

Teaching Science as Inquiry (TSI)

The Teaching Science as Inquiry (TSI) pedagogical model was developed at the University of Hawaii at Manoa's Curriculum Research & Development Group (CRDG) by a team of scientists and educators led by Dr. Francis Pottenger. TSI helps engage teachers and students as a community in the process of doing science through a supportive, skills and content-based model that builds inquiry into existing teaching practice with gradual and sustained implementation of skills within the classroom. The TSI model allows teachers to conduct authentic science successfully within their classrooms, helping students to build their own scientific habits of mind and participate in true scientific disciplinary inquiry practices.

TSI advocates learning-by-doing

- Disciplinary inquiry involves learning about a discipline by engaging in the complete practice of that discipline. Content is both an end goal as well as a framework for knowledge construction.
- By testing principles and connections through the generation and interpretation of their own data, students can begin to understand the fundamental underpinnings of science and build the demeanor and habits of mind associated with practicing scientists.
- By learning science as a community process, students also learn to use a variety of knowledge-acquisition tools and communication skills.
- Communication is an essential element in disciplinary inquiry. Practicing the communication of science prepares students to engage in civil discourse, to clearly communicate and defend their conclusions, and to consider and incorporate alternative points of view and additional information in their interpretations.

TSI learning cycle and incorporation of multiple learning modes

- Scientific investigations have many dimensions; they do not always proceed in a strict unidirectional fashion.
- TSI uses a flexible and fluid learning cycle where student instruction and communication is interwoven with multiple modes of knowledge generation.
- The use of multiple inquiry modes emphasizes the incorporation of inquiry and investigation in a variety of ways, paralleling the diversity of science practices.
- TSI is flexible, and can be easily incorporated at any level and with a variety of content and has been used successfully in a variety of venues.

TSI is a collaborative foundation

- In TSI, students and teachers work together to discover and understand the natural world.
- TSI instruction is ongoing, multi-directional, and embedded throughout the learning process.
- TSI emphasizes the process of discovery; investigations for which the result is unknown to both students and teacher are encouraged.
- Teachers are encouraged to engage students in the process of inquiry by helping them to ask scientifically oriented questions to promote learning by analysis.
- Students are encouraged to connect their explanations to their personal body of scientific knowledge.