

Learning Outcomes:

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| Nature of Science | Students should be able to appreciate the role of science in society; and its personal, social and global importance; and how society influences scientific research Students should be able to research and present information on the contribution that scientists make to scientific discovery and invention, and its impact on society Students should be able to organise and communicate their research and investigative findings in a variety of ways fit for purpose and audience, using relevant scientific terminology and representations |
| Earth and Space | Students should be able to illustrate how earth processes and human factors influence the Earth's climate, evaluate effects of climate change and initiatives that attempt to address those effects |
| Biological World | Students should be able to evaluate how humans can successfully conserve ecological biodiversity and contribute to global food production; appreciate the benefits that people obtain from ecosystems |

Scientists are sometimes asked to use their knowledge to design a solution to a problem. You are doing a summer work experience in the Marine Institute in Galway Bay. Some of the aquatic plants there, like others around the world, are dying for various reasons. Your science professors have asked you to design an artificial bay to help maintain biodiversity in the area. You will make a detailed sketch of your design. As a final project, you will present your design to the science professors.

Research more information about biodiversity.

| | Information | References |
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| Define biodiversity. | | |
| How is biodiversity important to the health of ecosystems? | | |

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| What are the main threats to biodiversity? | | |
| Research more information about coral bays. | | |
| How are they structured? | | |
| Why are they important to biodiversity on Earth? | | |
| What factors are threatening the health of coral bays? | | |
| What are artificial bays? | | |

Plan a design for an artificial bay.

Consider the following constraints and success criteria as you plan.

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| Where will your artificial bay be located? | |
| What materials will you use to construct your artificial bay? Can you recycle any materials to build your bay? | |
| Remember, the structure must be able to remain underwater indefinitely and it should not release chemicals that could harm living organisms. Also, organisms will need to be able to attach themselves to the floor of the bay. | |

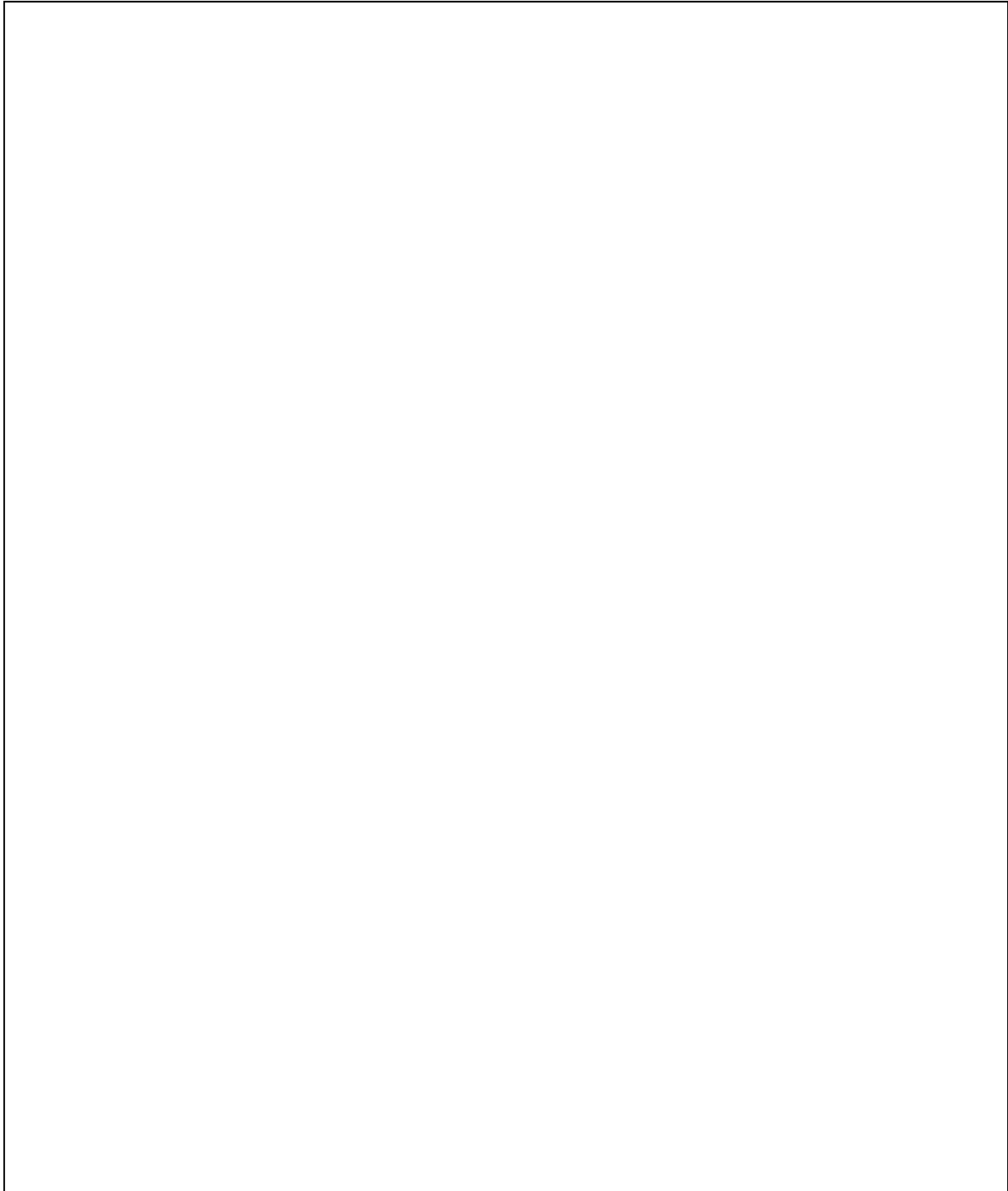
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| How will the texture of your materials accommodate this behaviour? | |
| How will you anchor your bay floor to the bottom so that it does not move? | |
| Keep in mind that your bay will need to be able to withstand waves and storms, including hurricanes. | |
| What will be the dimensions of your bay? | |
| How will your bay mimic the different types of habitats on a real Galway bay? | |
| How will the design of your bay attract the same species that live on a real Galway bay? | |
| Organisms should be able to move over, under, or through it in various places. | |
| What economic considerations do you need to think about? How much will your bay cost to build? Will it cost any money, time, or equipment to maintain it? | |
| Do you need to consider the culture of the people living near the location of your bay? Do they make their living by fishing on the bay? Do they rely on the fish and other organisms living on coral bays for food? Are tourism and/or ecotourism important to the region? | |
| How will the colonisation and biodiversity of species on your bay be monitored after becoming established? | |

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Finalise your design plan.

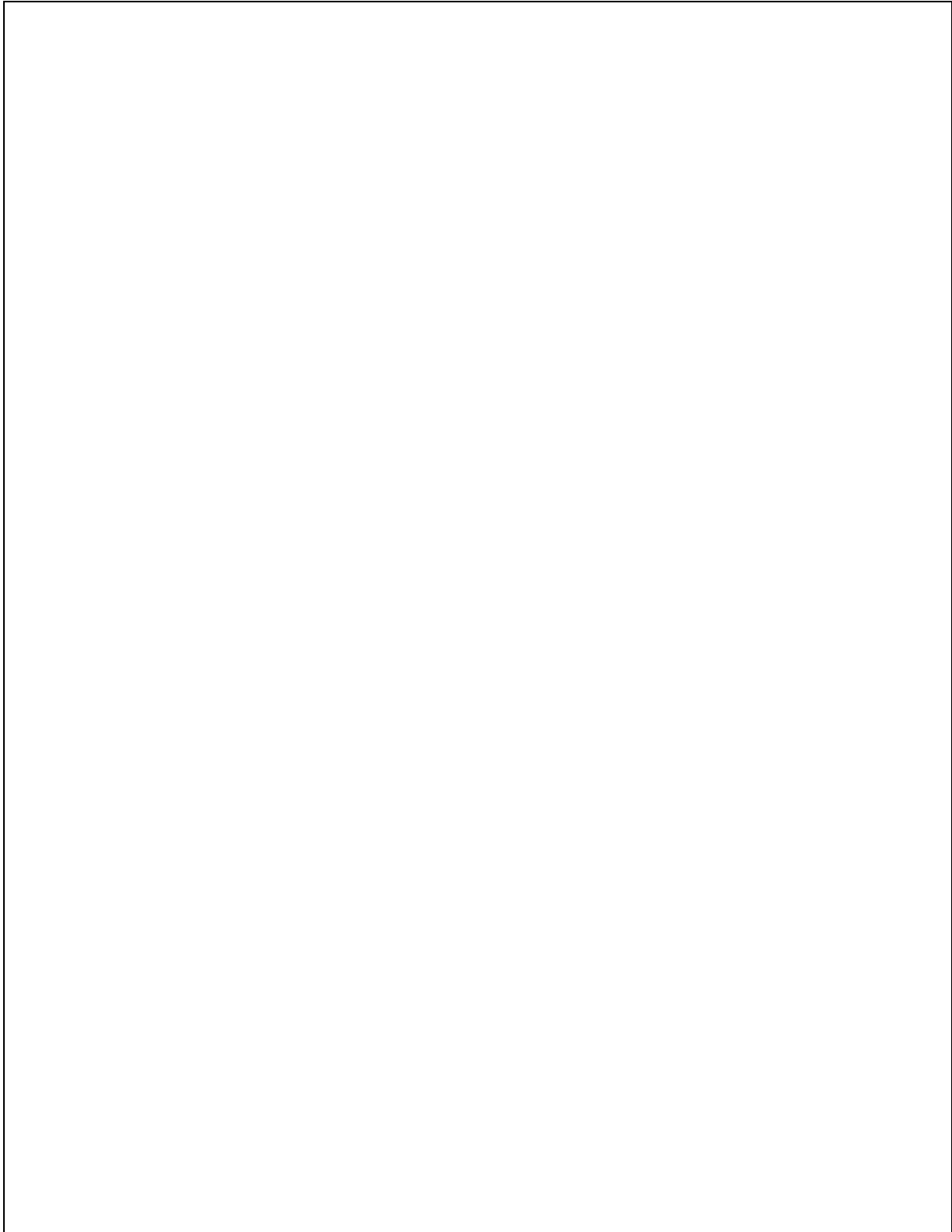
- Make a detailed sketch of your design. Include labels or a key that identifies the materials used. Be sure to include the scale at which your sketch is done as well.



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- Check your and three peers designs and sketches against the constraints and criteria listed previously. Finalise your design and sketch.



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- Prepare a presentation for your science professors.

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| <p>Include background information on the importance of Galway Bay to biodiversity and the current threats to and health of bays worldwide.</p> | |
| <p>Include an explanation of your design and why you think it will be successful.</p> | |
| <p>Address any of the constraints listed previously and explain how biodiversity on the bay will be monitored.</p> | |

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