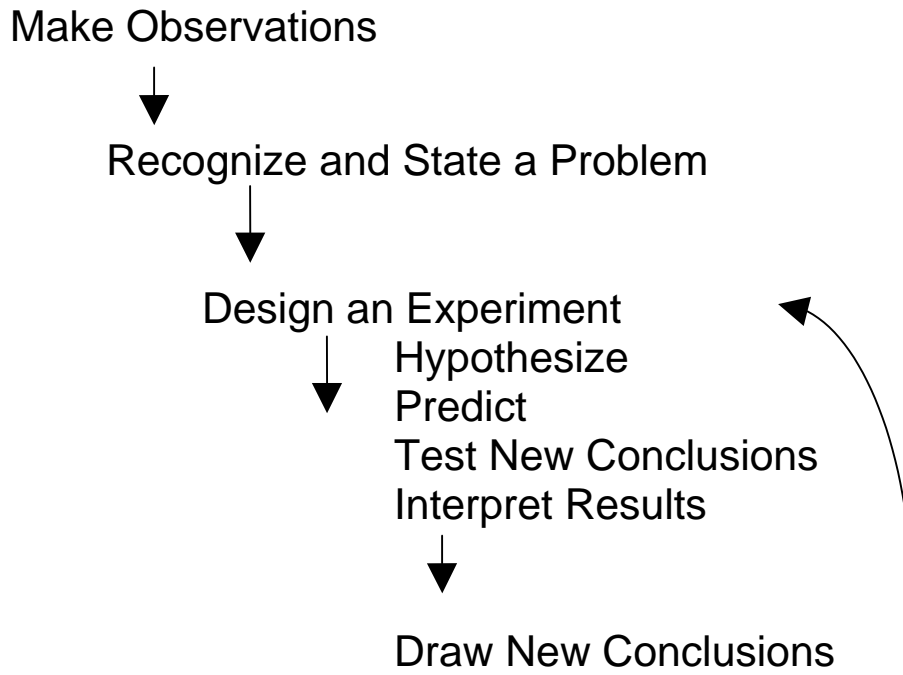


A MODEL OF SCIENTIFIC INQUIRY



SCIENCE PROCESS SKILLS

from *Science A Process Approach* (SAPA)

Basic Process Skills (introduced K-3)

- Observation
- Classifying
- Using space/time relationships
- Using numbers
- Communicating
- Measuring
- Predicting
- Inferring

Integrated Process Skills

- Formulating hypotheses
- Controlling variables
- Experimenting
- Defining operationally
- Formulating models
- Interpreting data



OUTCOMES OF INQUIRY-BASED SCIENCE EDUCATION

Children should:

- Believe that their observations have standing that can compete with the written word.
 - Be able to explain their understandings of ideas and defend them against alternatives.
 - Be able to translate an observation into useable data.
 - Be able to marshal data into predictions .
 - Modify individual concepts based on new data.
 - Identify gaps in their understanding and pose questions to fill them in.
 - Be disturbed by incongruent observations.
 - Be able to recognize patterns in data in order to limit observations.
 - Be able to recognize alternative explanations for observations.
 - Be able to pose effective questions and design fair tests to distinguish between alternatives.
 - Be able to persuade others that their observations, procedures, and explanations are valid.
 - Be able to determine which course of action—collecting data, thinking about data, formulating an explanation, or asking about a new question—should come next.
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- Schindel, D. (1991). Outcomes of inquiry-based science education. Paper presented at Elementary Science Integration Project Summer Workshop, June 27. Cited in Saul, W., Reardon, J., Schmidt, A., Pearce, C., Blackwood, D., and Bird, M. D. (1993). *Science workshop: A whole language approach*. Portsmouth, NH: Heinemann, p. 97.

