

**WORK PLAN**  
**(March-July 2023)**

**Course Name: VAC**

**Semester: II**

**Paper Code: 6967000015**

**Paper Name: Science and Society**

**Faculty: Dr Sharib Zeya**

Week	Theme/ Curriculum
1	<b>Unit 1: Science and Technology: From Ancient to Modern Times</b>
2	Philosophy of science and the scientific method
3	Importance of observation, questions and experimental design, rational thinking, myths vs. facts
4	Science, Technology and Traditional Practices
5	Construction, architecture and design - use of natural environment-friendly designs and materials
6	Agriculture including domestication of plants and animals.
7	Students should be made aware about the contributions of Indian scientists since ancient times and the contributions of women in science
8	Science and Technology in Modern Times: Suggestive areas include: Public Health: Nutrition, Hygiene, Physical and Mental Health, Vaccines and Antibiotics, Antimicrobial resistance
9	Food Security: Green Revolution, White Revolution
10	IT Revolution, E-Governance; Clean Energy, Renewable Energy; Space Science and Exploration; Evolution, Ecology and Environment
11	<b>Unit 2: Scientific Principles, and Concepts in Daily Life</b> Students are required to participate in activities and experiments. Suggested Activities:
12	<ul style="list-style-type: none"> <li>• Observing and documenting flora and fauna of the College campus/city</li> <li>• Visits to science laboratories in the College or neighboring College/Institute</li> </ul>
13	<ul style="list-style-type: none"> <li>• Visits to science museums, planetarium</li> <li>• Visits to biodiversity parks and nature walks</li> </ul>
14	<ul style="list-style-type: none"> <li>• Participation in a citizen science project/initiative</li> </ul>
14	<p>Suggested Experiments (minimum any four):</p> <ul style="list-style-type: none"> <li>• Measuring the height of the college building using a stick.</li> <li>• Measuring the curvature of earth, using distance and shadow length.</li> <li>• Isolation of DNA (DNA Spooling)</li> <li>• Observing transpiration and photosynthesis in plants</li> <li>• The blood typing game (online)</li> <li>• Are fruit juices, soap, carbonated drinks acidic or alkaline? (Using pH strips or developing your own Litmus Test)</li> </ul>

15	<ul style="list-style-type: none"> <li>• Do plants learn and remember? • Experiments on how migratory birds find their way. (Online) • How can a mosquito sit on a water surface or a blade float on water? • How does a submarine dip or rise in the ocean? • How and why does the path of the sun in the sky change with the seasons? • Identification of celestial objects with the naked eye</li> <li>• Types of clouds • Science of musical sounds • Science of splitting colors from white light: rainbow, CD-ram, prism, oil films. • Lenses, mirrors and the human eye</li> </ul>
16	Revision

### Essential Readings/Reference Texts:

- Basu and Khan (2001). Marching Ahead with Science. National Book Trust.
- Gopalakrishnan (2006). Inventors who Revolutionized our Lives. National Book Trust.
- Yash Pal and Rahul Pal (2013) Random Curiosity. National Book Trust.
- John Avery {2005}. Science and Society, 2nd Edition, H.C. Orsted Institute, Copenhagen.
- Dharampal (2000). Indian Science and Technology in the Eighteenth Century, OIP.

### Suggested Readings:

#### Philosophy of Science

<https://blogs.scientificamerican.com/doing-good-science/what-is-philosophy-of-science-and-should-scientists-care/>

[http://abyss.uoregon.edu/~js/21st\\_century\\_science/lectures/lec01.html](http://abyss.uoregon.edu/~js/21st_century_science/lectures/lec01.html)

<https://wps.ablongman.com/wps/media/objects/1449/1483820/182.pdf>

#### Myths vs. Facts

<https://www.sciencelearn.org.nz/resources/415-myths-of-the-nature-of-science>

#### History of Technology

<https://www.visualecapitalist.com/history-of-technology-earliest-tools-modernage/>

#### Water Harvesting

<https://worldwaterreserve.com/introduction-to-rainwater-harvesting/>

#### Public Health

[https://www.ajpmonline.org/article/S0749-3797\(11\)00514-9/fulltext](https://www.ajpmonline.org/article/S0749-3797(11)00514-9/fulltext)

<https://study.com/academy/lesson/public-health-vs-medicinedifferencessimilarities.html>

<https://www.deepc.org.in/video-tutorials/public-health>

#### Food Security

<https://www.concern.net/news/what-food-security>

<https://www.nrdc.org/stories/renewable-energy-clean-facts>

#### Space Science

<https://www.isro.gov.in/spacecraft/space-science-exploration>

<https://www.isro.gov.in/pslv-c11-chandrayaan-1>

<https://www.isro.gov.in/chandrayaan2-home-0>

<https://www.britannica.com/science/space-exploration>

#### Contribution of Indian Scientists & Women Scientists

<https://www.tifr.res.in/~outreach/biographies/scientists.Pdf>

<https://india.bioscience.org/media/articles/ISTI.pdf>

<https://www.thebetterindia.com/63119/ancient-india-science-technology/>

<https://ncsm.gov.in/indian-women-in-science-technology/>

#### Evolution

<https://www.livescience.com/474-controversy-evolution-works.html>

<https://www.ibiology.org/evolution/origin-of-life/>

#### Climate Change and Global Warming

<https://letstalkscience.ca/education>

<1-resources/backgrounders/introductionclimatechange>

#### Biodiversity

<https://india.mongabay.com/2020/09/nature-in-peril-as-biodiversity-losses-mount-around-gly-states-the-living-planet-report/>

#### Genomics and Modern Medicine

<https://www.nationalgeographic.com/science/article/partner-contentgenomicshealth-care>

<https://www.mja.com.au/journal/2014/201/1/impact-genomics-future-medicine-and-health>

<https://www.nature.com/scitable/topicpage/pharmacogenomics-and-personalized-medicine-643/>

#### Genetically Modified Engineered Crops

<https://www.nature.com/scitable/topicpage/genetically-modified-organisms-gmo-transgenic-crops-and-732/>

<https://factly.in/explainer-what-is-the-status-of-gm-crops-in-india/>

<https://www.fda.gov/food/agricultural-biotechnology/how-gmo-crops-impact-our-world>

#### Artificial Intelligence and Robotics

<https://www.ohio.edu/mechanical-faculty/williams/html/PDF/IntroRob.pdf>

<https://nptel.ac.in/content/storage2/courses/106105078/pdf/Lesson%2001.pdf>

#### Big Data Analytics

[https://www.researchgate.net/publication/328783489\\_Big\\_Data\\_and\\_Big\\_Data\\_Analytics\\_Concepts\\_Types\\_and\\_Technologies](https://www.researchgate.net/publication/328783489_Big_Data_and_Big_Data_Analytics_Concepts_Types_and_Technologies)

<https://www.youtube.com/watch?v=hrwL3u2Z4Kg>

<https://www.youtube.com/watch?v=khRMzxONplg>

<https://www.youtube.com/watch?v=YaPa4esJJx4>

#### Isolation of DNA

[https://melscience.com/US-en/articles/homednaextraction/?irclickid=2hh2pqRY8xyLTbawUx0Mo3ENUkBWIX3pGQDJSc0&utm\\_source=impact&irpid=2201352&irmpname=Science%20Journal%20for%20Kids&irgwc=1](https://melscience.com/US-en/articles/homednaextraction/?irclickid=2hh2pqRY8xyLTbawUx0Mo3ENUkBWIX3pGQDJSc0&utm_source=impact&irpid=2201352&irmpname=Science%20Journal%20for%20Kids&irgwc=1)

### Transpiration & Photosynthesis

<https://www.youtube.com/watch?v=JQvdXX7hGql> <https://www.youtube.com/watch?v=U4rzlhz4H H k> <https://www.youtube.com/watch?v=pFaBpVoQD4E>

### Online Game on blood Typing

<https://educationalgames.nobelprize.org/educational/medicine/bloodtypinggame/gamev3/1.html>

### Determination of pH

<https://www.youtube.com/watch?v=BEz6t e6gpc>

### Plant Behaviour

<https://youtu.be/KyoeCFTIXKk>

<https://youtu.be/gBGtSOeAQFk>

### Migratory Birds

<https://www.scienceabc.com/nature/how-migrating-birds-geese-navigate-longdistance-earthmagneticfield.html>