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| **Lesson Title : Physical and Chemical Properties** | **Unit #:**  **1** | **Lesson #:**  **1** | **Activity #:**  **1** |
| **Activity Title: Mr. Trash- Hook** |

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| **Estimated Lesson Duration:** | **45 - 1 class** |
| **Estimated Activity Duration:** | **40 minutes** |

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| **Setting:** | **Classroom** |

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| **Activity Objectives:**  **The students will be able to:**   1. **Explain how Mr. Trash works and what its purpose it** 2. **State 2 alternatives to throwing away recyclables** |

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| **Activity Guiding Questions: Where do trash/recyclables go once I throw them away?**  **Why do we sort trash? What is the purpose?** |

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| **Next Generation Science Standards (NGSS)** | |
| **Science and Engineering Practices (Check all that apply)** | **Crosscutting Concepts (Check all that apply)** |
| X☐ Asking questions (for science) and defining problems (for engineering) | ☐ Patterns |
| ☐ Developing and using models | X☐ Cause and effect |
| ☐ Planning and carrying out investigations | ☐ Scale, proportion, and quantity |
| ☐ Analyzing and interpreting data | X☐ Systems and system models |
| ☐ Using mathematics and computational thinking | ☐ Energy and matter: Flows, cycles, and conservation |
| ☐ Constructing explanations (for science) and designing solutions (for engineering) | ☐ Structure and function. |
| ☐ Engaging in argument from evidence | ☐ Stability and change. |
| X☐ Obtaining, evaluating, and communicating information |  |

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| **Ohio’s New Learning Standards for Science (ONLS)** |
| **Expectations for Learning - Cognitive Demands (Check all that apply)** |
| ☐ Designing Technological/Engineering Solutions Using Science concepts **(T)** |
| X☐ Demonstrating Science Knowledge **(D)** |
| X☐ Interpreting and Communicating Science Concepts **(C)** |
| ☐ Recalling Accurate Science **(R)** |

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| **Common Core State Standards -- Mathematics (CCSS)** | |
| **Standards for Mathematical Practice (Check all that apply)** | |
| ☐ Make sense of problems and persevere in solving them | ☐ Useappropriate tools strategically |
| ☐ Reason abstractly and quantitatively | ☐ Attendto precision |
| ☐ Construct viable arguments and critique the reasoning of others | ☐ Look for and make use of structure |
| ☐ Model with mathematics | ☐ Look for and express regularity in repeated reasoning |

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| **Unit Academic Standards (NGSS, ONLS and/or CCSS):**  **NGSS**  When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts (HS-PS2-c),(HS-PS3-b),(HS-LS2-j),(HS-ESS2-b),(HS-ESS3-f),(HS-ESS3-h) |

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| **Materials**: (Link Handouts, Power Points, Resources, Websites, Supplies) |

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| **Teacher Advance Preparation:**  **Teacher should have a sheet of questions to ask students between videos, all videos should be pulled up on the computer. Teacher should have worksheets for activity 3 to pass out to students at the end along with exit slips.** |

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| **Activity Procedures:**  Question of the day: *Where could your trash end up when you throw it on the ground? In a garbage can? In a Recycling bin?*  **Talk about Baltimore- the harbor and all of the trash- Show 2 videos of Mr. Trash**  [**https://www.youtube.com/watch?v=RkQbcrzyAeE**](https://www.youtube.com/watch?v=RkQbcrzyAeE)  [**https://www.youtube.com/watch?v=jmwxiYGp4OA**](https://www.youtube.com/watch?v=jmwxiYGp4OA)  Ask students:  *What is Mr.Trash?*  *How does Mr.Trash get his power?*  *Why do we need Mr.Trash?*  *Where does the Trash go once it's picked up?*  *Could we use something like this in Cincinnati?*  **Show video on the Ohio River Clean up**  [**https://www.youtube.com/watch?v=v8SwCRQyxU0**](https://www.youtube.com/watch?v=v8SwCRQyxU0)  *How much trash is picked out of the ohio river annually vs. picked out of the baltimore harbor daily?*  **Show video on the Garbage patch gyre**  [**https://www.youtube.com/watch?v=4dNhMfemjKk**](https://www.youtube.com/watch?v=4dNhMfemjKk)  *Why does the gyre have so much plastic?*  *Were you surprised by this video? Why or why not?*  **Show video on the recycling**  [**https://www.youtube.com/watch?v=TvN9W3XxFfc**](https://www.youtube.com/watch?v=TvN9W3XxFfc)  *How much of the plastic that you put in your recycling bin gets recycled?*  *What are the alternatives to just using plastic you can sort?*  *What could America do to improve their recycling program?*  **Assignment of Activity 3- Home study on how much trash students use (1 day of data collection)**  Teacher will ask students to get into pairs or groups of 3 to ask essential questions and to write them down. Guiding questions for the students should be “How can we use chemistry to help fix the Mr. Trash process of sending trash to a landfill” The teacher will tell the students that they will create a challenge out of these questions/ideas the students come up with. |

**Formative Assessments:** Link the items in the Activities that will be used as formative assessments.

There are two types of formative assessments in this unit. First there is the class discussion which tells the teacher how well the students understand concepts. Second, there is the generation of essential questions which can tell the teacher the level of understanding the students are at.

**Summative Assessments:** Post Test.

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| **Differentiation:**  This lesson did not need much modification for different learners. Since it was just brainstorming and processing new information, I made sure I clarified the instructions of coming up with essential questions for some students, especially for the ELL. |

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| **Reflection:** The Lesson overall was pretty successful. The students were very interested in where trash actually ends up. They were surprised that despite recycling, a lot of waste goes to landfills or into the ocean. It was easy for students to relate this to themselves because they thought about all the trash they throw away and how little they think about it. The students struggled with coming up with essential questions probably because they have never done so before. In the future I plan to do a mini EDP activity before this unit so students can have a small introduction to how the EDP process works. |