Appendix: Blackline Masters

A. Introducing SEPUP

Scientific Literacy (from the National Science Education Standards)
Comparison of the SEPUP Goals and the NSES Goals
Elements of SEPUP Instructional Materials
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Curriculum Integration (2 masters)

B. SEPUP Instructional Materials

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C. SEPUP Workshops

Self-Evaluation Checklist for Workshop Leaders
Workshop Evaluation Form
SEPUP Sign-up Sheet
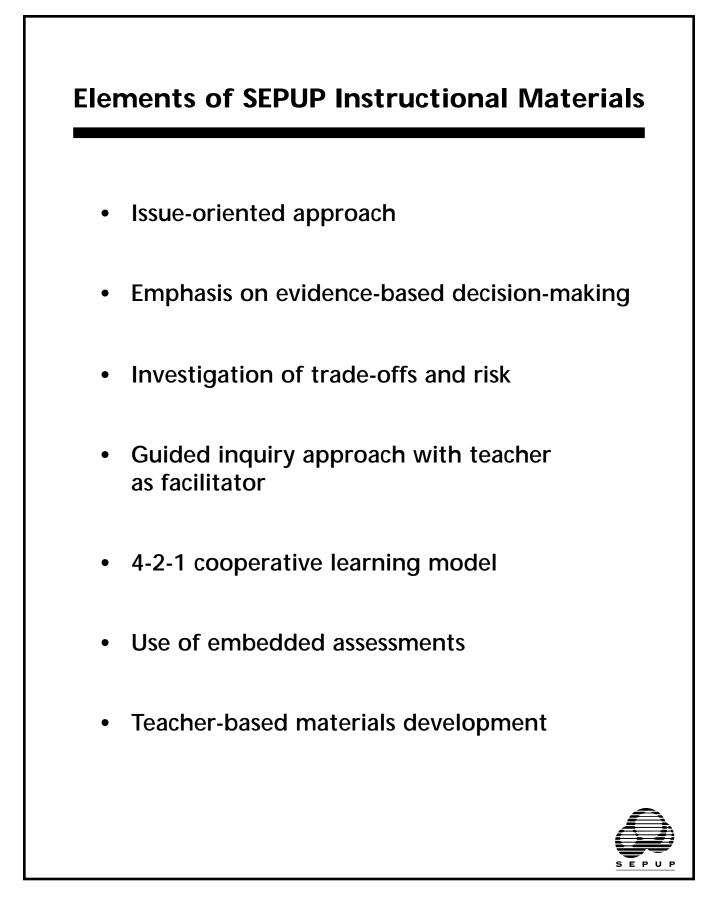Peer Coaching (4 masters)

A. Introducing SEPUP

In a world filled with the products of scientific inquiry, scientific literacy has become a necessity for everyone.

- Everyone needs to use scientific information to make choices that arise every day.

- Everyone needs to be able to engage intelligently in public discourse and debate about important issues that involve science and technology.

- Everyone deserves to share in the excitement and personal fulfillment that can come from understanding and learning about the natural world.

National Science Education Standards (NRC, 1996)

S E P U P

SEPUP Goals

- to provide educational experiences focusing on science and technology and their interaction with people and the environment;

- to promote the use of scientific principles, processes, and evidence in public decision-making;

- to contribute to improving the quality of science education in America; and

- to enhance the role of science teachers as educational leaders in their schools and communities.

SEPUP/CEPUP 1987

NSES Goals

Educate students to:

- experience the richness and excitement of knowing about and understanding the natural world;

- use appropriate scientific processes and principles in making personal decisions;

- engage intelligently in public discourse and debate about matters of scientific and technological concern;

- increase their economic productivity through the use of the knowledge, understanding, and skills of the scientifically literate person in their careers.

National Science Education Standards 1996

Elements of SEPUP Instructional Materials

- Issue-oriented approach

- Emphasis on evidence-based decision-making

- Investigation of trade-offs and risk

- Guided inquiry approach with teacher as facilitator

- 4-2-1 cooperative learning model

- Use of embedded assessments

- Teacher-based materials development

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Observation Checklist for Inquiry-based Science

Check areas where you have observed evidence in the classroom.

____ Science lessons are concept-driven and hands-on.

____ Students actively engage in science investigations.

____ Students engage in exploring self-generated inquiries.

____ Students manipulate science materials to investigate a scientific problem.

____ Teachers facilitate student understanding through divergent questioning strategies.

____ Teachers are responsive to student questions and comments.

____ Students discuss their understandings from scientific investigations using
    evidence as an explanation.

____ Students are encouraged to think critically and differentiate between
    observation and inference.

____ Students produce oral and written reports that present the results of their
    scientific inquiries.

____ Students work in cooperative learning groups.

____ Teacher taps into students' prior knowledge of science concepts to design and
    modify future instruction.

____ Teacher incorporates instructional strategies that are consistent with inquiry-
    based science.

____ Teacher uses instructional strategies to meet the varied needs and learning styles
    of students.

____ Teacher makes connections to real-world application.

____ Teacher uses assessment as a means to determine what is taught next.

____ Teacher uses a variety of assessment tools including performance and
    embedded strategies.

S E P U P

How to Integrate Using SEPUP Materials

➜ Conduct a SEPUP workshop for members of all academic departments.

➜ Have members of each department brainstorm activities that integrate science ideas from the activity with the subjects they teach.

➜ Activities should reflect the appropriate academic goals and objectives for each discipline.

➜ Departments can elect to do the integrated activities on days that have been designated as SEPUP integration days, coordinated with the SEPUP activity.

➜ Departments can save samples of the integrated activities students have produced and "publish" them in a SEPUP publication to be sent home to parents.

➜ Integrated activities can be displayed and experienced by parents at a School Community Night to showcase the SEPUP activities and the integrated student work produced in all subject areas.

Why Integrate With SEPUP?

Curriculum integration . . .

→ Makes learning relevant to all students.

→ Helps students become more involved and take responsibility for their learning.

→ Helps students understand connections between subject areas being taught.

→ Helps students understand that the processes of science need not be confined to science.

→ Helps students learn to use evidence as a powerful tool in other subject areas.

→ Helps meet the needs of ethnically diverse populations.

→ Helps level the playing field.

SEPUP
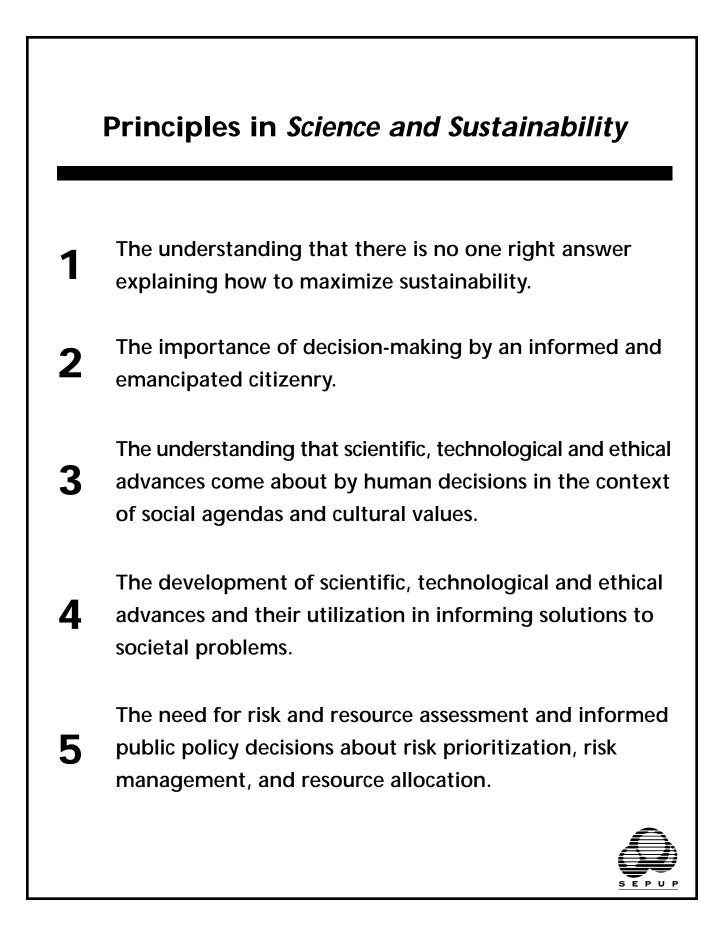
B. SEPUP Instructional Materials

Science and Sustainability

What is sustainable development?

"Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs."

From *Our Common Future*, A Report of the United Nations' World Commission on Environment and Development, 1990

SEPUP

Principles in *Science and Sustainability*

1 The understanding that there is no one right answer explaining how to maximize sustainability.

2 The importance of decision-making by an informed and emancipated citizenry.

3 The understanding that scientific, technological and ethical advances come about by human decisions in the context of social agendas and cultural values.

4 The development of scientific, technological and ethical advances and their utilization in informing solutions to societal problems.

5 The need for risk and resource assessment and informed public policy decisions about risk prioritization, risk management, and resource allocation.

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Science and Sustainability

1 Living On Earth

Sustainable Living

Survival Needs: Food

Survival Needs: Temperature

Energy Transfer

Designing an Insulated System

Living in Today's World

Modeling Human Population Growth

Population Dynamics

Changing Populations

Providing for the Population

2 Feeding the World

Food Production

Necessary Nutrients

Cell Structure and Function

Earth's Components

Classifying Elements

Photosynthesis

Plant Genetics and the Green Revolution

Breeding Improved Crops

Genetically Engineering Food

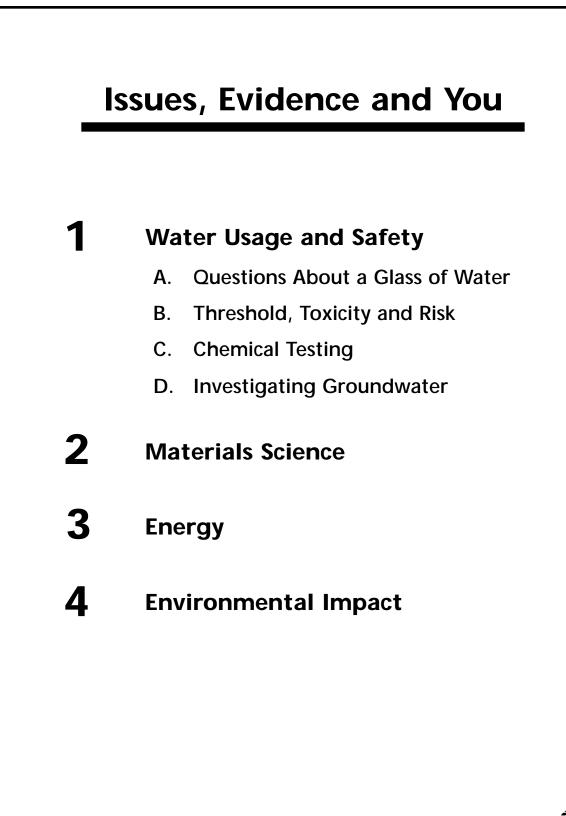The Role of Cloning in Food Production

3 Using Earth's Resources

Identifying and Separating Hydrocarbons

The Chemistry of Hydrocarbons

Clothing Materials

Materials Resources: Metals

By-Products of Materials Production

Catalysts, Enzymes and Reaction Rates

Breakdown!

Food Preservation

Refrigeration Technology

Economy of Material Use

4 Moving the World

Fueling Trade-offs

Fuel from Food

Exothermic and Endothermic Reactions

Energy From the Nucleus

Mechanical Energy

Trade-offs of Energy Use

Global Perspectives on Sustainability

Issues, Evidence and You

1   **Water Usage and Safety**

2   **Materials Science**

3   **Energy**

4   **Environmental Impact**

Grades 8–9

Science and Life Issues

Content

My Body and Me

Living Partnerships

Using Tools and Ideas

Process Skills

Scientific Thinking

Personal and Societal Decision-Making

Science and Technology as Professions

Science as a Predictive Activity

Themes

Maintaining One's Own Health

Investigating Living Organisms

Relationships Among Organisms

Evidence and Trade-offs in Decision-Making

Grades 6–8

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SEPUP Modules

Chemical Survey & Solutions and Pollution

Risk Comparison

Determining Threshold Limits

Investigating Groundwater: The Fruitvale Story

Toxic Waste: A Teaching Simulation

Plastics in Our Lives

Investigating Chemical Processes: Your Island Factory

Chemicals in Foods: Additives

The Waste Hierarchy: Where is "Away"?

Investigating Hazardous Materials

Household Chemicals

Understanding Environmental Health Risks
                            (for use in high school)

Grades 6–9

CHEM-2
(Chemicals, Environment, Health and Me)

Everyday Chemicals

Build a Community

Sound

Energy to Go!

CHEM Chronicle

The Inside Story

My Sweet Tooth

Mystery Spill

Hazardous Home

Trash or Cash?

What is a Threshold?

Smoking and My Health

Carbon Dioxide and Me

Pharmacology

Good to the Last Drop

Grades 4–6

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Highlights of CHEM Program

1   Chemicals, Health, and the Environment linked to Me.

2   Activities model how a scientist works. Science is dynamic—not static.

- Do activity
- Collect data
- Interpret data
- Make decisions

3   Personal decisions made are based upon data collected. Decisions are made first on personal level and then on a societal level.

4   Students are empowered to make decisions about smoking, food additives, chemicals …

5   Evidence is used to understand individual likenesses and differences (What is a threshold?).

6   Process is the focus rather than the "right" answer. Students learn to think using evidence to support ideas.

7   Integration across all subject areas ensures relevance for all students.

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CHEM-2 Facts

➜ CHEM-2 is designed for fourth- through sixth-grade students

➜ Each CHEM-2 unit consists of two or three activities that focus on a single concept

➜ CHEM-2 uses societal issue-oriented science materials

➜ Units in CHEM-2 relate easily to local and state expectations for the science program

➜ Each CHEM-2 unit uses commonly available household and classroom supplies

➜ Emphasis in CHEM-2 is placed on direct experience by the learner

➜ CHEM-2 was developed and tested by classroom teachers and SEPUP staff

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C. SEPUP Workshops

Self-Evaluation Checklist for Workshop Leaders

Organization

____ Identifies and clearly states workshop goals and objectives

____ Plans in advance but deviates from agenda when appropriate

____ Timing and sequence of tasks is appropriate

____ Uses a variety of instructional strategies

____ Transitions between activities are effective

____ Maintains appropriate pace or tempo

____ Logistics well thought out in advance, alternates ready if needed (Plan "B")

____ Instructions are clear and well understood

____ Closure statements or strategies used effectively

____ Follows up as needed

Discussion Skills

____ Presenter is honest, accepting, and supportive of participants' comments

____ Maintains a neutral position that encourages discussion

____ Presenter does not dominate discussion, allowing participants to clearly express their views

____ Allows sufficient "wait time"

____ Relates relevant personal experiences

____ Restates, summarizes, or paraphrases participants' comments to clarify

____ Responds to comments in a positive manner, indicating respect for participants

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Self-Evaluation Checklist (continued)

Personal attributes

____ Establishes personal trust and credibility with participants

____ Self-assured and self-confident

____ Speaks in a calm, deliberate manner

____ Displays enthusiasm for task

____ Able to motivate and interest others

____ Patience and openness

____ Appropriate content knowledge

____ Displays respect for participants

____ Uses humor appropriately

____ Perspective-taking or ability to understand viewpoints of others

Workshop Evaluation Form

Please take a few moments to complete this evaluation form. Your feedback will help us evaluate this workshop and the SEPUP materials. Thank you!

Workshop location _____ Date _____

Your job title *(e.g., fifth-grade teacher, science consultant)* _____

How did you first hear about SEPUP?

Please respond to the following statements.

1. The workshop was well organized and ran smoothly.

1	2	3	4	5
strongly agree	agree	uncertain	disagree	strongly disagree

2. The workshop objectives were well defined and appropriate.

1	2	3	4	5
strongly agree	agree	uncertain	disagree	strongly disagree

3. The pacing of topics was appropriate.

1	2	3	4	5
strongly agree	agree	uncertain	disagree	strongly disagree

4. Sufficient time was allowed for discussion and comments from participants.

1	2	3	4	5
strongly agree	agree	uncertain	disagree	strongly disagree

5. I feel that this workshop adequately prepared me to use SEPUP with my students.

1	2	3	4	5
strongly agree	agree	uncertain	disagree	strongly disagree

Workshop Evaluation Form (continued)

6. I plan to share information about SEPUP with my colleagues.

1	2	3	4	5
definitely	probably	uncertain	probably not	definitely not

7. I plan to use SEPUP materials with students *this* year.

1	2	3	4	5
definitely	probably	uncertain	probably not	definitely not

If your answer is 3, 4, or 5, please explain.

8. I plan to use SEPUP materials with students *next* year.

1	2	3	4	5
definitely	probably	uncertain	probably not	definitely not

If your answer is 3, 4, or 5, please explain.

9. Please give an overall rating of this workshop as compared with all others you have attended.

1	2	3	4	5
much better	better	about the same	worse	much worse

10. Please rate the usefulness of the SEPUP materials.

1	2	3	4	5
very useful	useful	somewhat useful	marginally useful	not useful

Additional Comments:

Thank you for your comments. Please follow the workshop leader's directions for returning this form.

Reflection and Dialogue

The value of dialogue and reflection between professionals is sometimes overlooked in the school environment. There seems to be a greater preoccupation with the more practical aspects of teaching. Yet it is taking the time for reflection and dialogue that gives us the potential to gain valuable insight into our teaching. After you have observed your colleague teaching a science lesson, the following questions may help further the dialogue for both of you.

Questions to Promote Reflection and Dialogue

➡   Can you talk more about that?

➡   Why do you think that happened?

➡   What evidence do you have about that?

➡   What do you need?

➡   What have you tried before?

➡   Why did/didn't it work?

➡   What if it happened this way?

➡   How else can you approach that?

➡   What do you want to happen?

➡   How might you do that better?

Key Skills in Peer Coaching

➜ Interpersonal ease: Relate simply and directly to others.

➜ Group functioning: Understand group dynamics and be able to facilitate teamwork.

➜ Knowledge content: Know your subject matter and the program well.

➜ Administrative/organizational skills: Define and structure work, activities, and time.

➜ Initiative-taking: Start activities, moving directly toward action.

➜ Trust/rapport-building: Develop a sense of safety and openness, and strive to build good relationships with your colleagues.

➜ Support: Provide nurturing, positive, and effective relationships.

➜ Collaboration: Create relationships where influence is mutually shared.

➜ Confidence-building: Strengthen your colleagues' sense of confidence and belief in themselves.

➜ Diagnosing individuals: Form a valid picture of the needs/problems of each individual and plan some direct help.

➜ Diagnosing organizations: Form a valid picture of the setting that you and your colleagues work in and provide realistic input as a basis for action.

➜ Managing: Orchestrate the improvement process; coordinate activities, time, and people.

➜ Demonstration: Model new behaviors in your teaching and with peers.

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Peer Coaching Self-Reflection

After a peer coaching session, it is a good idea to reflect upon what has taken place. The following form may be useful to you in reflecting upon a coaching session. It is suggested that both the coach and the person being coached use this form for personal reflection.

Name _____ Date _____

Partner's Name _____

Record the following after your peer coaching session:

1. What we did:

2. What I learned:

3. Plans for next time:

4. Questions/comments:

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How are you doing as a peer coach?

As a peer coach, it is essential that you continually assess the skills you use in relating to other teachers. Below is a checklist to help you monitor your behavior. It is a good idea to date and keep each checklist so that you can monitor your progress over time.

(N = never, S = sometimes, F = frequently, A = always)	✓	N	S	F	A
I accept the teacher as a unique individual.		❑	❑	❑	❑
I help the teacher feel comfortable teaching SEPUP and issue-oriented science.		❑	❑	❑	❑
I show confidence in the teacher.		❑	❑	❑	❑
I let the teacher know I care about him or her.		❑	❑	❑	❑
I make the teacher feel he or she has something to contribute.		❑	❑	❑	❑
I sense that the teacher is comfortable bringing problems to me.		❑	❑	❑	❑
I let the teacher express his or her feelings and ideas.		❑	❑	❑	❑
I live up to agreements we have made.		❑	❑	❑	❑
I hold inviolate confidential information about the teacher.		❑	❑	❑	❑
I provide him or her with resources for developing constructive ideas.		❑	❑	❑	❑
I offer constructive feedback based on observational data.		❑	❑	❑	❑

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How are you doing as a peer coach? (continued)

(N = never, S = sometimes, F = frequently, A = always)	✓	N	S	F	A
I respectfully and actively listen to and consider his/her point of view.		❒	❒	❒	❒
I continually seek to improve my ability to assess others in a just and impartial way.		❒	❒	❒	❒
I refrain from negative comments and making misinformed judgments about others.		❒	❒	❒	❒
I treat the teacher without prejudice.		❒	❒	❒	❒
I continually seek to improve my professional and interpersonal skills.		❒	❒	❒	❒
I model self-reflection.		❒	❒	❒	❒
I nurture the teacher's self-reflection.		❒	❒	❒	❒
I volunteer my special skills.		❒	❒	❒	❒
I am proud of my profession.		❒	❒	❒	❒
I evaluate the attitudes and activities of the new teacher with an open mind.		❒	❒	❒	❒
I encourage personal and professional growth of this teacher.		❒	❒	❒	❒
I am kind and understanding.		❒	❒	❒	❒

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