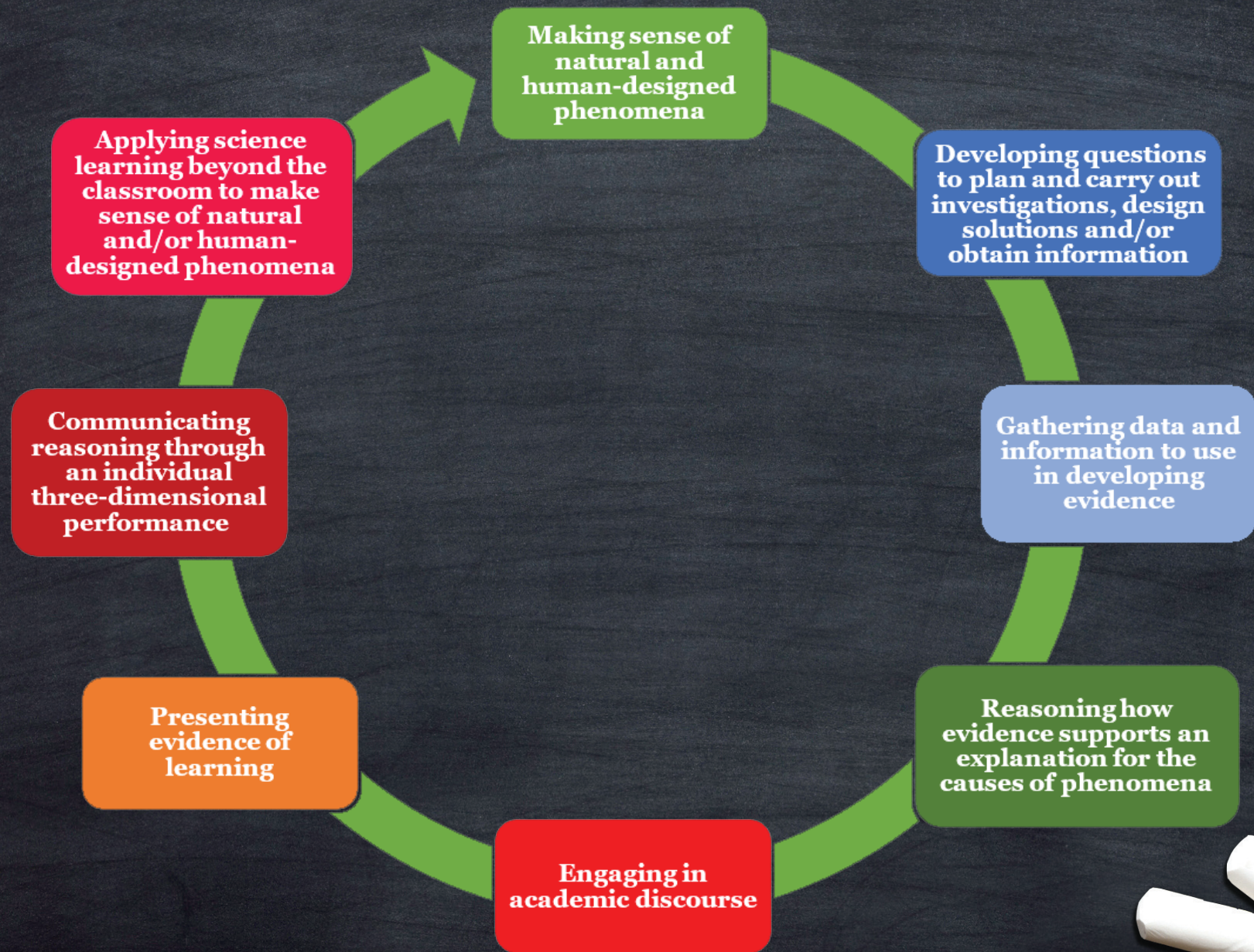


Powerful Science Instructional Practices Model



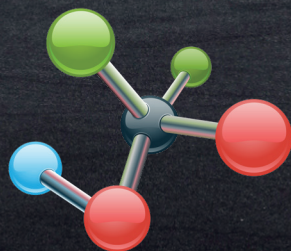
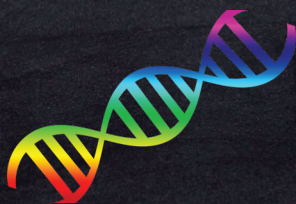
Powerful Science Instructional Practices Model

Engaging Students in Science Investigation and Design

Engage Students in:	Teachers Engage Students by:
1. Making sense of natural and human-designed phenomena.*	Presenting relevant phenomena that motivate students to seek explanations for the causes of those phenomena.
2. Developing questions to plan and carry out investigations, design solutions and/or obtain information.	Using instructional strategies to motivate students to develop relevant questions to plan investigations, gather data and/or research information to use as evidence.
3. Gathering data and information to use in developing evidence.	Developing opportunities for students to investigate the causes of phenomena and gather data and information to use as evidence. Establishing protocols for science experiments and simulations that provide students with data. Developing guidance for students to research information and/or obtain evidence from provided materials.
4. Reasoning how evidence supports an explanation for the causes of phenomena.	Using three-dimensional prompts to focus students' explanations for the causes of phenomena and arguments for how the evidence they gathered supports or refutes an explanation.
5. Engaging in academic discourse.	Establishing expectations for students to engage in academic discourse and argue for the relevance of data and information. Establishing norms for productive discourse for how specific lines of evidence support or refute an explanation.
6. Presenting evidence of learning.	Establishing appropriate rules for the classroom and small-group discourse. Develop questions and prompts to support students in making their thinking visible and learning from others.
7. Communicating reasoning through an individual three-dimensional student performance.**	Developing and/or using appropriate expectations and structures for students to present their reasoning through writing, speaking and presenting models. Establishing clear expectations for how students use evidence to support explanations and present scientific arguments.
8. Applying science learning beyond the classroom to make sense of natural phenomena.	Establishing clear expectations and using instructional strategies to motivate students to engage in making sense of phenomena beyond the classroom. Developing opportunities for students to share the phenomena they observe beyond the classroom and connect these phenomena to ideas and concepts learned in class.

* The term *phenomena* refers to natural science phenomena as well as human-engineered phenomena.

** The term *student performances* refers to students' active engagement in making sense of phenomena, including mental and physical engagement and hands-on investigations of phenomena.



$$V = \frac{d}{t}$$