STUDENT WORKSHEET

SMART-ESD Class

Subject: Biology

Topic: Environmental Change – Plastic Waste and Microplastics Pollution

Related Chapter: Organisms and Their Environment

Learning Model: Team Assisted Individualization (TAI)

Approach: Education for Sustainable Development (ESD)

Technology Integration: Artificial Intelligence (AI)

Driving Question

How can students design realistic and sustainable solutions to reduce plastic and microplastic pollution in aquatic ecosystems?

A. Learning Objectives

After completing this worksheet, students are expected to be able to:

Explain how plastic waste and microplastics pollute aquatic ecosystems.

Analyze the impacts of plastic pollution on organisms and the environment.

Propose sustainable solutions to plastic waste problems based on ESD principles.

Collaborate responsibly using the Team Assisted Individualization (TAI) model.

Express solutions creatively according to individual interests and talents.

B. Learning Instructions

Complete the tasks individually first, then work collaboratively in your group.

Use the e-learning module, videos, VR, and learning resources provided.

You may use AI tools responsibly to support understanding, idea development, or content creation.

Respect different opinions and actively support your group members.

Choose a learning product that matches your interests and strengths.

C. Activity 1 – Problem Awareness (Environmental Issue)

Observe the video or VR simulation about plastic waste pollution in rivers, lakes, or oceans.

You may focus on:

• a local environment (river, beach, lake, or drainage near your area), or

• a global environmental case.

Guiding Questions:

1. What types of plastic waste did you observe?

2. How can plastic waste turn into microplastics?

3. Which organisms are affected by plastic and microplastic pollution?

✍️*Write your reflection:*

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D. Activity 2 – Individual Exploration (Adaptive Learning)

Read the section about plastic pollution and microplastics in the e-learning module.

Task:

Complete the table below.

Environmental Problem	Causes	Impacts on Organisms
Plastic waste in water		
Micro plastic		

💡 *You may use AI tools to clarify concepts or examples. Briefly note how AI helped you:*

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E. Activity 3 – Cooperative Learning (TAI Group Discussion)

Work in your heterogeneous group.

Discussion Tasks:

1. Share your individual findings with your group.

2. Help group members who need clarification.

3. Discuss the following question:

How can humans reduce plastic pollution in aquatic ecosystems in realistic and sustainable ways?

🗣 *Group Discussion Summary:*

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F. Activity 4 – Solution Design (Differentiated Product)

Choose ONE product based on your interest and talent:

☐ Recycled product / creative reuse

☐ Digital poster or infographic

☐ Educational video or short film

☐ Social media campaign content

☐ Written proposal or report

Your Task:

Create a product that explains:

• The plastic waste problem (local or global)

• The impact on organisms and ecosystems

• Your proposed solution (reduce, reuse, recycle, or innovation)

• A sustainability message for society

💡 *AI tools may be used responsibly for idea generation, scripting, design, or language support.*

Success Criteria (Simplified Rubric)

Criteria	Excellent	Good	Needs Improvement
Understanding of the problem	☐	☐	☐
Creativity of solution	☐	☐	☐
Sustainability impact	☐	☐	☐
Collaboration	☐	☐	☐

LIVEWORKSHEETS

G. Activity 5 – Reflection and Meaning Making

Answer the questions individually:

1. What solution do you think is the most realistic to reduce plastic waste?
2. How did collaboration help you improve your solution?
3. Which solution would you be most willing to apply in your daily life? Why?

✍️ *Your Reflection:*

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H. Self and Group Assessment

Aspect	Yes	Not Yet
I understand plastic pollution and micro plastics	☐	☐
I contributed ideas to my group	☐	☐
I created a solution-based product	☐	☐
I used AI responsibly	☐	☐
I care more about environmental sustainability	☐	☐

🌍 Closing Message

"Sustainable solutions begin with awareness, responsibility, and action."

Write Your Answer Here