Table 1: Text Rich Investigation Design Elements

Topic: investigations are built around science phenomena

Disciplinary Concepts	The phenomena are scientifically significant and fit the curriculum of science domains and grade levels.
Practices	The phenomena afford investigation with modeling and argumentation.
Relevance	The phenomena are personally relevant and appeal to secondary students.
Complexity	The phenomena offer puzzlements and conundrums.
Scope	The phenomena afford investigation with manageable amounts of empirical data and theory.
Documentation	The phenomena are documented in texts with a wide range of accessibility and challenge.

Texts: text sets are built around science phenomena

Complexity	The texts present students with comprehension problems typical of science reading in school and public contexts such as the language and syntax of science communication, as well as the multiple forms of representation typical of science writing.
Content	The texts offer a compelling context as well as enough information to support the construction of models and explanations.
Uniqueness	Theoretical and empirical information is distributed among multiple texts necessitating integration across multiple sources to complete tasks.
Reliability	Texts present validated information from reliable sources (*e.g.* university science research sites, published science journals, high quality science news reporting, and government agency websites) to limit the complexity of the problem space.

Sequencing	Texts sequence builds students' science reading and reasoning skills and science knowledge over the course of the investigation unit, with early texts providing access to the science phenomena and personal relevance, and later texts supporting explanation with increasing complexity.

Tasks: consequential tasks are science practices

Science reading	Tasks focus on reading multiple texts to engage in science investigation practices, particularly modeling for explanation with argumentation.
Modeling	Tasks call for construction of explanatory models of science phenomena that express an explanation of the phenomena and comprehension of the texts.
Argumentation	Tasks entail interactive argumentation supporting the construction, justification, and critique of models of science phenomena.

Scaffolds and tools: An Interactive Notebook offers prompts, protocols, and notetakers for reading and discussions that support science reading, modeling, and argumentation.

Reading and sense making with multiple texts and representations	Prompts for metacognitive conversations discussion routines support making thinking visible through think aloud, text annotation, and sharing reading and reasoning processes. Prompts for collaborative sensemaking discussion and interactive argumentation routines support clarification of the meaning of the texts. Prompts that focus attention to student developed inquiry questions and core disciplinary concepts in text-based discussion support engagement in the investigation and conceptual change. Talk stems support discussion of science reading processes and sense making with texts.

Modeling science phenomena	Evidence and interpretation notetakers support students in identifying and making sense of the evidence to construct models and support their scientific arguments. Prompts for text-based evidence gathering support student engagement in locating and citing evidence, arguing what counts as evidence, why it counts, how it fits into the model, and how it might be represented. Discussion routines support generation and refinement of criteria for evaluating models.
Argumentation for inquiry and modeling	Prompts press student to develop a justification for why the phenomena is worthy of investigation. Protocols and prompts for peer review of student generated models support students in critique and justification of science models. Talk stems support discussion and argumentation for science inquiry, modeling, and argumentation.

Teacher mediation: Teacher supports reading, modeling and argumentation.

Orchestration of Reading, Reasoning, and Modeling Tasks	Teacher decides the text apportionment and frames reading tasks. Teacher orchestrates metacognitive and sense making discussions with texts eliciting students reading and reasoning processes. Teacher orchestrates individual and collaborative problematization of the phenomena, text-based evidence gathering, connecting and representing, model construction, and peer review of student generated models based on co-constructed criteria for models.
Demonstration of Reading, Reasoning, and Modeling Practices	Teacher demonstrates their own reading and thinking processes with texts for problematizing the phenomena, locating and citing text-based evidence, connecting and representing ideas, model construction, and model justification and critique.

Formative Assessment of Reading, Reasoning, and Modeling Practices	Teacher assesses student reading processes and comprehension to inform dynamic scaffolding of reading. Teacher assesses students' modeling process and products to inform emphasis of support on next iteration or model task. Teacher assesses student argumentation to inform emphasis of support for argumentation tasks.