



Next Generation Science Standards Alignment Supports *THE PRIVATE EYE*® — (5X) *LOOKING / THINKING BY ANALOGY*® Correlation



Science and Engineering Practices & The Private Eye Process

NGSS “Science and Engineering Practices” are native to The Private Eye process!

1. Asking Questions:

The four core Private Eye questions lead students into all eight Science and Engineering Practices in the NGSS. As students investigate any phenomena, as they try to make sense of and understand the phenomena, natural or manmade, they typically begin by asking the 1st of four TPE Questions — “What else does this remind me of? What else does it look like? What else?” With this simple question they connect the phenomenon to their own experience as they forge comparisons they will mine for insight. There’s no wrong answer; all students can participate. The answers to this the initial question are analogies — in the compressed form of metaphors and similes. Analogies do many things, starting with: they capture characteristics. Students further explore these characteristics using the 2nd Private Eye Question: “Why did it remind me of *that*?”

2. Developing and Using Modeling:

NGSS says “Models include diagrams, physical replicas, mathematical representations, analogies and computer simulations.” A closer look reveals that most models ARE analogies! Student analogies generate models as well as hypotheses. When students ask the 3rd and 4th Private Eye Questions: “Why is it like that, I wonder?” they use their analogy lists as clues to why something is the way it is by asking the next Private Eye question: “If it reminds me of _____, I wonder if it might work or function like that in some way?” Or “Could I design something like that? **Could I design a model like that** to help give insight into my current puzzler or problem?”

3. Planning and Carrying Out an Investigation:

The Private Eye Questions lead students directly into planning and carrying out an investigation — into hypothesizing or “making sense of” why some object / material / event / reaction is the way it is (“Why is it like that, I wonder?”). Students generate and use analogies as clues to help answer that question — or for design solutions (“If it reminds me of _____, I wonder if it might work or function like that in some way?” Or “Could I design something like that?”) Students explain their thinking, then design tests for their hypotheses, run tests, construct explanations, argue from evidence, and pursue further research, and communicate tentative results.

During Private Eye investigations students design, run and repeat tests of their analogy-based hypotheses, record and share results, add research...

4. Analyzing and interpreting data (from their testing)

5. Using Mathematics and Computational Thinking: As students run and refine tests, they’ll estimate, measure, compute, chart, and graph results.

6. Constructing Explanations (for science) Students explain overlapping characteristics of an analogy and how the analogy can give insights and clues for why something is the way it is; they explain why they designed the tests they did, etc. **For engineering, students design solutions.** Student analogies prompt design solutions. “If ‘x’ reminds me of ‘y’ could I design something like that?” Biomimicry, for example, is based on analogies.

7. Engaging in Argument from Evidence: Students offer evidence of overlapping characteristics in their analogy; they offer evidence from test results to support or refute hypothesis, etc.

8. Obtaining, Evaluating and Communicating Information: Students use their own analogies as high quality springboards for obtaining, evaluating and communicating insight and information about phenomena.



The NGSS claim-evidence approach is a key instructional shift and The Private Eye helps teachers make that shift: no longer are students mere fact collectors, they are critical thinkers who can apply their conceptual understanding to new situations. This raises the expectations for teachers to have lessons fit together coherently, build on each other, and help students build proficiency on a targeted set of performance expectations. This cannot be done through isolated science activities, reading about science or through student choice centers. In order for students to be proficient at the performance expectations based in the Core Disciplinary Ideas, teachers need to create high quality units that makes connections to the subject area, but also to the Common Core State Standards in Mathematics and English Language Arts to truly leverage student thinking and learning. The Private Eye provides the framework for those high quality units.