



THE HUNTINGTON'S PRIMER ON

Working with SCIENTIFIC INVESTIGATION

BEST PRACTICES

The Huntington Standard engages educational best practices through Connections to Collections, Cutting Edge Pedagogical Design and Techniques, and Innovative Thinking.

In facilitating learning with our materials, The Huntington applies the following practice. It is applicable to all disciplines; however, it is inspired by and especially appropriate to Scientific Investigation:

- Observe & Describe
- Explain & Interpret
- Reason with Evidence
- Wonder & Question

What is the Scientific Method?

The Scientific Method and the Scientific Process are two ways of approaching investigation. They encourage habits of inquiry: both provide a structure to observe, ask questions, test ideas, and draw conclusions. Though they have similar components, they are conceptually different in regards to goals and products.

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What is the Scientific Method? (cont.)

The Scientific Method is a linear form of discovery that may start with a single question and end with a single correct answer. It is the more traditional investigative approach, is more commonly found in classroom materials, and may be a more concrete concept to grasp for younger children.

It utilizes the following steps:

- 1) Ask a question
- 2) Research
- 3) Form a hypothesis
- 4) Test the hypothesis by conducting an experiment
- 5) Analyze data
- 6) Draw conclusions

What is the Scientific Process?

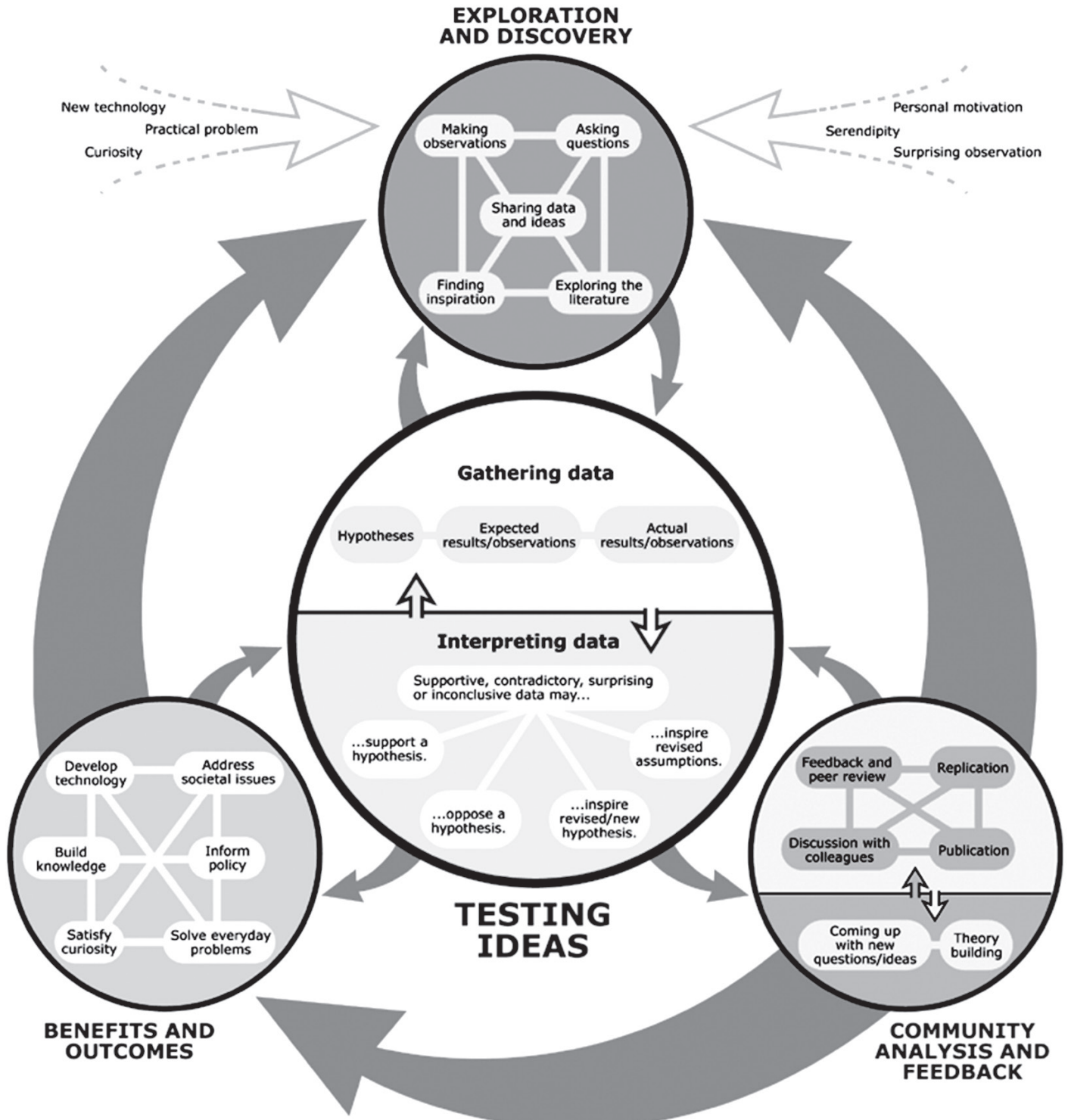
The Scientific Process is a non-linear form of discovery that emphasizes the ongoing growth of information and places testing ideas at the center. When testing ideas, the scientist gathers and interprets data. However, every stage of the experiment incorporates exploration and discovery; benefits and outcomes; and community analysis and feedback. As a result, changes can be made throughout the experiment. The Scientific Process is also open-ended; a conclusion encourages more questions about the implications of the discovery to other scenarios. The Scientific Process allows revision of the experiment in light of evolving knowledge.

For an static flowchart about the Scientific Process, please refer to the graphic on the following page.

For an interactive flowchart about the Scientific Process, refer here: <http://undsci.berkeley.edu/article/scienceflowchart>



Scientific Process Flowchart



What Skills Does Scientific Investigation Build, and Why Are They Important?

Scientific Investigation builds students' skills of observation, measurement, sorting and classifying, inferring, predicting, experimenting, communicating, and overall critical thinking. The Huntington refers to these habits of inquiry as Innovative Thinking, and believes they are applicable for youth and adults in approaching any discipline, in both formal and informal learning environments. Students who build these skills are more likely to challenge assumptions and formulate, test, and share original ideas as adults.

When Scientific Investigation Can Be Applied, and How Does It Look When It Is Effective?

Because Scientific Investigation builds Innovative Thinking skills, it can be applied to any learning situation in which students may deduce relationships between materials and/or circumstances. Deducing relationships may be drawn from noticing patterns, cause-and-effect situations, deep looking and describing, etc. Relationships may also be understood in the context of prior knowledge, in which a real or created scenario does or does not align with that information. When executed well, students will notice correlations, articulate observations, formulate questions, design ways to test their ideas, and measure and interpret the results.

When Using Scientific Investigation with Students, Remind Them That:

Science is based in experimentation – it is alright for an experiment to fail, because that leads to unexpected discoveries, which can be very valuable.

Everyone can be a scientist – we are all curious and creative, and scientific investigation gives us ways of testing our ideas. Science is fun!

