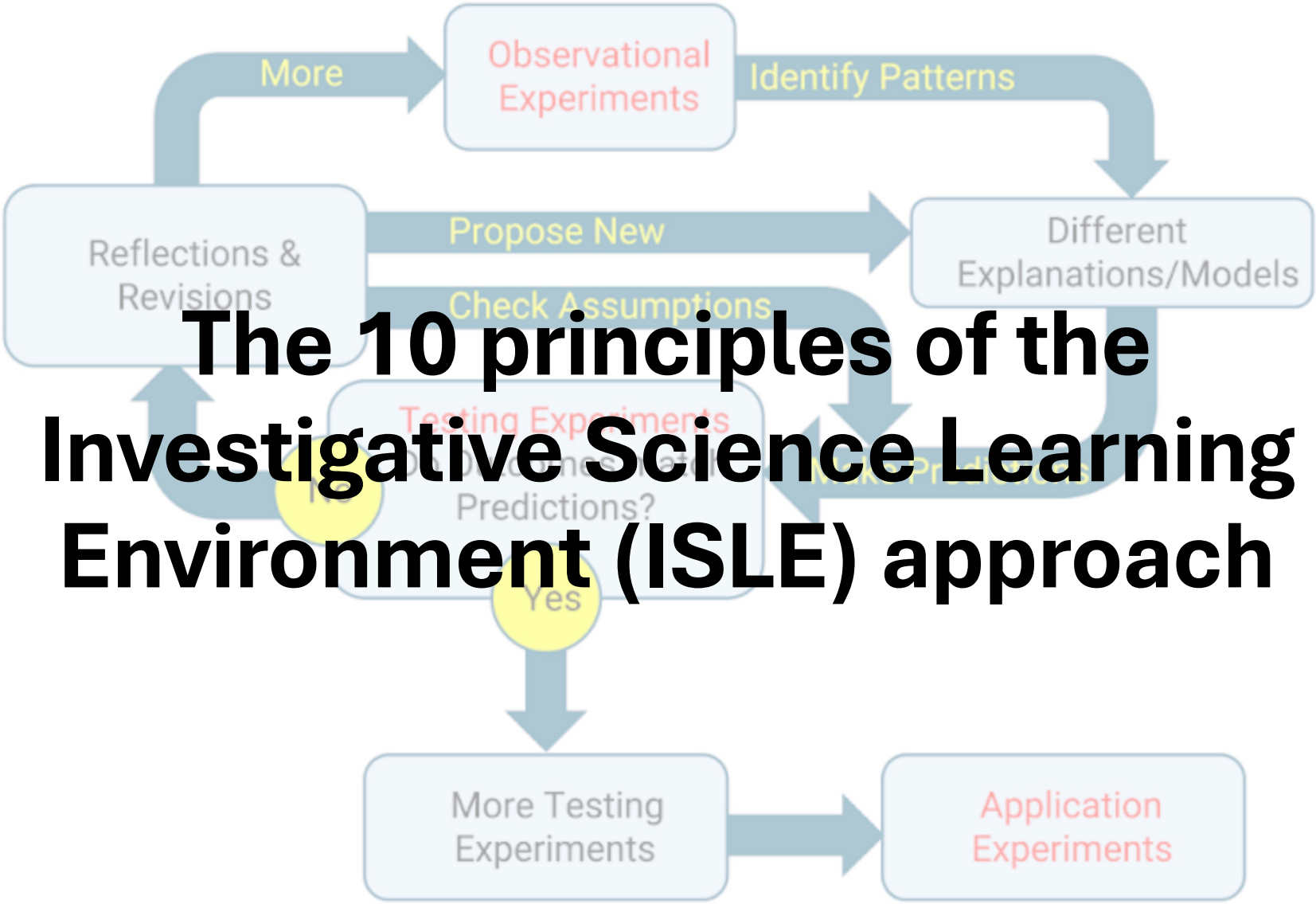

The 10 principles of the Investigative Science Learning Environment (ISLE) approach

Science Is a Way of Thinking — Not a Set of Facts

ISLE brings back a thinker in a student. They observe phenomena, generate hypotheses, design experiments, revise models — just like real scientists. It restores science as an active process, not passive content.

1

Every student already has a science mind

ISLE trusts that all learners are capable of authentic reasoning, decision-making, and experimentation. With the right structure and support, students engage in real scientific thinking — not some-day, but every-day.

Conceptual depth over procedural fluency

ISLE emphasizes developing a strong conceptual foundation for key ideas in science. Simply being able to perform calculations or answer rote questions does not demonstrate scientific understanding. It is more important for students to develop conceptual fluency than it is for a course to "cover" a wide range of topics.

3

Critical reasoning (thinking) is practiced, not preached (Scientific skills)

ISLE trains students to carefully observe phenomena and ask questions about them, generate explanations and hypotheses and test them, examine and validate their assumptions, evaluate and communicate. They learn how to think clearly and carefully — not just repeat what they've heard. In fact, all skills must be practiced, not just learned by osmosis.

Error is an Engine, Not a Shame

In ISLE, mistakes aren't punished — they are opportunities. Students iterate, revise, and reattempt. This fosters resilience, grit, and a deep trust in the learning process itself.

Collaboration is at the heart of learning

In ISLE classroom, students form a scientific community: they argue for their models, justify their predictions, and respectfully challenge each other's reasoning. This practice builds intellectual courage and productive, evidence-based dialogue.

Thinking tools are essential in our complex world

The habits of mind built in ISLE—constructing models from evidence, rigorously testing them, and revising one's own thinking—are not just for physics. They are essential survival tools for modern life and the new age and the use of artificial intelligence. These abilities empower students to critically evaluate information, design experiments to test claims, and distinguish credible science from plausible-sounding fiction.

Concrete experiences come before names and equations

Students first observe and describe phenomena qualitatively using everyday language. They develop an image of an idea before the idea is given an accepted physics term. Only after developing a solid conceptual understanding do they start describing phenomena quantitatively and connect them to mathematics through a bridge of multiple representations

ISLE is a humanizing force in education

In a system too often focused on control and standardization, ISLE is a radical, humane act of trust in the scientific potential of every learner

Motivation is an outcome, not a prerequisite

ISLE doesn't wait for motivation; it builds it.
Its engaging, game-like routines offer autonomy and a sense of competence, transforming effort into a satisfying habit.