**SAMPLE LESSON PLAN**

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| **Lesson Plan #3** |
| Lecturer name: Joao Frias |
| Date: 29/01/2019 |
| Duration of Learning unit: 1h30 |
| Continuous Professional Development – Research project |
| Topic: Microplastic sampling techniques |
| Mark the type of session:  Lecture **X** Tutorial ☐ Lab ☐ Studio ☐ Workshop ☐ |

1. **AIM**

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| **The main aim of this lesson is to:**   * Introduce students to the concepts of marine litter and microplastic pollution and to the wide range of tools and techniques commonly used to sample microplastics in the environment; * Provide the theoretical background to collect samples of water, sediments and organisms focused on microplastic identification; * Provide the theoretical background to reduce cross-contamination while sampling and processing samples for microplastics, both *in-situ* and at the laboratory; * Ensure that students understand the magnitude of the environmental problem, how to quantify it and how to minimize cross-contamination while sampling and processing. |

1. **MAIN LEARNING OUTCOME & CORRESPONDING ASSESSMENT**

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| **Module Learning Outcomes (LOs)**  **At the end of this lesson the students will be enabled to…** | **Assessment of LOs**  **(Note: each LO has an assessment. Include a variety of types.)** |
| Understand the most common methods to collect environmental samples of water, sediment and biota to assess microplastic pollution in marine and freshwater ecosystems.  Online resources such as videos and photos will be used to explain the different tools to collect microplastics from water surface, benthic sediments and biota samples | Assessment though questions and interactive feedback in the class room  Acquisition type of learning activity |
| Understand the most common procedures to reduce cross-contamination while collecting sediments at sea  Forensic science methodologies to reduce airborne microplastic contamination will be shared | Assessment though questions and interactive feedback in the class room  Acquisition type of learning activity |
| Share their ideas in a small debate about the issue | Debate in the class room where students will share their views and potential solutions to minimise or mitigate this environmental issue  Discussion and collaboration type of learning activity |
| Be aware of what they need to bring to the practical lesson | Student will be reminded of what they need to bring to the practical lesson on board of R/V Celtic Voyager  Assessment via email confirming all material and personal protective gear |

1. **THE LESSON**

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| TIME LINE | LECTURER ACTIVITIES | LEARNER ACTIVITIES |
| SET INDUCTION (BEGINNING) | | |
| 5 mins  (5 mins) | Introduction to the topic of marine anthropogenic litter and microplastic pollution sampling  Outline of the lesson | Students will be told the outline of the lesson, which will include nature of the problem, common sampling tools and reduction of cross-contamination |
| LESSON SEQUENCE (MIDDLE) | | |
| 25 mins  (30 mins) | Quantifying microplastic pollution | Students will see global distribution maps of microplastic accumulation, and will learn about different sampling methodologies to collect microplastics via video and/or photos collected in Ireland |
| 15 mins  (45 mins) | Reducing cross-contamination | Students will learn about different methods of reducing airborne cross-contamination. |
| 10 mins  (55 mins) | Debate | Discussion learning, flipped learning |
| CLOSURE (END) | | |
| 3 mins  (58 mins) | Conclusion of the debate and ensuring that everyone has a group assigned for day trips | Discussion learning |
| 2 mins  (60 mins) | Take home message | Recap of what was mentioned today, and of what is needed to the practical lab. |

1. **LIST OF TEACHING RESOURCES**

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| For class:  PowerPoint slides, short interactive video of manta net assembly |

**5. CRITICAL REFLECTION**

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| **Strengths**  **(before lecture)**  This lecture is a mix between a traditional academic lecture of the acquisition type, with elements of debate and a case-study practice. It was designed to be visually appealing to students and it includes elements of photos and video recorded by myself. Text in slides is kept to a minimum to engage students.  **(after lecture)**  Questions posed during the lecture helped the students to be focused on the topic. Some of the questions posed by the students allow me to improve tasks I had initially planned in the vessel to meet their learning goals |
| **Challenges**  **(before lecture)**  This lecture can be quite technical because it focuses on several methodologies to sample and reduce cross-contamination, so the way to make it engaging is to have several photos and videos of what is being told.  **(after lecture)**  Students felt comfortable to share their ideas and thoughts due to the small nature of the group |
| **Areas that could be improved upon**  Something I have learned from last semester is the importance of sharing more online resources, photos and videos, which was exactly what I did this semester |

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| **Select & Prioritise Your Content:**  For the session, decide what material is used in class and what material the students should study independently and/or online. To do this, think about the material and its relative importance and prioritise and list in the appropriate quadrant.   |  |  |  | | --- | --- | --- | |  | **Support Learning** | **Independent Learning** | | **Priority**  **(Need to know)** | 1  Manta net video, will be shared with students  in class and will follow a debate on the topic | 2 Manta net sampling videos are available online  and students can access them for future reference | | **Supplementary**  **Learning (Nice to**  **know)** | 3  Two open source online resources will be  shared with the students in case they want  to know more about this topic | 4  Two open source online resources will be  shared with the students for the case they want  to know more about this topic  One book available in GMTI library will be  shared in the slides as supplementary information | |
| **Online Student Engagement Tools:**  Online video shared with students for them to be aware of what the surface water sampling will look like. Video available here: <https://www.jove.com/video/55161/protocol-for-microplastics-sampling-on-sea-surface-sample>  *Two online resources (books)*  Marine anthropogenic litter: <https://link.springer.com/book/10.1007/978-3-319-16510-3>  Freshwater microplastics: <https://link.springer.com/book/10.1007/978-3-319-61615-5>  One resource available in GMIT library (book)  Microplastic contamination in Aquatic Environments : <https://www.elsevier.com/books/microplastic-contamination-in-aquatic-environments/zeng/978-0-12-813747-5> |
| **Teacher Reflection:**  **What worked?**  Engaging with the audience by ensuring the importance of the lecture to the upcoming day trip at sea. Addressing each student by their names in the classroom allows them to feel more engaged with the lecturer and the topic of the lesson  **What did not work?**  N/a  **To what extent did you address different domains of learning?**  Different domains of learning were address by using acquisition and discussion learning activities.  **What would I do differently next time?**  N/a |