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| ACTIVITY PLAN | | |
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| **Theme** | **Subtopic** | **Activity Title** |
| 1. Environmental Awareness and Conservation | * 1. Biodiversity and Ecosystems | Nature in a Bottle |

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| Introduction part (or activity overview) |
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| **Introduction part (or activity overview)** | Two main processes are being studied here: photosynthesis and respiration. Students read and discuss any previous knowledge and experience.  [**http://www.bbc.co.uk/schools/gcsebitesize/science/add\_ocr\_gateway/green\_world/photosynthesisrev1.shtml**](http://www.bbc.co.uk/schools/gcsebitesize/science/add_ocr_gateway/green_world/photosynthesisrev1.shtml)  Students watch a video on making a terrarium (Duration: 9:00 minutes)  <https://www.youtube.com/watch?v=7Lg4tzkHgVo&t=7s> |
| **SETTING** | A lab/ chemistry classroom |

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| Materials Needed |
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| **Materials Needed** | Stoppered glass jar, Pebbles, Compost, Rocks, Seeds/plantlings, Water, Ants/woodlice/worms,  Soil, Bowl |

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| **Learning Outcomes** | To understand the process of photosynthesis.  To understand the process of decomposition by detritivores. |  |
| **Activity Contents** | **Activity 1: Making a terrarium (Duration: 80 min.)**  **Theoretical part:** *Introduction discussion*: (10 minutes)  **The teacher introduces the students to the steps of making the terrarium**  Step 1: Clean the glass jar and add a layer of rocks, pebbles and soil to the bottom of the jar (preferably in that order).  Step 2: In a bowl, dampen the compost and place a layer over the soil.  Step 3: Select a small number of seeds/seedlings and embed them into the soil. (If using seeds, ensure that they are placed deep enough and if using plantlings make sure that the roots are fully embedded within the soil).  Step 4: Pour a small amount of water over the compost.  Step 5: Place a few insects on the soil.  Step 6: Seal the container and place in a well lit area.  **The students start making the terrarium, following the steps according to the teacher's instructions**  **Activity 2: Discussion (Duration: 50 min.)**  The teacher discusses and analyzes connected topics: Photosynthesis, chloroplast/chlorophyll, formation of oxygen as byproduct, respiration, decay process.  Students discuss what they witnessed, what they produced, how was it achieved.  **Example questions (reflection):**  ***Why is the system sealed?*** To prevent gases from escaping.  ***Why should the container be placed in direct sunlight?*** To allow the plants to photosynthesise.  ***Why should the container be transparent?*** To allow light to pass through in order to reach the plants.  ***Why do we add both soil and compost?*** To aerate the soil for the roots.  ***Why do we add the insects?*** To break up decaying material and increase the nutrient content within the soil.  **Additional tips**  Try covering the container with foil or cardboard paper – the terrarium should not grow.  Investigate the rate of plant growth by exposing the terrarium to different types of light sources (natural, UV, artificial, LEDs etc).  Try growing the terrarium without the rock layer or without the insects and observe how this influences the microcosm. |  |
| **Assessments** | The final result is evaluated with a grade.  All students in the class can be included in the evaluation.  Each student independently evaluates his contribution to the work.  Students can compete for the best-made terrarium through online voting and questionnaires.  The assessment takes into account: the terrarium (its design, decoration, number of plants used), description, cost calculation and conclusions. |  |
| **Key Competences** | Communication competence  Cognitive competence  Competence for creativity  Artistic competence |  |
| **Connections with Eco STEAM** | **Eco** - selection of ecological materials for making a terrarium.  **S**ience - knowledge of chemistry, biology and mathematics; environmental sciences – fostering sustainability thinking.  **T**echnology - using a computer in the research process.  **E**ngineering - creation of oxygen.  **A**rt - arrangement.  **M**athematics - calculating the costs and price of terrarium production. |  |
| **References** | <https://www.youtube.com/watch?v=7Lg4tzkHgVo&t=7s>  [**http://www.bbc.co.uk/schools/gcsebitesize/science/add\_ocr\_gateway/green\_world/photosynthesisrev1.shtml**](http://www.bbc.co.uk/schools/gcsebitesize/science/add_ocr_gateway/green_world/photosynthesisrev1.shtml) |  |
| **Notes** | Activity 1 may take a while until the seeds have sprouted and the terrarium is complete.  http://steamexperiments.com/wp-content/uploads/2020/08/environment-glass-glass-jar-plants.jpg |  |

**Assessment Table for individual work:**

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| Evaluation Criteria | Points | Comments |
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| Understanding the process of photosynthesis | \_\_/5 |  |
| Understand the process of decomposition by detritivores | \_\_/5 |  |
| Communication competence | \_\_/5 |  |
| Cognitive competence | \_\_/5 |  |
| Competence for creativity | \_\_/5 |  |
| Answered questions correctly | \_\_/10 |  |
| Completed homework | \_\_/10 |  |

**Assessment Table for group work:**

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| Assessment Criteria | Points | Comments |
| Internet research skills | \_\_/5 |  |
| Terrarium design, decoration | \_\_/10 |  |
| Calculation of cost price | \_\_/5 |  |
| Ecological Interpretations in the project | \_\_/5 |  |
| Teamwork and Collaboration | \_\_/5 |  |
| Skills of presenting the work | \_\_/5 |  |