

Aligning Montessori Principles with Inquiry-Based Science

Montessori Principle	Inquiry-Based Science Practice	Developmental Outcomes for Students
 Child-Centered Learning: Children choose their work	 Students pose questions, design investigations, and make decisions	 <i>Autonomy, initiative, self-directed learning skills</i>
 Hands-On Materials: Sensory and manipulative experiences	 Use of experiments, models, and scientific tools	 <i>Concrete understanding, sensory-motor skill development</i>
 Observation: Focus on details and patterns	 Careful data collection and result interpretation	 <i>Concentration, analytical thinking, reasoning skills</i>
 Freedom Within Limits: Structured freedom	 Conducting investigations within set parameters	 <i>Responsibility, decision-making, ethical engagement</i>
 Teacher as Guide: Facilitator of learning	 Asking open-ended questions, guiding inquiry	 <i>Independent thought, problem-solving, reflection</i>
 Constructivist Knowledge Building: Active learning	 Hypothesis testing and reflecting on findings	 <i>Deep understanding, critical thinking, knowledge construction</i>
 Real-World Context: Learning connected to life	 Investigating real-world phenomena and applications	 <i>Engagement, relevance, practical problem-solving</i>



What is Science Inquiry?

Science Inquiry: “Science inquiry refers to the diverse ways in which scientists study the natural worlds and propose explanations based on evidence from their work.” (National Science Research Council, 1996)

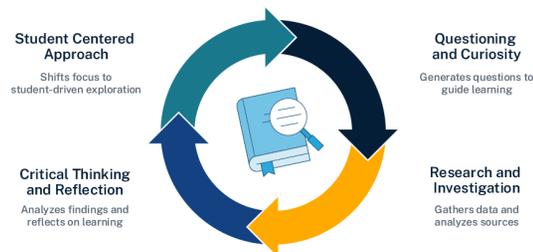
Where to get started?

1. **Direct Exploration:** Select phenomena from the child’s local environment that allow for hands-on investigation.
2. **Scientific Importance:** Focus on fundamental scientific concepts, such as how an animal's physical structure relates to its behavior and needs.
3. **Developmentally Appropriate:** Choose topics that allow for in-depth, multi-perspective exploration over time.
4. **Engagement:** Ensure topics are interesting and engaging for both children and teachers.
5. **Curriculum Balance:** Maintain a steady mix of life science and physical science.

Young Children’s Inquiry Process:

- **Notice, Wonder, Explore - Exploration/ phenomenon of the materials,** experience what they can, observe, wonder, use prior knowledge, raise questions, share ideas.
- **Guided Stage: Identify questions that you may want to investigate further.** Some may be children’s questions and others may be facilitated by adults.
- **Prediction, Planning, Collecting and recording data**
- **Organizing the experience and looking for patterns and relationships;** Engaging in conversation and scientific reasoning.
- **Make conclusions** and do some research to learn more.

Cycle of Inquiry-Based Learning



Inquiry Worksheets



YOUNG CHILDREN'S INQUIRY

