

ADARSH GYANODAYA VIDYALAYA

SENIOR SECONDARY SUMMER HOLIDAY HOMEWORK — JUNE 2026

CLASS XI (ELEVEN) — SCIENCE & COMMERCE STREAMS

Dear Students,

Welcome to Class XI. This academic year marks a transition to specialized and deep conceptual study. These summer assignments are designed to strengthen your foundational grasp, develop analytical problem-solving skills, and prepare you thoroughly for the CBSE curriculum. Complete all written exercises in dedicated subject notebooks, and execute projects on standard sheets with precision and clarity.

1. Subject Matrix & Scope of Work

Review this matrix to identify tasks relevant to your chosen stream (Science, Commerce, or Humanities/Arts Electives).

Subject	Syllabus Units Covered	Notebook Work
English Core	Comprehension, Note Making, Poster Drafting, Literature (Intro)	Yes
Physics	Units & Measurements, Motion in a Straight Line	Yes
Chemistry	Some Basic Concepts of Chemistry, Structure of Atom	Yes
Biology	The Living World, Biological Classification	Yes
Mathematics	Sets, Relations & Functions	Yes
Accountancy	Conceptual Base of Accounting, Accounting Equation	Yes
Business Studies	Evolution of Business, Forms of Business Organisations	Yes
Economics	Introduction to Microeconomics, Statistics (Data Collection)	Yes
Painting	Prehistoric Rock Paintings, Indus Valley Art History	Yes

2. Core Academic Assignments

A. English Core (Compulsory for All Streams)

- Q1. Advanced Reading & Note-Making:** Read any editorial column from a national daily newspaper (e.g., *The Hindu* or *The Indian Express*) dealing with contemporary environmental or technological themes.
- (a) Draft systematic notes using headings, subheadings, and a recognizable abbreviation key (minimum 4 abbreviations).
 - (b) Provide a suitable title and draft a summary in not more than 80 words.
- Q2. Creative Writing (Poster Design):** Design an aesthetically striking and informative poster on behalf of your school's Environment Club, advocating for the preservation of groundwater resources and rainwater harvesting under the theme: "*Catch the Rain when it falls, where it falls*".
- Q3. Literature Review (Hornbill & Snapshots):** Write detailed analytical character studies (120–150 words each) for the following:
- (a) The changing relationship between the author and his grandmother in *The Portrait of a Lady* across three distinct phases.
 - (b) The contrast between the characters of Mourad and Aram in *The Summer of the Beautiful White Horse* regarding the Garoghlanian tribe's hallmark of honesty.

B. Physics (Science Stream)

Q1. Dimensional Analysis:

- (a) Derive the dimensional formula for the Universal Gravitational Constant G , Surface Tension T , and Coefficient of Viscosity η .
- (b) Check the dimensional consistency of the physical relation:

$$\lambda = \frac{h}{p}$$

where λ is the de Broglie wavelength, h is Planck's constant, and p is momentum.

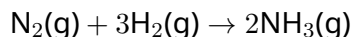
- Q2. Error Analysis:** The period of oscillation of a simple pendulum is given by $T = 2\pi\sqrt{\frac{L}{g}}$. The measured value of L is 20.0 cm known to 1 mm accuracy, and the time for 100 oscillations of the pendulum is found to be 90 s using a wrist watch of 1 s resolution. Find the percentage error in the determination of the acceleration due to gravity g .

Q3. Kinematics (Calculus and Graphical Methods):

- (a) Using graphical methods, derive the kinematic equations of motion: $s = ut + \frac{1}{2}at^2$ and $v^2 - u^2 = 2as$.
- (b) A particle moves along a straight line such that its displacement x at any time t is given by $x = t^3 - 6t^2 + 3t + 4$ meters. Find the velocity of the particle when its acceleration becomes zero.

C. Chemistry (Science Stream)

Q1. Stoichiometry & Limiting Reagent: Dinitrogen and dihydrogen react with each other to produce ammonia according to the chemical equation:



If 2.00×10^3 g of $\text{N}_2(\text{g})$ reacts with 1.00×10^3 g of $\text{H}_2(\text{g})$:

- Calculate the mass of ammonia (NH_3) produced.
- Identify the limiting reagent in this chemical reaction.
- Calculate the mass of the excess reactant remaining unreacted.

Q2. Empirical & Molecular Formula Determination: An inorganic salt on analysis gave the following percentage composition by mass: Na = 29.11%, S = 40.51%, and O = 30.38%. Determine the empirical formula and the molecular formula of the salt, given that its molecular mass is 158 g mol^{-1} .

Q3. Structure of Atom & Quantum Numbers:

- Write the complete set of four quantum numbers for the unpaired electron in a chlorine atom ($Z = 17$).
- State and explain Hund's Rule of Maximum Multiplicity and the Pauli Exclusion Principle with suitable orbital diagrams using Nitrogen as an example.

D. Biology (Science Stream)

Q1. Taxonomic Hierarchy & Systematics:

- Outline the universal rules of Binomial Nomenclature. Explain why scientific names are usually written in italics and Latinized.
- Tabulate the complete taxonomic categories (Kingdom, Phylum/Division, Class, Order, Family, Genus, Species) for *Homo sapiens*, *Musca domestica* (Housefly), and *Mangifera indica* (Mango).

Q2. Biological Classification:

- Distinguish between Archaeobacteria and Eubacteria based on their cell wall composition. How do Archaeobacteria survive in extreme saline and thermal environments?
- Highlight the salient features of Kingdom Fungi. Distinguish between Phycomycetes, Ascomycetes, Basidiomycetes, and Deuteromycetes on the basis of mycelium structure and mode of spore formation.

Q3. Microscopic Diagram Project: Draw neat, well-labeled diagrams of a bacteriophage, a typical bacterial cell, and *Euglena* in your practical record book.

E. Mathematics (Science & Commerce Elective)

Q1. Set Theory Operations: Let $U = \{x : x \in \mathbb{N}, x \leq 20\}$ be the universal set. Let $A = \{x : x \text{ is a prime number}\}$, $B = \{x : x \text{ is a multiple of 3}\}$, and $C = \{x : x \text{ is a factor of 24}\}$. Determine:

- $A \cup (B \cap C)$
- $(A \setminus B) \cup (C \setminus A)$
- Verify De Morgan's Law: $(A \cup B)' = A' \cap B'$

Q2. Algebraic Proofs & Venn Diagrams: In a survey of 60 students, it was found that 25 students read newspaper H, 26 read newspaper T, 26 read newspaper I, 9 read both H and I, 11 read both H and T, 8 read both T and I, and 3 read all three newspapers. Find:

- The number of students who read at least one of the newspapers.
- The number of students who read newspaper I only.
- Represent this entire survey configuration using an accurate Venn diagram.

Q3. Relations & Functions: Find the domain and range of the real functions:

$$f(x) = \sqrt{9 - x^2} \quad \text{and} \quad g(x) = \frac{1}{x - 3}$$

F. Accountancy (Commerce Stream)

Q1. Theoretical Framework: Explain the following fundamental accounting principles and assumptions with realistic business examples:

- Business Entity Principle
- Going Concern Assumption
- Revenue Recognition (Realisation) Concept
- Prudence (Conservatism) Principle

Q2. Double-Entry System & Classification: Classify the following ledger accounts into Assets, Liabilities, Capital, Revenue, or Expenses under the Modern Approach:

- (i) Outstanding Salary A/c
- (ii) Prepaid Insurance A/c
- (iii) Goodwill A/c

- (iv) Drawings A/c
- (v) Bad Debts Recovered A/c
- (vi) Carriage Inward A/c

Q3. Accounting Equation: Prove that the Accounting Equation (Assets = Liabilities + Capital) holds true for the following transactions of M/s Shreyas Traders:

- (a) Commenced business with cash \$50,000 and goods worth \$20,000.
- (b) Purchased goods from Mahesh on credit for \$15,000.
- (c) Sold goods costing \$10,000 to Suresh for \$12,000 on credit.
- (d) Paid \$14,500 to Mahesh in full settlement of his account.
- (e) Received cash \$11,800 from Suresh in full settlement.
- (f) Paid rent outstanding \$1,000 and salary \$2,000 in cash.

G. Business Studies (Commerce Stream)

- Q1. Fundamentals & Economic Classification:** Compare Business, Profession, and Employment on the basis of: (i) Qualification, (ii) Reward or return, (iii) Risk element, (iv) Transfer of interest, and (v) Code of conduct. Present your comparison in a neat table.
- Q2. Business Risks:** "Profit is the reward for risk-taking." Analyze this statement. Detail the primary causes of business risks (Natural, Human, Economic, and Other causes).
- Q3. Forms of Business Organisations (Case-Based):** Five friends graduate from college and decide to launch a sustainable apparel brand. They require high capital, specialized management, limited liability, and long-term continuity.
- Which form of business organisation would you suggest to them? Explain its merits.
 - Draft a comparative analysis highlighting the differences between a Private Joint Stock Company and a Public Joint Stock Company.

H. Economics (Commerce Stream)

Q1. Introduction to Microeconomics:

- Explain the central problems of an economy: "What to produce", "How to produce", and "For whom to produce".
- Define a Production Possibility Frontier (PPF). Explain the economic implications when: (i) the PPF shifts to the right, and (ii) the PPF rotates on the X-axis. Draw neat coordinate diagrams to support your explanation.
- Why is the Marginal Rate of Transformation (MRT) always increasing, causing the PPF to be concave to the origin?

Q2. Statistics in Economics:

- "Statistics is both a science and an art." Discuss this statement in light of Singular and Plural definitions of Statistics.
- Differentiate between Primary Data and Secondary Data based on originality, cost, and collection sources. State three precautions to keep in mind when using secondary data.

I. Painting (Arts / Elective)

- Q1. Prehistoric Rock Paintings:** Write an essay (150–200 words) on the artistic features of the Prehistoric Rock Paintings of Bhimbetka Caves (Madhya Pradesh). Focus on the choice of colors, subjects, and linear depictions.
- Q2. Indus Valley Civilisation Art History:** Write a detailed description of the following world-renowned sculptures based on medium, style, and place of discovery:
- The Bronze "Dancing Girl"
 - The Red Sandstone "Male Torso"
- Q3. Practical Fine Arts Exercise:** On separate, professional cartridge sheets, sketch and render:
- A still life composition containing a jug, an apple, and a textured cloth. Use graded graphite pencils (2B, 4B, 6B) for shading.
 - A landscape painting depicting a village scene during sunrise using watercolours or poster colours.

3. Interdisciplinary & Experimental Projects

Choose and complete one project from this section according to your academic stream.

A. Science Stream: Green Energy & Mathematical Modeling

Build a functional, miniature model of a clean energy generator (e.g., wind turbine or solar cell layout) or design a comprehensive research file. Write a project report covering the following criteria:

- Dimensional Formulation:** Calculate the dimensional units and power efficiency equations of the generator.
- Calculus Applications:** Formulate a mathematical equation that shows how kinetic energy or solar exposure changes with time, using derivative expressions (dE/dt).
- Chemical Composition:** Explain the chemical composition of the solar cell plates (silicon doping) or the aerodynamic materials (fiberglass polymers) used in the turbine blades.

B. Commerce Stream: Small-Scale Business Plan & Economic Analysis

Create a detailed, hypothetical business plan for an eco-friendly consumer startup (e.g., hand-made paper bags, bamboo bottles, or organic food delivery). Your project report must include:

- Corporate Setup:** Define the business structure (Partnership or Private Company) and draft a mock Partnership Deed or Memorandum of Association.
- Financial Modeling:** Construct a starting Accounting Equation showing how you acquired cash, assets (machinery, inventory), and liabilities (bank loan) to start the business.
- Economic Resource Allocation:** Draw a Production Possibility Curve (PPC) illustrating how your startup splits its daily resources between two products. Show the opportunity cost when shifting production from one product to the other.

4. Homework Completion Tracker

Check off each subject box as you complete your homework notebook and project tasks!

Homework Status Check-Sheet

- | | |
|-------------------------------------------------------------|-------------------------------------------------------------|
| <input type="checkbox"/> English Core Assignments | <input type="checkbox"/> Accountancy Exercises Complete |
| <input type="checkbox"/> Physics Problems & Derivations | <input type="checkbox"/> Business Studies Corporate Project |
| <input type="checkbox"/> Chemistry Stoichiometry Worksheets | <input type="checkbox"/> Economics Micro & Stats Exercises |
| <input type="checkbox"/> Biology Records & Diagrams | <input type="checkbox"/> Mathematics Set Theory Practice |
| <input type="checkbox"/> Painting Still Life & Art History | <input type="checkbox"/> Selected Stream Project |
-

□ **Wishing you a highly analytical, productive, and safe summer break!** □