ITL PUBLIC SCHOOL

Active Engagement of Young Minds during Summer Vacations 2026-27

Class: XII **Subject: Geography**

Theme: "GIS: Connecting Geography with Intelligent Solutions"
Integrating Computational Intelligence (CI) and Artificial Intelligence (AI)
Project Title: "Smart Mapping for a Better Tomorrow"
Objective:
To help students understand how Geographic Information Systems (GIS), Computational Intelligence, and Artificial Intelligence can solve real-world geographical, environmental, and social problems.
Students will identify one local or global issue that can be solved using GIS technology along with CI and AI.
Suggested Issues:

- Traffic congestion, Waste management, Water conservation, Disaster management, Pollution monitoring, Forest conservation, Smart city planning.

A. 1. Decomposition (Breaking the Problem into Smaller Parts)

Decomposition helps students divide a large geographical or environmental issue into smaller manageable sections for better analysis using GIS, CI, and AI.
Few examples are given Below: (Select any one of the following)
Examples:

Waste Management: Household waste generation, Collection routes, Dumping grounds Recycling centers, Plastic waste zones, Waste segregation methods, Collection schedules.

A. 2 Pattern Recognition for Waste Management (Using GIS, CI, and AI)

Pattern Recognition in waste management involves studying GIS maps, spatial data, and community waste records to identify recurring waste generation trends, disposal issues, and collection inefficiencies.

Key Components for Analysis
Students will examine:

- Household waste generation levels
- Collection routes
- Dumping grounds
- Recycling centers
- Plastic waste hotspots
- Waste segregation methods
- Collection schedules

A.**3. Abstraction (Focusing on Essential Waste Management Issues)**
Abstraction means selecting only the most relevant information from large datasets to create practical solutions.
What to Focus On (Important Factors)
Core Issues:

- Areas producing maximum waste
- Overflowing or unmanaged waste zones
- Inefficient garbage collection routes
- Lack of recycling facilities
- High plastic waste concentration
- Poor segregation practices
- Irregular collection schedules

What Can Be Ignored (Less Relevant Details)

- Individual household minor waste variations
- Temporary daily fluctuations
- Non-critical seasonal differences
- Minor road-level waste issues

A.4 **Algorithmic Thinking for Smart Waste Management (Step-by-Step Solution Using GIS, CI, and AI)**

Algorithmic Thinking is the process of designing a clear sequence of steps to solve a problem logically and efficiently.

Step 1: Identify the Waste Management Problem

- Observe local waste-related issues
- Record overflowing bins, plastic waste, dumping grounds, and irregular collection

Step 2: Collect Spatial and Attribute Data

GIS Data:

- Household waste generation
- Collection routes
- Dumping grounds
- Recycling centers
- Plastic waste zones
- Collection schedules

Step 3: Input Data into GIS

- Create digital maps
- Enter location-based waste data
- Link waste statistics with geographical areas

Step 4: Analyze Patterns

- Identify waste hotspots
- Detect inefficient routes
- Locate plastic accumulation zones
- Compare recycling access

Step 6: Develop AI Solutions

Examples:

- Smart bins with sensors
- AI route optimization
- Automated segregation systems
- Plastic waste detection drones
- Predictive collection scheduling

The Students will present their findings and Solutions through PPT

1. **Practical File: Complete Ch 1 Data Sources and Compilation**

2. **Map Activity- Cartographer Delight (Make your own Atlas)**

Fundamentals of Human Geography Class XII - Textbook I (NCERT)

Chapter 4 Primary Activities

1 Areas of subsistence gathering
2 Major areas of nomadic herding of the world
3 Major areas of commercial livestock rearing
4 Major areas of extensive commercial grain faming
5 Major areas of mixed farming of the World

Chapter 7 Transport and Communication
2 **Transcontinental Railways**: Terminal Stations of transcontinental railways– Trans Siberian, Trans Canadian, Trans-Australian Railways
3 **Major Sea Ports:**
Europe: North Cape, London, Hamburg
North America: Vancouver, San Francisco, New Orleans
South America: Rio De Janeiro, Colon, Valparaiso
Africa: Suez and Cape Town
Asia: Yokohama, Shanghai, Hong Kong, Aden, Karachi, Kolkata
Australia: Perth, Sydney, Melbourne
4. Inland Waterways: Suez Canal, Panama Canal, Rhine waterway and St. Lawrence Seaway
5. Major Airports:
Asia: Tokyo, Beijing, Mumbai, Jeddah, Aden
Africa: Johannesburg & Nairobi
Europe: Moscow, London, Paris, Berlin and Rome
North America: Chicago, New Orleans, Mexico City
South America: Buenos Aires, Santiago
Australia: Darwin and Wellington

India - People and Economy Class XII Textbook II (NCERT)
Map Items for locating and labeling only on the outline political map of India
Ch.1-Population Distribution Density Growth and Composition
• State with higher level of population density & one state with lowest level of population density (2011)
Ch.3-Land Resources and Agriculture
crops: Largest Producing State (a) Rice (b) Wheat (c) Cotton (d) Jute (e) Sugarcane (f) Tea and (g) Coffee
Ch.5-Mineral and Energy Resources
Mines:
•Iron-ore mines: Mayurbhanj, Bailadila, Ratnagiri, Bellary
•Manganese mines: Balaghat, Shimoga
•Copper mines: Hazaribagh, Singhbhum, Khetari
•Bauxite mines: Katni, Bilaspur and Koraput
•Coal mines: Jharia, Bokaro, Raniganj, Neyveli
•Oil Refineries: Mathura, Jamnager, Barauni
Ch.8-International Trade

(i) Major Sea Ports: Kandla, Mumbai, Marmagao, Kochi, Mangalore, Tuticorin, Chennai, Vishakhapatnam, Paradwip, Haldia
(ii) International Air ports: Ahmedabad, Mumbai, Bengaluru, Chennai, Kolkata, Guwahati, Delhi, Amritsar, Thiruvananthapuram & Hyderabad

3. (Answer these questions in your note book)

Fundamentals of Human Geography Class XII - Textbook I (NCERT)

Ch.4 Primary Activities.

Answer the following Questions (1 mark each) Answer to each of these questions should not exceed 40 words

1. Name the oldest economic activities.
2. Name the country which was most successful in cooperative farming.
3. Name few of the plantation crops.
4. Name the type of cultivation that was mainly introduced by the Europeans in colonies.
5. Name the two important zones where gathering is mainly practiced.

6. What do you understand by transhumance?
7. Name few of the important countries where commercial livestock rearing is practiced.
8. What is truck farming?

Answer to each of the following questions should not exceed 80 words: (3 marks questions)

1. What is cooperative farming? Explain few of its advantages.
2. "Dairy farming is the most advanced and efficient type of rearing of milch animal in the world "Analyse the statement with proper examples.
3. Large scale dairy farming is the result of developed transportation and refrigeration "Discuss on the given statement.
4. What type of farming is mainly practiced in Mediterranean regions? Mention few of its characteristics.
5. What are two different methods of mining? Explain the factors affecting mining activities in the world.

Answer the following questions not exceeding 150 words. (5 marks questions)

6. Distinguish between Mixed farming and Dairy farming
7. Explain any five significant characteristics of collective farming.
8. What is subsistence Agriculture? Mention four of the important characteristics of Primitive subsistence agriculture.
9. What is Market Gardening? Explain the significance of Market Gardening and Horticulture.
10. Distinguish between Nomadic Herding and commercial livestock rearing.
11. Discuss five important features of Hunting and Gathering.
12. Why is Market gardening developed near urban center?
13. Give five points of difference between subsistence agriculture and commercial agriculture.
14. Explain the important characteristics of plantation agriculture.

Ch. 6 Secondary Activities:

Answer the following Questions (1 mark each) Answer to each of these questions should not exceed 40 words

1. What do you understand by secondary activities?
2. What is the importance of Ruhr regions of Germany?
3. What is Foot Loose industry?
4. What is the main point of difference between the House hold industries and small-scale manufacturing?
5. Define the term manufacturing?
6. Name the mineral that is added to manufacture steel.

Answer to each of the following questions should not exceed 80 words: (3 marks questions)

1. Distinguish between Small Scale Industry and Large-Scale industry.
2. Why is Iron and steel industry a basic industry and also a heavy industry?
3. Why has technological innovation become essential in modern manufacturing industry? Explain by giving any three points.

Answer to these questions should not exceed 150 words. (5 marks questions)

4. Describe five basic features of traditional large scale industrial regions.
5. Explain any five factors that determine the location of the industries.
6. Explain the characteristics of modern large-scale industries.

Book 2 India People and Economy: (Class XII)

Ch. 1 Population: Distribution Density, Growth and Composition

1. Discuss the Spatial pattern of density of population in India. (See pg. 3) Second column.
2. What do you understand by population growth? Discuss the two main components of population growth in India.
3. "Uneven spatial distribution of population in India suggests close relationship between population and physical, socio economic and historical factors". – Discuss.
4. Describe the important features of linguistic composition in India.
5. Explain with examples the regional variation of population growth in India.
6. Discuss each of the main phases of Indian democratic history in detail.
7. Explain the composition of working population in India.

Ch.2. Human settlement:

1. What is Human settlement?
2. What are the main differences between the rural and urban settlement?
3. Give few points of difference between the clustered rural settlement and the semi clustered rural settlement.
4. Name the different types of rural settlement. Discuss any three important features of each of them.
5. Classify the Indian towns on the basis of their evolution in three different periods. Give one example from each.
6. Classify the different types of Indian towns on the basis their functions. Explain each one of them.
7. Which cities are called metropolitan cities? How do they differ from urban agglomeration?