Instructional Strategy	Intended Purpose & Process	Strengths	Limitations
Project-Based	Student's interest is piqued by an engaging activity then they work in small, collaborative groups to research and create a product that demonstrates their learning. Teachers facilitate by re-directing with questioning and feedback.	High level of student engagement with positive impact on building student internal motivation. Student-driven, collaborative, and inquiry-based development of their own problems Shown to be as effective as traditional teaching/learning.	Teachers must dedicate more time up-front to create meaningful project guidelines/rubrics. Potential for students to not fully participate – Jigsaw Requires significant guidance/facilitation by teacher. Can over-focus on the product.
Problem-Based (similar to project-based but with a well constructed problem)	Teachers facilitate learning by posing challenging, messy, and open-ended problems that lack any single solution. The problems are driven by the learning goals. Students work in small collaborative groups to solve the problem. Generally, the product is a report or presentation.	Students are very engaged and actively develop their critical thinking and creativity. Students learn to collaborate and build problem-solving skills. Students transfer their learning to new scenarios.	Takes more time so less material is covered. Teachers must actively facilitate students to ensure they are moving toward intended outcomes without giving away any "answers".

Place-Based	Teachers work with community to create outdoor local learning environments that focus students' attention on where they learn as well as what they learn.	Students focus on learning in their community's environment, history and people. High-level of community and student engagement.	Teachers need to create opportunities to ensure that students can apply what they learn locally to the global community.
Phenomenon-Based	Phenomena "anchor" a unit of study by providing students a discrepant event to engage them in the work of "figuring things out". Teachers create a unit around the phenomena.	High-level of student engagement. Very flexible.	The phenomena does not make the unit, the unit must be strong in its own right. The phenomena provides a theme to the unit so the activities have to be well-selected, framed and timed to create the greatest learning.
Data-Based	Students use authentic scientific data from scientific organization to learn about natural phenomena.	Real-world application of using scientific data to drive student learning. Students have the opportunity to engage in real data and develop quantitative critical thinking skill.	Knowledge of and ability to access and present data for students to use and understand may be challenging. Students need guidance and practice to do this well and begin to think like scientists.
Solutions-Focused	Teachers and students collaborate on identifying, designing, and possibly	High-level of student direction, collaboration, and commitment.	Risk of solution not being implemented or failing and students becoming

	implementing a scientific solution to a problem or issue.	Wide-opportunities for learning about and applying science in a real-world context. Students experience that STEM provides real-world solutions, may lead to desire to pursue a STEM career.	demoralized. Requires significant guidance/facilitation by teacher. Potential for students to not fully participate – Jigsaw as an option.
Arts Integration	Students adapt scientific content in a creative and individualistic way. This is often dubbed STEAM - science, technology, engineering, art, and math	Adds an element of creativity to science learning. Opportunity to integrate with Art, LA classes, etc. Potential to "hook" students on science who are not typically interested in the subject.	Requires an added element of knowledge and preparation on the part of the science teacher to incorporate the arts and/or integrate with other non-science teachers. Challenge to keep the learning focus on STEM.
Argument-Driven Inquiry	Debate- or discussion-style scenario where students research and communicate their perspective on a scientific topics and issues.	Students are deeply engaged in the process of understanding a scientific issue and communicating the facts behind it.	If the topic is at all controversial, it can be a challenge to maintain an objective and science-focused perspective vs. personal opinions and beliefs.