

Science Education for Public Understanding Program (SEPUP)

- Based at the Lawrence Hall of Science, University of California, Berkeley
- Funded by the National Science Foundation (NSF) since 1988
- Published and distributed by LAB-AIDS, Inc.

Workshop Goals

Participants Will...

- Understand the SEPUP Approach through a series of investigations from Force and Motion.
- Utilize the SEPUP Assessment System
- Recognize Literacy Strategies
- Become familiar with the components of the SEPUP curriculum

Workshop Goals

Participants Will...

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- Become familiar with the components of the SEPUP curriculum



The SEPUP Approach to Teaching and Learning

- Personal and societal issues to introduce science
- The role of scientific evidence and trade-offs in decision making
- Different approaches to hands-on inquiry
- Age-appropriate teaching strategies
- Spiraling of key concepts and skills over time



The SEPUP Approach to Teaching and Learning

- Assessments that are embedded in the curriculum
- The 4-2-1 approach to cooperative learning
- Curriculum designed using the best of research and practice
- Explicit connections to other disciplines, such as literacy, mathematics, and technology

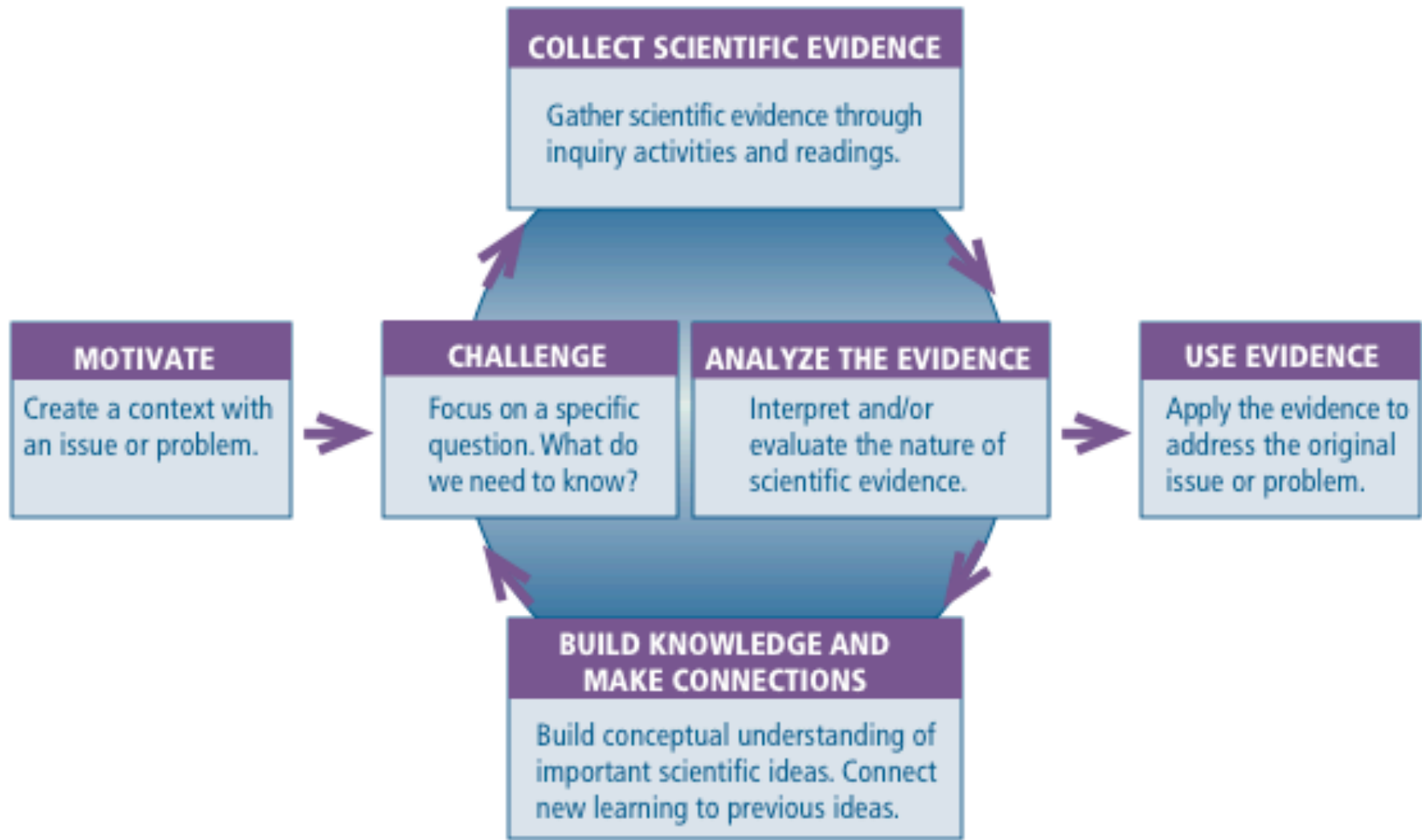
What is Issue-Oriented Science?

- *How can a motor vehicle be made safer?*
- *How can a family reduce their energy costs?*
- *What is the environmental impact of the life cycle of your computer?*

What is Issue-Oriented Science?

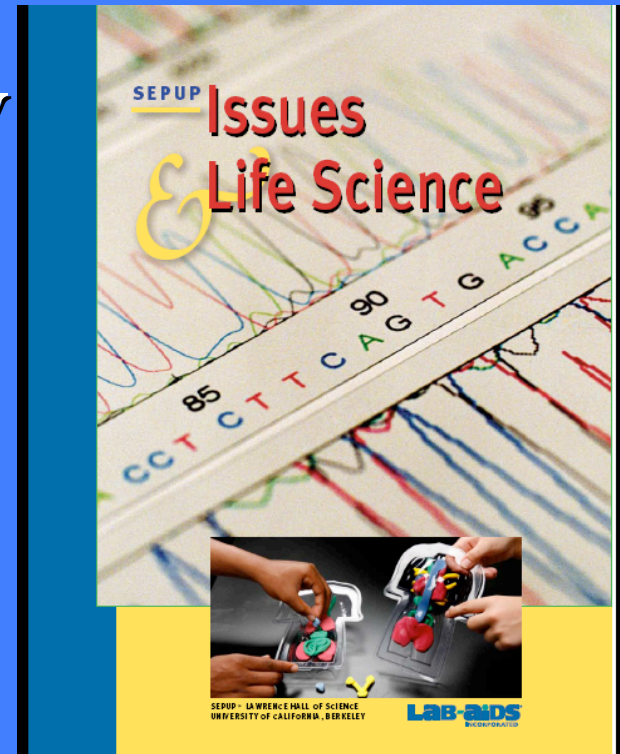
- *How do you decide what type (s) of medication, if any, to take when you are ill?*
- *How might you accidentally introduce a new species into a local ecosystem?*
- *What can you do to reduce the risk of catching an infectious disease?*

SEUPUP Learning Cycle

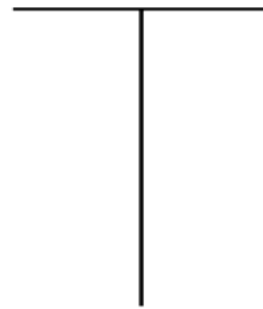
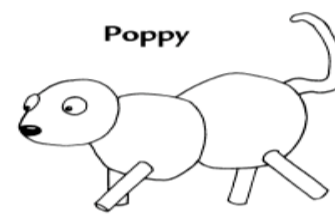
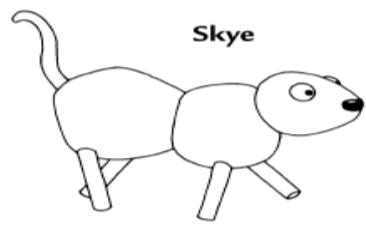


Issues and Life Science

- Experimental Design:
Studying People Scientifically
- Body Works
- Cell Biology & Disease
- Genetics
- Ecology
- Evolution
- Bioengineering



Critters Breed 1



Activity 65 – Breeding Critters

1. Model the diversity of offspring possible from two parents.
2. Discover patterns of inheritance other than strict dominant/recessive traits.

Synthesizing concepts & vocabulary

Content vocabulary in this activity:

Allele

Dominant

Characteristic

Gene

Chromosome

Recessive

Diversity

Trait

Breeding Critters

CHALLENGE: What are some patterns of inheritance other than the ones discovered by Mendel?

ASSESSMENT – Understanding Concepts (UC)

PROCEDURE – Generation Three Offspring

Given two pure breed grandparents, who produce all heterozygous offspring, what traits will appear in the third generation?

Model includes simulation of:

- *Co-Dominance
- *Incomplete Dominance
- *Environmental Effects on Inherited Traits
- *Sex Determination

Scoring Guide: Understanding Concepts (UC)

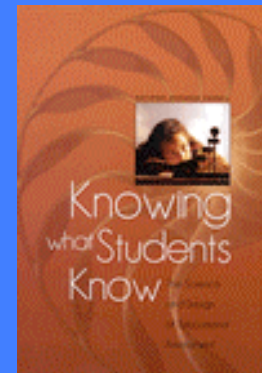
What to Look For

Response identifies and describes scientific concepts to a particular problem or issue.

Level 4 <i>Above and beyond</i>	Student accomplishes Level 3 AND goes beyond in significant way, such as <ul style="list-style-type: none">• using relevant information not provided in class to elaborate on your response.• using a diagram to clarify scientific concepts.• relating your response to other science concepts.
Level 3 <i>Complete and correct</i>	Student accurately and completely explains or uses relevant scientific concepts.
Level 2 <i>Almost there</i>	Student explains or uses scientific concepts BUT has some omissions or errors.
Level 1 <i>On your way</i>	Student incorrectly explains or uses scientific concepts.
Level 1	Student's response is missing, illegible, or irrelevant.
X	Student had no opportunity to respond.

The SEPUP Assessment System has been cited in numerous journal articles and publications, as an exemplary approach to assessing student learning.

**Knowing what Students Know*

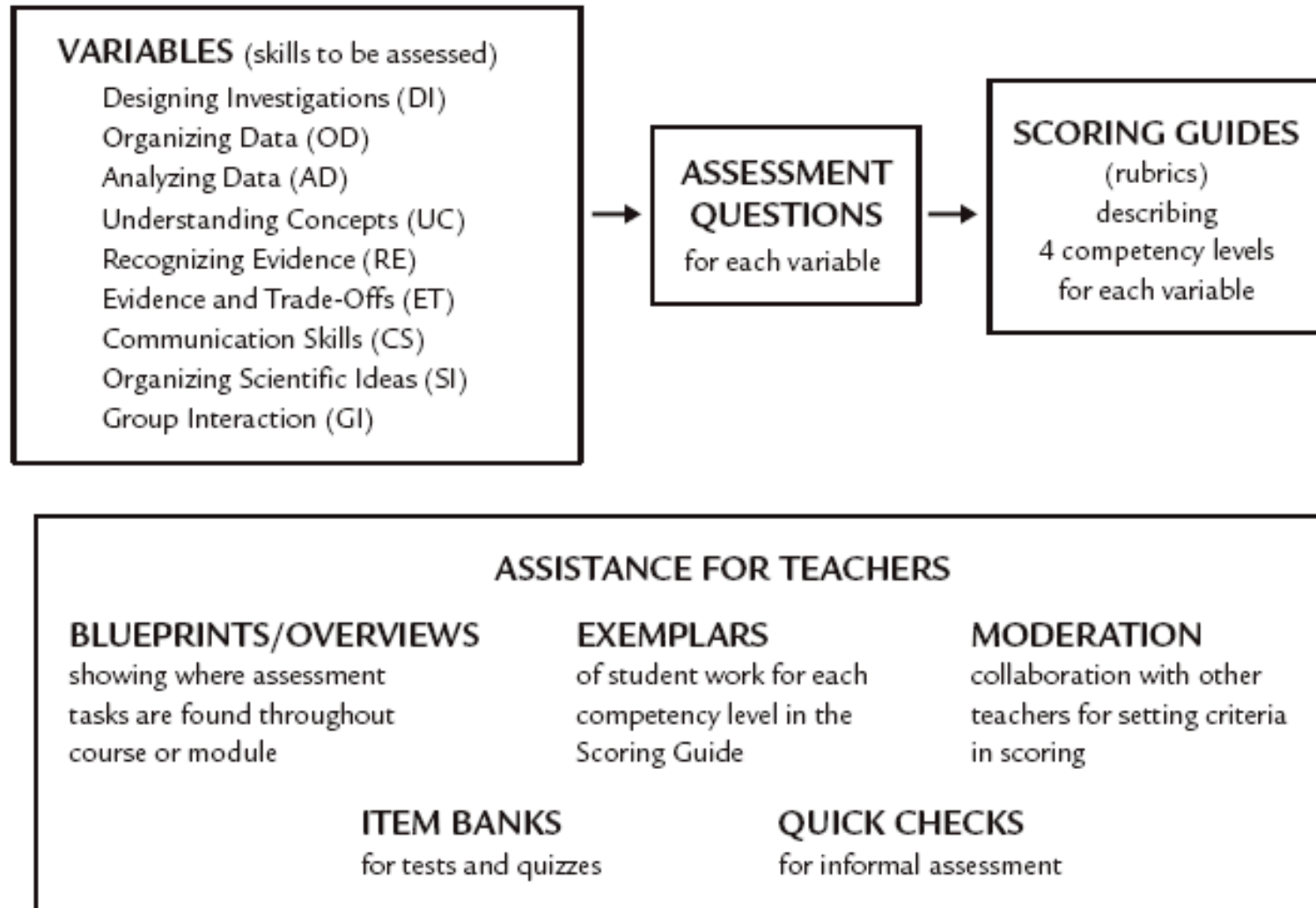


**Classroom Assessment and the National Science Education Standards*



(National Research Council, 2001)

COMPONENTS OF THE SEPUP ASSESSMENT SYSTEM



Literacy Strategies Embedded in SEPUP Core Curriculum

Literacy Category	Literacy Strategy
Supporting Reading Comprehension	<ul style="list-style-type: none">● Anticipation Guide● Directed Activities Related to Text (DART)● Listen, Stop, Write● Reading Scientific Procedures● Three-Level Reading Guide
Enhancing Student Writing	<ul style="list-style-type: none">● Keeping a Science Notebook● Writing a Formal Investigation Report● Writing Frame Writing Review● Research Project● Assessment: Communicating Scientific Information
Facilitating Group Discussion	<ul style="list-style-type: none">● Discussion Web● Intra-act● Oral Presentation● Walking Debate● Assessment: Group Interaction
Synthesizing Concepts and Vocabulary	<ul style="list-style-type: none">● Categorization Activity● Concept Map● KWL● Talking Drawing● Venn Diagrams

Strategies for Diverse Learners

	Strategy
Students with Learning Disabilities	<ul style="list-style-type: none">· Hands-on activities provide concrete experiences.· Optional student sheets provide step-by-step procedures for open-inquiry labs.· Literacy strategies support improvement of reading comprehension and writing skills.· Discussion strategies facilitate communication.· Scoring guides state clear assessment goals.
English-language Learners	<ul style="list-style-type: none">· Vocabulary is introduced with operational definitions that connect concepts to learning experiences.· 4-2-1 cooperative groupings encourage student interactions in an unthreatening environment.· Discussion strategies enhance speaking and listening skills.· Literacy strategies strengthen reading and writing skills.
Academically Gifted Students	<ul style="list-style-type: none">· Issues stimulate evaluation of problems in real-world contexts.· Lab activities encourage students to design complex investigations.· Scoring guides challenge students to demonstrate their depth of understanding.· Extension activities encourage in-depth inquiry into related topics.