Geospiza, Camarhynchus
- (c) Certhidea, Geospiza
- (d) Camarhynchus, Geospiza

Q7. It is observed that the male birds of the type represented in the picture for Q6 have two types of song sounds A and B .Observation leads to the fact that birds with song A have short beaks and this helps them tear apart the cactus base and eat the pulp and any insect larvae and pupae, while birds with song B have longer beaks and they are able to punch holes in the cactus fruit and eat the fleshy aril pulp, which surrounds the seeds. What do you think is the possible advantage of this difference in features?

- (a) Reduces competition for nesting sites during breeding season, ensuring higher reproductive success for all groups.
- (b) Ensures that birds with song A can avoid predators more effectively by staying near the cactus base, while birds with song B can feed higher up and escape aerial predators.
- (c) Helps maintain genetic diversity among the population by encouraging different song types during mating displays.
- (d) Maximises their feeding opportunities during the non-breeding season when food is scarce



Q8. The man shown in the above picture was at University of Calcutta, where he flared out the end of a waveguide, demonstrating the horn antenna. He pioneered the investigation of radio microwave optics, made significant contributions to botany, and was a major force behind the expansion of experimental science on the Indian subcontinent. He was also the first one to announce the presence of "nervous system" of plants .Identify the man and also name the instrument which he used to measure the plant's growth

- (a) Jagadish Chandra Bose, crescograph
- (b) Satyendra Nath Bose, radiometer
- (c) Debendranath Bose, botanogram
- (d) Gyanchandra Bose, coherer



Q9. In 1985, Harold Kroto from the University of Sussex, along with James R. Heath, Sean O'Brien, Robert Curl, and Richard Smalley from Rice University, discovered structures resembling the picture. These were found in the sooty residue formed by vaporizing carbon in a helium atmosphere. The mass spectrum of the residue revealed distinct peaks corresponding to molecules with precise masses equivalent to 60, 70, or more carbon atoms—specifically, C_{60} and C_{70} . Identify the molecule

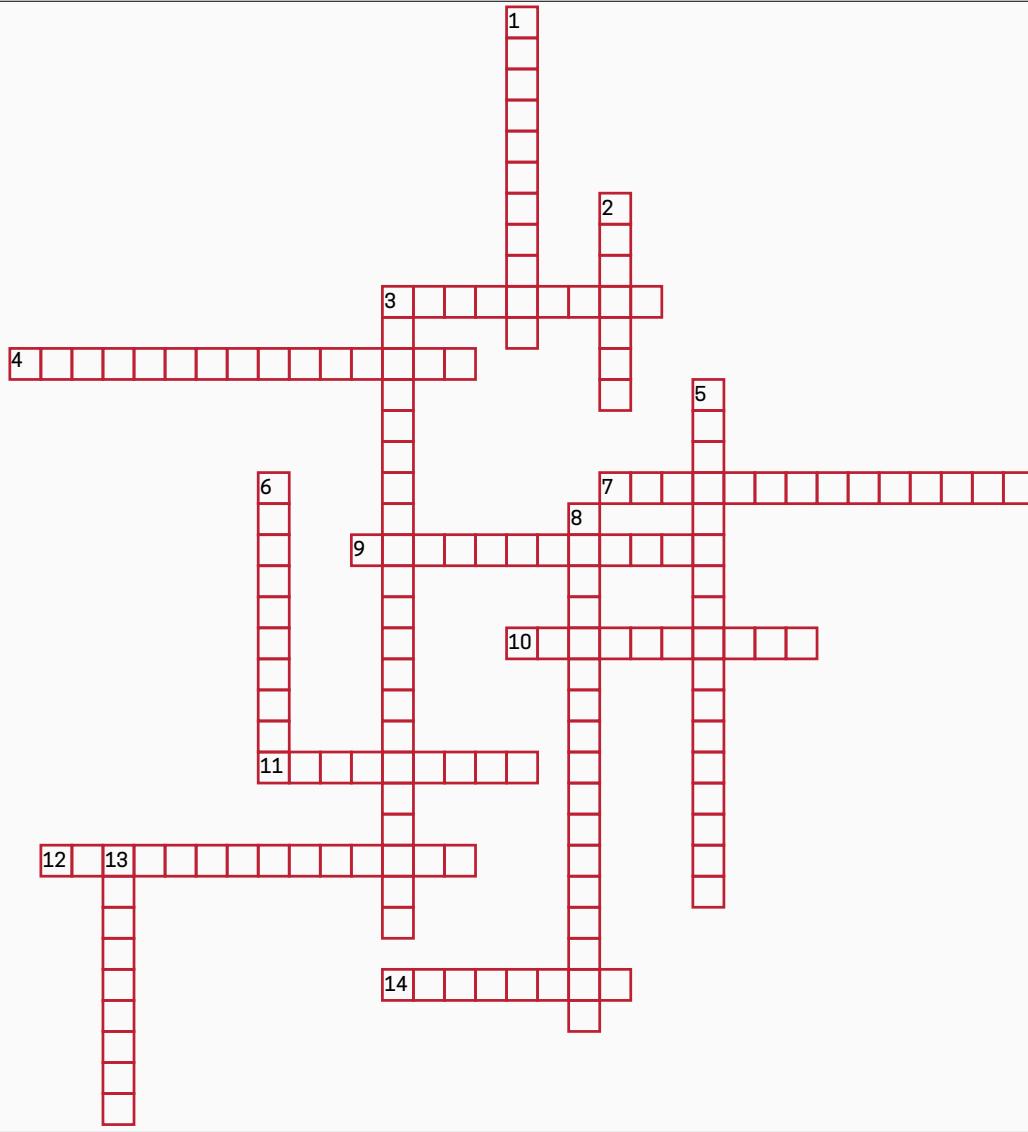
- (a) Graphite
- (b) Diamond
- (c) Fullerene
- (d) Carbon nanotube

Q10. Poincare conjecture is a theorem in geometric topology that states that every closed three dimensional manifold is topologically equivalent to sphere. This was an unsolved problem till 2002, until it was solved by the man in the picture. He went on to decline the Fields medal, saying "I'm not interested in money or fame, I don't want to be on display like an animal in a zoo. I'm not a hero of mathematics. I'm not even that successful; that is why I don't want to have everybody looking at me". Can you name this mathematician?

- (a) Don Zagier
- (b) Grigori Perelman
- (c) Dennis Sullivan
- (d) Andrew Wiles

Themed Crossword

This issue's crossword is based on **evolutionary biology**.



Across

- 3 Evolutionary history and relationships among species (9)
- 4 This refers to the proportion of a specific allele (variant of a gene) within a population's gene pool (15)
- 7 Estimation of evolutionary timescales based on mutation rates (14)
- 9 Random changes in allele frequencies in a population (12)
- 10 The effect that refers to a sharp reduction in population size causing genetic diversity loss (10)
- 11 Long-term interaction between different species, often mutually beneficial (9)
- 12 This refers to evolutionary changes within a population or species over a relatively short period of time (14)
- 14 Movement of genes between populations through migration (8)

Down

- 1 Reciprocal evolutionary changes between interacting species (11)
- 2 The effect which refers to genetic variation resulting from a small group establishing a new population (7)
- 3 The idea that evolution occurs in rapid bursts rather than gradually (21)
- 5 Environmental factors that influence reproductive success (17)
- 6 Anatomical similarities due to shared ancestry (10)
- 8 The rapid evolution of multiple species from a common ancestor (17)
- 13 A diagram depicting evolutionary relationships (9)

Solution can be found at the end of the issue.

Linked List

Linked List is a general science-based word game. The rules are straightforward:

1. The goal is to **guess eleven words** that have been drawn from science.
2. The **first word** (the seed) will be provided to you, and hints and **number of letters** will be provided for the remaining words.
3. You are also informed that the **first letter of any word is the last letter of the previous word**. So the first letter of the second word will be the last letter of the seed word, the first letter of the third word is the last letter of the second word, and so on.
4. This property goes all the way, so that the **last letter of the last (eleventh) word is also the first letter of the seed word**.

Find all the words!

Today's seed: ENZYME

2. A thermodynamic quantity representing the degree of disorder in a system (7)

E

3. The amount of product formed in a chemical reaction (5)

4. The bending of waves around obstacles leading to patterns of bright and dark bands. (11)

5. A nearly massless subatomic particle with no electric charge (8)

6. The diffusion of water across a selectively permeable membrane (7)

7. Quantum mechanical attribute, must be integer for bosons (4)

8. A subatomic particle with no electric charge, found in the nucleus of an atom (7)

9. A point in a standing wave where the amplitude is zero (4)

10. A negatively charged subatomic particle (8)

11. Fundamental unit of chromatin, consisting of a segment of DNA wound around a core of histone proteins (10)

E

Answers can be found at the end of the issue.

Do Contribute!

Contributions are welcome from students and faculty members across all academic institutions, on a rolling basis. The portals for submitting all kinds of content can be found on our website. More specific details regarding content submission can also be found there, so please take a close look at the linked page if you are interested in contributing. For any queries, reach out to us at scicomm@iiserkol.ac.in.

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Short Summaries: In order to showcase the frontiers of research, we publish short summaries (350-400 words) of recently published science research articles. The summary should broadly lay out the questions being asked and the new results obtained. Submit your research stories [here](#).

Quizzes and Games: We also feature science games such as crosswords, quizzes and word-link games. If you have content for these games or have new interesting games in mind, please pass them on to us via our email.

Interview Recommendations: If you want us to interview specific scientific personalities or if you have an interview that you want to publish, please send us an email.

Finally, but very importantly, we would love to hear any feedback that you might have about this endeavour, so please send us your comments at scicomm@iiserkol.ac.in.

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Crossword Solution

Across

- 3 PHYLOGENY
 - 4 ALLELEFREQUENCY
 - 7 MOLECULARCLOCK
 - 9 GENETICDRIFT
 - 10 BOTTLENECK
 - 11 SYMBIOSIS
 - 12 MICROEVOLUTION
 - 14 GENEFLOW
- Down**
- 1 COEVOLUTION
 - 2 FOUNDER
 - 3 PUNCTUATEDEQUILIBRIUM
 - 5 SELECTIONPRESSURE
 - 6 HOMOLOGOUS
 - 8 ADAPTIVERADIATION
 - 13 CLADOGRAM

Quiz Answers

- 1. Option 1
- 2. Option 4
- 3. Option 1
- 4. Option 2
- 5. Option 4
- 6. Option 3
- 7. Option 4
- 8. Option 1
- 9. Option 3
- 10. Option 2

Linked List Solution

- 2. ENTROPY
- 3. YIELD
- 4. DIFFRACTION
- 5. NEUTRINO
- 6. OSMOSIS
- 7. SPIN
- 8. NEUTRON
- 9. NODE
- 10. ELECTRON
- 11. NEUCLEOSOME

