

Iron Canyon Fish Passage Project

MS Energy Unit Outline

Topic	NGSS Standards	Ideas for Lessons/Activities
What has energy? (evidence of energy)	PS3.A	- Hook: sorting activity - students sort images of everyday systems based on whether they think it has energy or not (use examples/images relevant to Iron Canyon curriculum focus) - Students use results of sorting activity to come up with the definition of energy being the ability to make things move or change - Hands on: students test various systems at lab stations to determine whether each has energy based on new understanding and definition.
Forms of energy (kinetic and potential)	PS3.A	- Students learn about PE and KE through place-based storytelling of: A) Dams; Iron Canyon story and also maybe Oroville dam/the spillway incident circa 2017 B) fires for land management: students learn about how too much vegetation all packed together and overgrown is a lot of potential energy and the more PE is stored that way, the more KE is released when there is a fire. Dangerous when too much. That's why people who live in or manage forests use fire to keep the amount of PE down, therefore avoid large amounts of KE if there was a natural fire. Managed low energy fires can result in new fire-dependent vegetation and more biodiversity - Create a digital interactive fire management map of burn areas and fire lines in the area (or put in thermal energy unit) - Students practice identifying PE and KE through stories told in a different medium: by viewing a series of short clips from familiar movies that have scenes with good examples of each (the Goonies, Toy Story, Chitty Chitty Bang Bang, etc.)
Types of energy (light, chemical, mechanical, sound, etc.)	LS1.C PS3.D	- Students learn about where each type of energy comes from, how it's used, what it does, and examples of each type - Guest speaker (He-Lo or other) to share examples and give demonstrations of the different types through the lens of TEK and place-based education of local Native American culture/lifestyle - Types of energy scavenger hunt: students go around and find their own examples of each type of energy in "the real world." Collect evidence of each by taking photos and/or audio recordings and putting their data into a slides presentation with figure legends explaining what they found for each type. **IF POSSIBLE: do this as a field trip to Bidwell park

Energy sources (hydro, wind, solar, geothermal, etc.)	<i>ESS2.A</i> <i>LS4.D</i>	Use examples of each from TEK/culture/lifestyle. Special focus on hydro through lens of iron canyon dam. - Energy source expert groups: students divide into groups to do a deep dive on a specific source. Then each group takes turn being the “teacher” to present research findings about their energy source to the class. Maybe each group also creates a short, fun, little assessment for the rest of the class about their energy source, after presenting/teaching about it.
Renewable and nonrenewable energy sources	<i>ESS3.C</i> <i>ESS3.D</i>	Socratic seminar about pros and cons of different energy sources. Students construct scientific arguments for which is/are the best for various cultures, places, purposes, overall. Special focus on which sources were used by local tribes, and how they harnessed it (special tools/technologies they developed for it, etc.) Also on the environmental, cultural, and economic outcomes of the renewable energy sources used by local tribes, vs. the outcomes of the nonrenewable sources used today, and by settlers who came here. -Students use online program to calculate their own carbon footprint
Energy transfer and energy conversion	<i>ESS2.C</i> <i>PS3.B</i> <i>PS3.C</i>	- Water movement causing erosion, energy transfer, etc. - Native american fire use (see videos)
Conservation of energy	<i>LS2.B</i> <i>PS3.B</i>	