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5th Grade

Ortega School

Pacifica, CA

Solutionary Unit of Study:

Our waste impacts our community

Storyline:

Students will build awareness of how waste on our campus impacts our world. We will start with a physical understanding of what waste is and how it travels to the ocean. Students will start by contemplating a problem we have seen on our local beaches of having a lot of dead birds. They will start to explore the different reasons we are seeing this phenomena as they gain a better understading of the waste problems our world is facing. We will examine the problems of litter on our campus and in our community, pollutants in the watershed, and the problem of landfills and waste diversion. We will also take a deeper look at the problem of waste primarily from a consumption standpoint. Students will brainstorm, plan and implement solutions to help reduce waste on our campus as well as ways to reduce the amount of waste that ends up in our local ocean.

We need to keep our watershed clean because of it’s connections to the ocean and because of the cyclical nature of water. Our actions at Ortega impact our watershed directly and therefore impact our local fresh and saltwater habitats.

\*\*In addition to the lessons listed below, weekly in math we will look at relevant environmental data and discuss it with a mathematical lens.

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| Standards:  DCIs  5-PS1 Matter and Its Interactions  5-PS2 Motion and Stability: Forces and Interactions  5-ESS2 Earth’s Systems  5-ESS3 Earth and Human Activity  3-5-ETS1 Engineering Design  SEPs  CCCs  EP&Cs |

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| Phenomomena/Problem: We are finding a lot of dead birds at the beach. |
| Essential Questions: Where does the waste we produce go when we litter, put it in a landfill and/or recycle or compost? |
| Enduring Understanding: Our waste is impacting our community and our world. |

Background / Foundation

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| Lesson # | Lesson Goal | Lesson Strategy/Experience |
| 1 (Engage) | Students begin to understand the anchoring phenomena of waste. Students begin thinking about the question: Where does our waste go and how does this impact our world? | Students see pictures of dead birds on our local beaches. Discuss experiences seeing dead birds on the beach. Then see a photo of a sea bird with plastic in its stomach. Discuss how that might happen. Show students a plastic water bottle and ask them to diagram how they think the bottle could get from our playground to the local beach. Students share diagrams. |
| 2  (Explore and Explain) | Visualize Landfills and think about what types of trash there are and where it all goes | Brainstorm and Discuss waste students created today. Students list and then share out. Sort share out into compost, trash, and recycling  Watch WallE |

Problem 1: What happens to plastic when we are done with it?

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| 3  (Explore) | Chemical vs. Physical Changes | Lab: Students explore changes |
| 4  (Explain) | Explore and understand different ways matter is changed | Visit and explore compost using waste from lunch. Then students explore [webquest](https://docs.google.com/document/d/1d7F22MXMN65MGECuwfRWvND3ZRuSVhMmJJkbH_9dg1o/edit?usp=sharing) on chemical and physical changes with relevance to waste. |
| 5  (Engage) | Thinking about the lifespan of plastic | Preview model landfill project. Watch videos on Pacific Garbage Patch. |
| 6 | Students examine waste on our campus and begin to understand what happens to plastic in a landfill. | Students pick up garbage around campus and analyze the types of items found.  Then, using the garbage found, students build a model of a landfill layered with soil. Students will make predictions about what will happen to their landfill overtime. |

Problem 2: How does waste travel to the ocean?

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| 7  (Explore) | Students understand the effect of gravity on water flowing to the ocean | Build a basic model of a watershed. Discuss the flow of water locally and globally.  Explore rivers and watersheds on google Earth. |
| 8 | Students take a deeper look at watersheds and examine the role of pollutants | Students look at enviroscape with pollutants and relate it to our local creek/watershed. Students use [webquest](https://docs.google.com/document/d/1F3cePPWTJLoH3m7JQfP8FvRTyW4GqIxIj5eW9cUedaY/edit?usp=sharing) to research the sources of pollution in our local watershed and brainstorm solutions. |
| 9 | Students understand the water cycle and think about how pollutants can travel between the air and water | Students build a model of the water cycle  file:///Users/kstevenson/Downloads/g5-l1.4-water-cycle.pdf |

Problem 3: Why is compost the best option?

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| 10 | Mold Lab (Mystery Science) | Students learn about the process of natural decomposition and design their own experiment to study how mold breaks down food. |
| 11 | Office of Sustainability Games! | Students play games designed to show how the three stream system works and why it is important in terms of natural resources. |
| 12 | Sustainable Cycles | Go over [Cycles in Nature](https://docs.google.com/presentation/d/1rH158gzYcz6S6hkjuizdcIukSTD0wxwwKAb0cXHXIXs/edit#slide=id.p) and engage students in understanding closed loop systerms based on their experiences in the natural world. |
| 13 | School Wide Examination of Sorting System | As a class, review and discuss how our school does (or does not) divert waste from the landfill. |

Solutions and Implementation

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| Lesson # | Lesson Goal | Lesson Activity |
| 14 | Students define the problem of waste and why it matters for our earth. | Read Aloud: What a Waste  Discuss how our waste problem is affecting our Earth on a global scale. |
| 15 | Students practice solving environmental problems. | Lab: Cleaning up an Oil Spill: Students create a model of an oil spill and come up with solutions as a group in an attempt to isolate and clean the oil spill. |
| 16 | Students think about the problem of waste at the local level, define a specific problem to focus on brainstorm/examine root causes. | Read Aloud: One Plastic Bag..  Following the same thinking as the characters in the book, students define and examine root causes of the waste problem at our school.  Students begin:  [Waste Project](https://docs.google.com/document/d/1htr83T-3C1IZmHs2p-ClyIJjcStq-5Xg4WaRay99WG4/edit) |
| 17 | In groups, students begin to look at the data for the problems they have defined. | Continuing their [Waste Project](https://docs.google.com/document/d/1htr83T-3C1IZmHs2p-ClyIJjcStq-5Xg4WaRay99WG4/edit), students  gather/examine school data. Review what is data and how to quantify and record information. |
| 18  (several days) | Students plan and implement a solution based on the data and root causese. | Continuing their [Waste Project](https://docs.google.com/document/d/1htr83T-3C1IZmHs2p-ClyIJjcStq-5Xg4WaRay99WG4/edit) work:  Using Data, students think about how to effect change. Students work together to come up with and present a solution to our school community. |

Reflection/Sharing

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| Lesson # | Lesson Goal | Lesson Activity |
| 16 | Students reflect on their work. | Students put together a reflective slideshow summarizing their work. |
| 17 | Students share their work with the class. | Students present their slideshows and the class discusses effectiveness and next steps. |
| 18 | Assessment | Students complete [assessment](https://docs.google.com/document/d/1_IQEpfj6KyIfkn3rDalPbKu1SAZlnsa2jcI384juR4M/edit?usp=sharing) on their understanding of the importance of waste divsersion to our community and to our world. |
| Ongoing | Continued work... | Students are invited to join a leadership group of eco-ambassadors to continue the work we have begun. |