

**SUMMER HOLIDAY HOMEWORK**  
**SHAMBHU DAYAL GLOBAL SCHOOL**  
**INTEGRATED RESEARCH BASED PROJECT**  
**CLASS : 7**

**TOPIC: Science: The Mystery of the "Magnet Algae"**

**Instructions:**

1. This homework is research based and integrated with all subjects.
2. All work must be done according to the given project.
3. Write your name, class, section and subject clearly on every sheet.
4. The main topic is related to Science, but all subjects are integrated in the project.
5. Use colourful headings, pictures and creative presentation wherever required.
6. Mention the source of your content clearly. If you used ChatGPT, Clipboard, books, websites or any other source, write it properly.
7. Maintain cleanliness and proper handwriting in your work.
8. Submit the homework on time.
9. This activity will be assessed according to the given rubrics, and the marks obtained in each subject will be added to the report card.( Each subject is of 50 marks)

**“Learning through Creativity and Research”**

**Assessment Sheet**

**Assessment Sheet/RUBRICS**

Criteria	Marks	Description
Understanding of case study	10	Correct identification of facts, causes, and effects
Analytical thinking	10	Logical and thoughtful responses
Writing skill	10	Grammar, clarity, and sentence structure
Vocabulary and language use	10	Appropriate use of words
Presentation	10	Neatness, organization, and creativity

**Science: The Mystery of the "Magnet Algae"**

In 2026, researchers have developed a special type of **algae** that acts like a magnet to pull microplastics out of the water. **(20 marks)**

- Find out the name of species of Algae which is acting as Magnet algae. (1)
- Paste its picture in your **Holiday Homework file.** (2)

Q.1 Why this algae called as Magnet Algae? (2)

Q.2 Where this algae found? (2)

Q.3 How this algae can be converted into Microplastic? Draw the procedure in form of Flowchart. (2+4)

Q.4 How does algae impact on BOD of water resources? Give reasons. (any two) (3+2)

Q.5 How plastic made from algae is different from normal plastic? (Answer with any two points) (2)



**Task I** **( 10 marks)**

- **Activity (The Filtration Test):** Students simulate water pollution. Mix water with "pollutants" like glitter (which represents microplastics), soil, and oil in three separate containers.
- **The Experiment: Challenge:** To create a **Homemade water filter** using layers of cotton, sand, napkin paper and charcoal.
- **Observation:** Which "pollutant" was the hardest to remove? Did the water become clear? Prepare the table, Collect the data and conclude the result. (4)

	SAMPLE	EASY/HARD/MODERATE	WATER CLEAR	LAYER USED
1				
2				
3				

Paste the pictures of your experiment with details. (2)

Q.1.1 What are water pollutants? Give examples. (2)

Q.1.2 Does our ROs have filtration cylinders? If yes what are their kinds? (2)

### Task II

(10 marks)

#### The Plastic Footprint

- This is where you act as "Data Scientists."
- Audit Activity:** For 3 days, you will keep a "Plastic use Diary." Every time you touch or use something made of plastic (a wrapper, a pen, a bottle, a toy), you will make a tally mark. (3)
- Create a pie chart showing which category contributed most to their plastic use. (3)

Q.2.1 What are plastic polymers? What are their types? (2)

Q.2.2 Why Microplastic is a threat to us? (2)



### Task III

(10 marks)

#### Creative Corner

**Upcycling:** Take one piece of plastic that was meant for the bin and turn it into something useful (like a "Vertical Bottle Garden" or a pencil stand) or any other useful article of your choice. (3)

Q.3.1 What materials you used to make your creative article? (1)

Q.3.2 The used plastic material lies in which type of category? (1)

(PET/LDPE/PP/PS/HDPE) (1)

Q.3.3 Is Plastic made by algae can be categorised under Bioplastic? If yes, why? (2)

Q.4.3 How can we reduce Plastic consumption? Give your opinion and suggestions. (3)



### विषय - हिंदी

#### निर्देश (Instructions)

- सभी कार्य **A4 शीट** पर साफ-सुथरे एवं रचनात्मक तरीके से करें।
- परियोजना फ़ाइल का सुंदर **Cover Page** बनाइए।
- अपने अनुभव और विचार स्वयं लिखने का प्रयास करें।

**विषय : "मैग्नेट एल्गी" - पानी से माइक्रोप्लास्टिक हटाने वाली अद्भुत खोज**

**कल्पना कीजिए!**

सन् 2026 में वैज्ञानिकों ने ऐसी विशेष शैवाल (Algae) बनाई है जो चुंबक की तरह पानी में मौजूद छोटे-छोटे प्लास्टिक कणों (Microplastics) को अपनी ओर खींच लेती है। इससे नदियाँ, झीलें और समुद्र साफ हो सकते हैं।

अब इसी रोचक वैज्ञानिक खोज को हिंदी विषय से जोड़ते हुए निम्न रचनात्मक कार्य कीजिए -

## ✿ रचनात्मक हिंदी गृहकार्य गतिविधियाँ

### 1. 📄 “भविष्य की खबर” बनाइए । (Roll No-1 - 10)

कल्पना करें कि आप वर्ष 2030 के एक समाचार संवाददाता हैं।

“मैग्नेट एल्गी” की खोज पर लगभग 80-100 शब्दों की हिंदी समाचार रिपोर्ट लिखिए।

✿ सजावट सुझाव:

- समाचार पत्र जैसा बॉर्डर बनाइए ।
- हेडलाइन रंगीन लिखिए ।
- छोटे चित्र या कटिंग चिपकाइए

### 2. 🗣️ संवाद लेखन (Roll No- 11 - 20)

“नदी” और “मैग्नेट एल्गी” के बीच मजेदार संवाद लिखिए।

उदाहरण:

- नदी क्यों दुखी थी?
- एल्गी ने उसकी मदद कैसे की?
- प्लास्टिक देखकर दोनों ने क्या कहा?
- ✿ कम से कम 8 संवाद लिखिए।

### 3. 📖 कहानी पूरी कीजिए ।

नीचे दी गई शुरुआत को आगे बढ़ाकर कहानी लिखिए –

“एक दिन वैज्ञानिकों ने एक ऐसी हरी चीज़ बनाई जो चुंबक की तरह काम करती थी। जैसे ही उसे नदी में डाला गया...”

✿ कहानी का शीर्षक स्वयं दीजिए।

✿ लगभग 120 शब्द लिखिए

### 4 . 🎨 पोस्टर निर्माण (Roll No- 21- 26) विषय : “प्लास्टिक हटाओ - धरती बचाओ”

पोस्टर में:

- आकर्षक नारे
- रंगीन चित्र
- पर्यावरण संदेश शामिल करें।

## ✿ बोनस एक्टिविटी (Innovative Task) (FOR ALL STUDENTS)

### 🗣️ “मैग्नेट एल्गी” इंटरव्यू

कल्पना करें कि “मैग्नेट एल्गी” एक सुपरहीरो है। उसका छोटा-सा इंटरव्यू लिखिए।

उदाहरण प्रश्न:

- आपका जन्म कैसे हुआ?
- आप पानी कैसे साफ करते हैं?
- बच्चों को क्या संदेश देंगे?

### ✿ निर्देश

- सभी कार्य A4 शीट पर करें।
- रंगों और चित्रों का प्रयोग करें।
- जहाँ से जानकारी ली गई हो, उसका स्रोत अवश्य लिखें।

## विषय – संस्कृत

### सामान्य निर्देश -

- 1- सभी कार्य A4 शीट में करें।
- 2- निश्चित तिथि पर जमा करें।

स्वास्थ्यं महद् धनम्। अर्थात् स्वास्थ्य ही सबसे बड़ा धन है।

स्वस्थ रहने के लिए हमें पौष्टिक भोजन, व्यायाम, पर्याप्त जल, योग और स्वच्छता का पालन करना चाहिए।

### केस स्टडी - 1 अध्ययन प्रसंग

राहुलः प्रतिदिन प्रातःकाले उत्थाय व्यायामं करोति। सः फलानि खादति, दुग्धं पिबति, पर्याप्तं जलं पिबति। तेन सः निरोगी अस्ति।

प्रश्नाः-

क राहुलः कदा उत्थति?

ख सः किं करोति?

ग सः किं खादति?

घ सः किं पिबति?

ङ राहुलः कथं अस्ति?

### केस स्टडी - 2 अध्ययन प्रसंग

सीमा प्रतिदिन सेवफलम्, दाडिमम्, गाजरम् च खादति। सा स्वच्छतां पालयति। अतः सा स्वस्थाऽस्ति।

प्रश्नाः-

क छात्रायाः नाम किम्?

ख सा कानि खादति?

ग गाजरम् कस्मै हितकरम् अस्ति

घ सा किं पालयति?

ङ सीमा कथम् अस्ति?

### रचनात्मक गतिविधियाँ

गतिविधि 1 एक स्वस्थ थाली का चित्र बनाइए तथा संस्कृत में नाम लिखिए:

गतिविधि 2 पत्रिकाओं से फल एवं सब्जियों के चित्र काटकर चिपकाइए और संस्कृत नाम लिखिए।

गतिविधि 3 मेरा स्वास्थ्य चार्ट एक सप्ताह का स्वास्थ्य चार्ट बनाइए।

गतिविधि 4 लघुनिबन्धः - मम प्रियं फलम् अपने प्रिय फल पर संस्कृत में 5-7 वाक्य लिखिए।

गतिविधि 5 विशेष कार्य अपनी माता से पूछकर यह लिखिए—

अस्माकं परिवारस्य प्रियं फलम् किम्? प्रियं शाकं किम्? किमर्थं तत् हितकरम् अस्ति?

### SOCIAL SCIENCE

#### *Integrated topic – The Mystery of the “Magnet Algae”*

- Students must prepare the project in a separate file using colourful pages, neatly labelled, headings, creative presentation, colourful graphs/charts, pictures, maps and proper decoration to enhance the overall appearance of the work.

#### **TASK 1 – ENVIRONMENT, SOCIETY & GOVERNMENT ACTION (25 Marks)**

##### **Activity: Water Bodies and Human Responsibility**

##### **Part A – Research Work**

- Research and write about:
  - Why rivers, ponds, and lakes are important for human settlements
  - How growing population and urbanisation affect water bodies
  - What happens when algae increase rapidly in polluted water
  - Effects of polluted water on:
    - Farmers
    - Fishermen
    - Local people
    - Tourism
- Role of government and citizens in protecting water resources

## Part B – Social Science Case Study

- Choose any one polluted water body in India and study it from a social science point of view:
- Yamuna River
- Ganga River
- Dal Lake
- Bellandur Lake
- **Include:**
- Location of the water body
- Human activities causing pollution
- Social and economic effects on nearby communities
- Government steps taken to control pollution
- Your suggestions to improve the situation

## Part C – Poster Activity

- Create a poster on: “Clean Water, Healthy Society”

### TASK 2 – COMMUNITY SURVEY, DATA INTERPRETATION & REPORT (25 Marks)

- **Activity: Public Awareness on Water Pollution**
- Conduct a survey of **10 people** in your locality.
- **Ask the following questions:**

S.No

Questions

- 1 Do you think water pollution is increasing in India?
- 2 What is the main reason for polluted rivers and lakes?
- 3 Should industries be strictly punished for polluting water?
- 4 Does polluted water affect people’s livelihood and health?
- 5 Should schools and society spread awareness about water conservation?

### Task:

- Record all responses in table form.
- Calculate:
  - Total responses
  - Percentages
  - Most common opinions
- Write 5 observations based on the survey results.
- Write a report on: “How Water Pollution Becomes a Social Problem”

### Include:

- Impact on society
- Environmental imbalance
- Economic effects
- Need for public awareness
- Role of citizens

## FRENCH

### Activité de Recherche-

#### Task-1 Recherche sur les Pays (Different Country’s Research)-

Choisis 3 pays et fais une recherche sur :(Choose any 3 countries & do research on :)

La capitale

La langue parlée

La nationalité

Deux adjectifs pour décrire les habitants

Deux professions célèbres dans ce pays

### Présentation

#### Écris :

8 à 10 lignes en français ;(8 to 10 lines in French)

Ajoute des images ou dessins ;(add image/drawings)

Utilise des phrases simples.

#### Task-2 Mon Profil International-

Écris un paragraphe sur toi-même (About Yourself)-.

Inclue :  
 ton nom ;  
 ta nationalité ;  
 trois adjectifs ;  
 la profession de tes rêves ;(your draem profession)  
 les langues que tu parles ;  
 le pays que tu veux visiter.(country where you wnt to visit)  
 (Do all the Project Work on A-3/A-4 Sheets.)

## Mathematics

### **Theme: *The Mystery of Magnetic Algae***

Scientists discovered a strange type of algae in a lake that reacts to magnets. These “Magnetic Algae” move toward magnetic fields and form amazing patterns in water. Your mission is to become a Math Detective Scientist and investigate the mystery using mathematics.

#### TASK 1: MAGNETIC ALGAE POPULATION RESEARCH

Situation Scientists found that one drop of lake water contains 2,45,678 magnetic algae cells.

1. Estimate how many algae cells will be present in:
  - a. 10 drops
  - b. 100 drops
  - c. 1000 drops
2. Write the numbers:
  - a. In Indian System
  - b. In International System
  - c. In words

Create a colourful “Magnetic Algae Population Counter” by using Canva Infographic, Flipbook  
 Research Extension

Search and find:

- Which lake in the world has the highest algae growth?
- What problems can huge algae populations create?

#### TASK 2 — Algebraic Investigation

Title: “Creating an Algebra Formula for Algae Growth”

Suppose:

- $a$  = amount of algae
- $m$  = magnetic material nearby
- $p$  = pollution level

Create algebraic expressions such as:

$$a = 2m + 3p$$

$$a = 2m + 3p$$

Activity:

1. Create 3 algebraic expressions related to algae growth.
2. Substitute values and solve them.
3. Identify variables and constants.

Example Table:

Magnetic Material (m)	Pollution (p)	Algae Growth (a)
2	3	13
4	2	14

Reflection Questions:

1. How does algebra help in science?
2. Which variable affected algae growth the most?
3. Can formulas predict nature perfectly?

#### TASK 3: THE MAGNETIC ALGAE MAGIC SQUARE

Mystery Story

Scientists discovered that magnetic algae arrange themselves in a special number pattern called a Magic Square.

Every row, column, and diagonal gives the same total because of the magnetic energy balance!

Your mission is to decode the algae’s hidden mathematical pattern.

Step 1: Study the Magnetic Magic Square

**8 1 6**

**3 5 7**

**4 9 2**

2. Form Arithmetic Expressions

Example:  **$(8 + 1 + 6) = 15$**

Create 5 more expressions from the square.

3. Create Your Own Algae Magic Square ( taking any 9 consecutive numbers)

- 3×3 square
- Colour coded square
- Magnetic symbol square

Make a Digital Magic Square App

Create using:

- Scratch
- Canva
- PowerPoint
- Google Slides

Add:

- Moving numbers
- Sound effects
- Automatic sum checker

 RESEARCH CONNECTION

- Who invented Magic Squares?
- Where are Magic Squares used today?
  - Games
  - Coding
  - Architecture
  - Puzzles
  - Artificial Intelligence

 REFLECTION QUESTION

“How can patterns and numbers help scientists study nature?”

REFLECTION SECTION 

1. What did you learn from this project?
2. Which maths chapter did you enjoy most?
3. How is maths useful in scientific research?

## ENGLISH

*The Mystery of Magnet Algae*

**Research-Based Holiday Homework · Connected with "The Glacier" by Ruskin Bond**

Overview: Scientists have recently discovered that certain algae respond to magnetic fields — navigating, growing, and even signalling through Earth's invisible forces. In this assignment, you will explore this phenomenon through the lens of English language and literature, connecting it with Ruskin Bond's vivid writing in "The Glacier." You will read, research, analyse, write, and reflect — developing skills of inquiry, critical thinking, and creative expression as valued in the IB Middle Years Programme.

**Science Connection**

Magneto taxis in algae, Earth's geomagnetic field, biological navigation, polar ecosystems

**Literature Link**

"The Glacier" by Ruskin Bond — nature writing, descriptive language, environmental theme

**IB Theme**

Global context: Orientation in space and time · Scientific and technical innovation

**NOTE- Do any TWO activity**

**Activity-1 Vocabulary & Language Study**

**Part A — Scientific Vocabulary in Context**

Research the meanings of the following scientific terms. For each word, write: (i) a precise definition in your own words, (ii) one sentence using the word in a scientific context, and (iii) one sentence using it in a literary or creative context.

- *Magnetotaxis · Magnetoreception · Biomagnetic · Phytoplankton · Geomagnetic*

## Part B — Word Craft from "The Glacier"

Ruskin Bond uses language to make nature feel alive and mysterious — much like magnet algae are mysterious.

- Find 4 examples of descriptive or figurative language from "The Glacier."
- For each: quote it, name the device (metaphor, personification, imagery, etc.), and explain its effect in 2–3 sentences.
- Then write your own sentence inspired by that technique but applied to magnet algae or a magnetic force.

### Activity-2 Research Report : Investigative Research Essay (400–500 words)

Write a structured, research-based essay on The Mystery of Magnet Algae. Your essay must be written in formal English

Critical thinking prompts

1. How is the magnet algae's "sensing" of the world similar to and different from how Bond senses the glacier?
2. What does it mean to "navigate" — for an algae cell, for a hiker on a glacier, for a writer?
3. Should this phenomenon change the way we protect glacial ecosystems? Why or why not?

### Activity-3 Creative Writing

Descriptive Paragraph in the Style of Ruskin Bond

Write a descriptive paragraph (150–180 words) imagining you are a single magnet algae cell on the surface of a glacier. You are sensing Earth's magnetic field for the first time.

- Use first-person narrative voice, sensory details, and at least one figurative device (simile, metaphor, or personification).
- Your writing should echo Bond's style: quiet wonder, intimate connection with nature, precise yet poetic observation.

### Activity-4 Visual & Analytical Task

Comparative Analysis

Write a structured comparison (200–250 words) exploring the theme of "Finding Direction" — as it appears in the behaviour of magnet algae AND in Ruskin Bond's journey through the glacier landscape.

- Use the point-by-point method: discuss one aspect of the theme, then compare both texts/subjects.
- Consider: physical direction, emotional direction, a sense of purpose, and the role of the natural environment.
- End with your own reflection: What does "finding direction" mean to you personally?

### Activity-5 Reflection & Learner Profile

Throughout your work on this assignment, maintain a Research Journal with at least 4 dated entries. Each entry should record:

- What you researched or read that day
- One new thing you learned and why it surprised or interested you
- One question that arose in your mind (show your curiosity!)
- A connection to English language, literature, or your own life

Your final entry (at least 120 words) must be a metacognitive reflection answering: *"How has completing this project changed the way I think about science, language, and the natural world?"*