Inquiry Learning and Scientific Inquiry

Theory by Richard Suchman

Development of the Theory

- His purpose was to develop miniature versions of the kinds of problems that scholars and creative research scientists use to help students learn independently – a strategy they will need in future endeavors.

Development of the Theory

- Like Bruner (discovery learning) and Taba (inductive learning), Suchman believes that students can become increasingly conscious of the process of inquiry.
- All people are inquisitive, but our thinking skills improve when we are conscious of them.

Development of the Theory

- All students must be aware that all knowledge is tentative. The ‘right’ answer is often pushed aside over time and replaced with a new ‘right’ answer.
- Students must be made aware that another person’s point of view can enrich their own thinking.
- Tolerance of alternative points of view is required.

What are Inquiry methods?

- Inquiry methods are designed to present a discrepancy or problem for the students to explore or solve.
- The purposeful creation of “forks in the road” for students to explore will reinforce the concept that is learned.
- Decisions, critical thinking, and problem-solving are key elements.

What are Inquiry methods?

- Inquiry methods are divided into 5 phases:
  - Confrontation (challenge the problem)
  - Verification and Experimentation (gather data)
  - Organize and Explain (solving the problem)
  - Analyze (the strategy in their work)
Why use Inquiry methods?

- Inquiry is a way for learners and teachers to handle the rapid growth of knowledge.
- The organization required to solve the inquiry creates a structure for the knowledge that helps students remember the content for longer periods of time.

Why use Inquiry methods?

- Inquiry provides a purpose for learning by engaging students in the processes of "finding out.
- Children who learn through inquiry methods in school become well-equipped for autonomous investigation and decision-making in other situations.
- Inquiry prepares students for employment where inquiry skills are highly valued.

Tips for using Inquiry

<table>
<thead>
<tr>
<th>Rule</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rule 1: Questions</td>
<td>Questions should be phrased so that they can be answered with 'yes' or 'no.'</td>
</tr>
<tr>
<td>Rule 2: Freedom to ask questions</td>
<td>A student may ask as many questions as desired once they begin.</td>
</tr>
<tr>
<td>Rule 3: Teacher response to statements of theory</td>
<td>When students suggest a theory, the teacher should refrain from evaluating it. Recording or questioning it are okay.</td>
</tr>
<tr>
<td>Rule #4: Testing theories</td>
<td>Students should be allowed to test their theories at any time.</td>
</tr>
<tr>
<td>Rule #5: Cooperation</td>
<td>Students should be encouraged to work in teams in order to confer and discuss their theories.</td>
</tr>
<tr>
<td>Rule #6: Experimenting</td>
<td>The teacher provides materials that help students explore their ideas.</td>
</tr>
</tbody>
</table>

INQUIRY BOX

- Examine the inquiry box and tell us as much as you can about the inside.
- Use all of your individual senses and use your imagination.
- Each group member should draw what you think the inside of the box looks like.
- Compare your drawing to the drawings of the other group members, and come to a consensus.

INQUIRY BOX

- What does your pattern look like?

INQUIRY BOX

- After learning basic terminology for weathering (below) students could work on the deductive inquiry in the following activity.

Weathering: the break-down of rock due to exposure to the atmosphere.

Physical weathering: the breaking-down of rock without altering the chemical composition of the rock.

Chemical weathering: the break-down of rock by altering the chemical composition of the rock.
Rates of Weathering

After receiving teacher instruction...
- The 4 effervescent tablets represent rocks.
- The beaker and other materials can be used to recreate conditions in our environment that cause weathering.

Rates of Weathering
- Before each experimental trial, formulate a hypothesis for the results – will the conditions you impose on your rocks create a fast, moderate, or slow rate of weathering?
- Are the conditions physical, chemical, or both?

Rates of Weathering
- Find at least 3 ways that you can vary the rates of chemical weathering for your “rocks.”
- Groups should compare their trials and the results that they obtained in their experiments.
- Students will then apply their results to real-life conditions that change the rate of chemical weathering in nature.

Inductive Inquiry
- Concept or principle is "discovered" by the student

Deductive Inquiry
- Concept or principle is presented by the teacher

How can you evaluate inquiry learning?
- There are 3 main areas for evaluation when using inquiry methods:
  - Application of the Content
  - Formulation of the Question
  - Design of the Investigation

*See attached rubric sheet for more details.*
Take a few minutes to think of your own inquiry-based lesson plan.