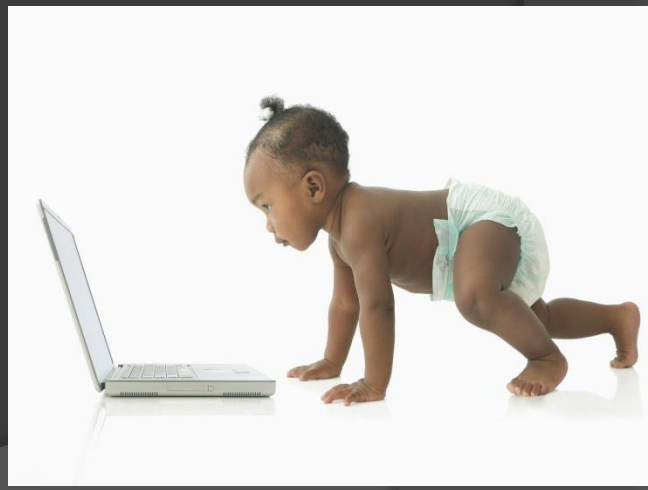
INQUIRY BASED LEARNING

Introduction:

- Old Adage: “Tell me, I forget; Show me, I remember; Involve me – I understand.
- Involvement in learning implies possessing skills and attitudes that permit you to seek resolutions to questions and issues while you construct new knowledge
- Babies begin the process of gathering information and data – HOW?
- Little children are always asking “why?”



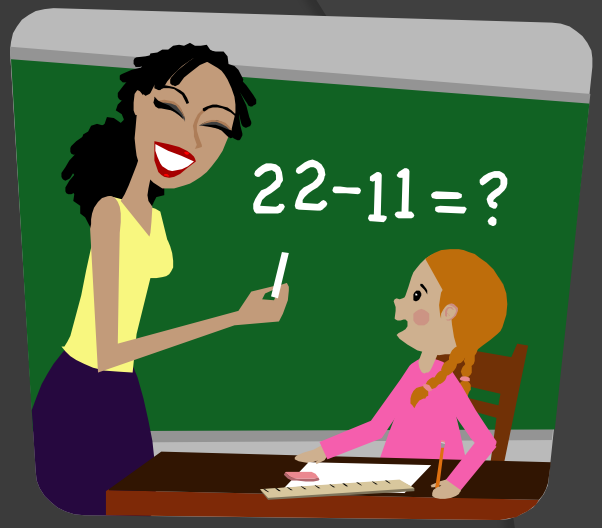
New Teachers – Survival Tools

- Dependence on Textbooks, worksheet activities
- 92% of new teachers use textbooks as basic teaching and reference tools
- Activities typically follow step-by step instructions
- Constantly struggle to guide students towards curriculum goals.

Risks New Teachers Face

- Confuse survival with teaching
- Present science as step-by-step, fill in the blanks
- Deprive students of ownership of their own investigations
- Terminate explorations prematurely

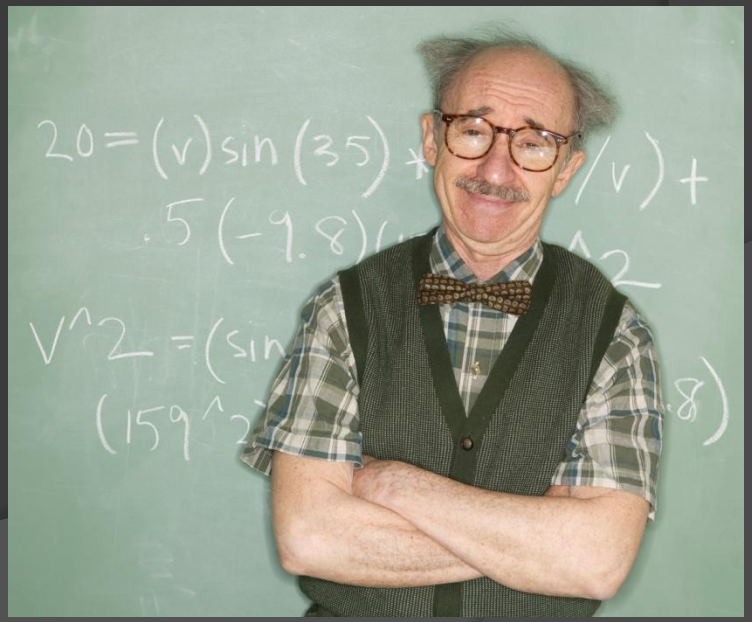
Context for Inquiry



- Traditional education discourages inquiry
- Effective inquiry is more than just asking questions
- Not so much seeking right answers but seeking appropriate resolutions to questions and issue

Traditional Classroom

- Learning focused on mastery of content
- Assessment focused on importance of one right answer
- More concerned with preparation for next grade (or next test!)
- Less focused on development of skills or inquiring students



Inquiry Classroom

- Develop information processing and problem-solving skills
- Student centered – Teacher facilitator
- More emphasis on “how we came to know,” less on “what we know”
- Assessment – progress of skills + content understanding
- Use resources beyond classroom/school
- Not just for laboratories or group work

Full Inquiry Model

1. **Discrepant events engage students in direct inquiry**
2. **Brainstorming activities facilitate planned investigations**
3. **Students provide a product of their research**
4. **Reflections through class discussion and writing/drawing activities**

Full Inquiry - Steps

1. Pose productive question
2. Design investigation toward answering question
3. Carry out investigation – gather data
4. Interpret and document findings
5. Publish or present findings in an open forum

Brainstorming

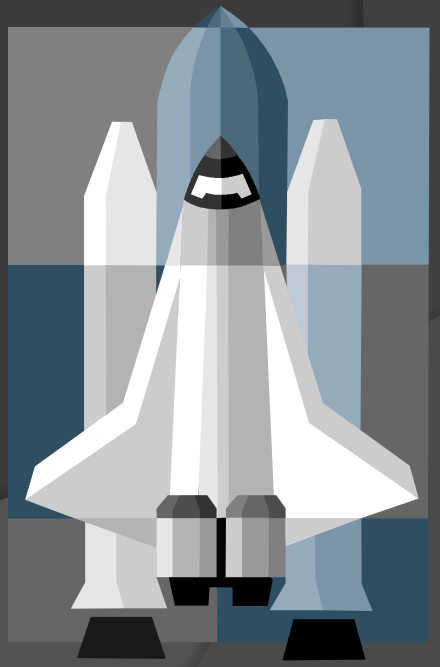
- Capitalizes on natural enthusiasm and creativity
- Must have structure that constrains and channels inquiry towards manageable task
- Facilitates students in choosing tasks and planning for investigation
- Provides whole group instruction to prepare students for inquiry
- Move from **“Can you think it?”** TO **“Can you do it?”**

Additional Questions

- Did the inquiry answer all of our questions?
- Did any one variable emerge as best?
- Did the inquiry raise any new questions?
- If you had it to do over, what would you do differently?
- How did this activity show that science is always subject to change?

Outcomes of Inquiry

- **Useful knowledge about the natural and human-designed world:**
- **1. How are these worlds organized**
- **2. How do they change?**
- **3. How do they interrelate?**
- **4. How do we communicate about, within, and across these worlds?**

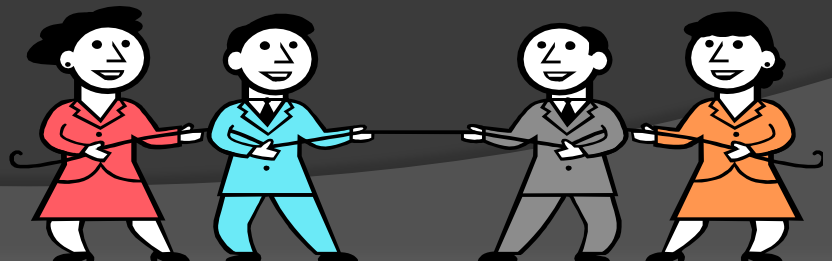


Variations of IBL

- **Future Problem Solving Approach**
- **Problem-based Learning**
- **Hands-on, Inquiry Based Learning**

TE vs. IBL - Differences

- **Traditional Education Classrooms:**
  - **Focuses more on Learning about Things**
  - **Focuses on thinking WHAT**
- **Inquiry Based Learning Classrooms:**
  - **Focuses more on Learning Things**
  - **Focuses more on thinking HOW**



What does this have to do with my Classroom?

Role of Teacher - IBL

- Reflects on the purpose and makes plans for inquiry learning
  - Plans for each learner to be actively involved
  - Encourages/Enables learner to take increasing responsibility for his learning
- Facilitates classroom learning
  - Accepts that teaching is a learning experience
  - Is constantly alert to learning obstacles
  - Asks key types of questions – Why?, How do you know?, What is the evidence?
  - **Student assessment made an ongoing part of the facilitation of the learning process**

Role of Students- IBL

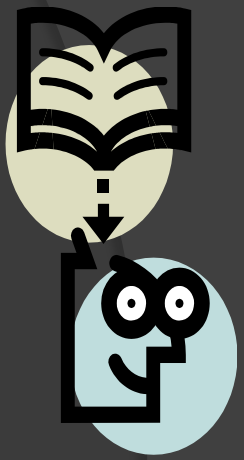
- Learners in the process of learning
- Accept an “Invitation to learn” and willingly engage in exploration process
- Raise questions, propose explanations, and use observations
- Plan and carry out learning activities
- Communicate using a variety of methods
- Critique their learning practice

IBL Nurtures Questions Reflections

- Questions like:
  - How do you know? What is the evidence? How did you arrive at that decision?
- In TE, the teacher is usually the questioner – asked to provoke feedback
- In IBL, the teacher asks questions that more open and reflective in nature
- This should encourage self-initiated questions from students

Types of Questions

- Inference Questions: Beyond immediate information
- Interpretation Questions: Understand the consequences of information or ideas
- Transfer Questions: Provoke new depth of thinking, take knowledge to new places
- Hypotheses Questions: What can be predicted and tested. Become aware of expectations



IBL Facilitates Reflective Learning

- Involves analysis of activity in whole group learning
- Supports students in reflective journal writing
- Directs students' attention to modest questions –
  - What is scientific exploration?
  - What is a controlled experiment?
  - How much confirmation does a hypothesis require before it is established?

Key Principles of IBL

1. All learning activities should focus on using information-processing skills
2. Inquiry learning puts the learner at the center of an active learning process
3. The role of the teacher becomes one of facilitating the learning process.
4. **What is valued is what is assessed.**

General Educational Concerns

- Modern world requires workers who can problem solve and think critically
- Young people must master new ways of acting and thinking
- IBL can turn information into useful knowledge – stresses skill development
- All subjects require information processing skills –more can be done to enhance connections among them