Professional Development:

Tools for Developing Inquiry in 4-H Programs

Northeast Regional Science Academy, Penn State Cooperative Extension
January 25, 2012
Take-Home Messages

- Students use process skills to build a conceptual understanding of science content.
- Students of all ages use all of the process skills. Each skill can be practiced at simple and increasingly complex levels.
- Process skills are not used separately but as intertwined, coherent sets of skills.
- Teachers can redesign activities to help students develop stronger process skills.

INSTITUTE FOR INQUIRY:
www.exploratorium.edu/ifi

© Exploratorium
What is Inquiry?

Inquiry is an approach to learning that involves a process of exploring the natural or material world, and that leads to asking questions, making discoveries, and testing those discoveries in the search for new understanding.

• The inquiry process is driven by one’s own curiosity.
• The process begins when the learners notices something new and begins to wonder.
• The next step is for the learner to take action and find one’s own path through the investigation process.
• Along the way the learner makes observations, asks questions form hypotheses & predictions, investigates, measures and collects data, and interprets to develop their understanding.
• The learner makes meaning and develops understanding from the experience through reflection, communication, comparison of results and sharing with others.

INSTITUTE FOR INQUIRY:
www.exploratorium.edu/ifi

© Exploratorium
Inquiry Structure for Learning Science Content

The Institute for Inquiry’s approach is designed to enable learners to come to a conceptual understanding of scientific ideas that are new to them. The inquiry process is driven by the learner’s curiosity and sustained by his or her sense of ownership of the process. But curiosity and ownership alone are not enough to ensure that learners have productive experiences that lead to the deeper understanding of scientific ideas. A well-thought-out structure and guidance by a teacher gives shape and direction to curiosity within the context of a teacher’s learning goals for science content, process, and attitudes.

**Inquiry Starters**
Learners explore materials, make observations, and raise questions related to content goals.

**Focused Investigation**
Learners plan and carry out investigations based on their questions.

**Sharing Understanding**
Learners share investigation results with each other to further their understanding of scientific concepts.

**Inquiry Starters**
Inquiry Starters are carefully designed activities intended to:
- Engage the learner’s curiosity about phenomena related to content goals
- Stimulate a range of questions that learners can pursue in their investigations

**Focused Investigation**
Small groups plan and carry out investigations based on questions raised at the Inquiry Starters. Investigations involve the following:
- Interacting with materials
- Making observations
- Proposing tentative explanations
- Making predictions and testing them
- Revisiting questions and explanations in light of new observations
- Recording and representing thinking through writing and drawing

**Sharing Understanding**
This is an opportunity for learners to examine their ideas and share their experiences. This includes:
- Giving participants time to consolidate ideas and figure out how to communicate what they’ve learned to others
- Encouraging investigation groups to build upon each others’ ideas to arrive at an understanding of key science concepts
- Having facilitators summarize key science concepts by drawing upon ideas presented by investigation groups

www.exploratorium.edu/ifI

© Exploratorium

explOration
Science Process Skills

Observing
Questioning
Hypothesizing
Predicting
Planning and Investigating
Interpreting
Communicating
Take-Home Messages

- Students use process skills to build a conceptual understanding of science content.
- Students of all ages use all of the process skills. Each skill can be practiced at simple and increasingly complex levels.
- Process skills are not used separately but as intertwined, coherent sets of skills.
- Teachers can redesign activities to help students develop stronger process skills.