The SEPUP Approach To Teaching and Learning

SEPUP (Science Education for Public Understanding Program) is a science education project developed primarily by former and current classroom science teachers at the Lawrence Hall of Science at the University of California at Berkeley.

SEPUP develops instructional materials and approaches to support classroom science education. SEPUP’s approach to science education is an instructional model that integrates scientific inquiry with a thematic approach for teaching science in the context of personal and social issues. The phases of the model are illustrated in the diagram. In all of its curriculum materials, SEPUP incorporates:

1. Personal and societal issues to introduce science
   An issue-oriented approach engages students in learning science and helps students understand the everyday relevance of scientific concepts.

2. The role of scientific evidence and tradeoffs in decision-making
   The purpose of issues in SEPUP is not limited to engaging students in science. As students evaluate issues, they consider the types of evidence required to make an informed decision. Students learn how scientific ideas and processes can provide evidence and are expected to apply their knowledge of scientific evidence to their decision-making.

3. Different approaches to hands-on inquiry
   SEPUP supports student inquiry by providing numerous opportunities for hands-on investigations. The instructional activities follow an inquiry continuum, from more guided to more open-ended. Guided inquiry introduces students to important ideas and gives students a model for scientific approaches. More open-ended-inquiry experiences encourage students to develop their ability to ask and investigate questions, to understand how to apply science to new problems, and to think critically about scientific evidence.

4. Age-appropriate teaching strategies
   Using different strategies, such as simulations, projects, analysis of data, and physical and computer models stimulates students to improve laboratory, research, reading, and writing skills. It also provides increased learning opportunities for students with different learning styles.

5. Spiraling of key concepts and skills over time
   SEPUP utilizes a learning-cycle approach in which concepts and skills spiral throughout the curriculum. Key concepts and vocabulary introduced in one activity are used repeatedly in later activities, enhancing student understanding and retention.

6. Assessments that are embedded in the curriculum
   SEPUP materials provide both a well constructed multiple choice item bank and a research-based assessment system developed in cooperation with the University of California Graduate School of Education.

7. The 4-2-1 approach to cooperative learning
   SEPUP’s approach to cooperative learning ensures individual learning while maximizing the benefits of group interaction. The “4-2-1” refers to how responsibilities are shared:
   - A group of four students share certain lab materials, such as bottles of chemicals. This sharing facilitates interactions within the group.
   - Each pair of students within a group of four performs the procedure.
   - Each student is expected to have access to a copy of the student book/pages. Students keep individual records of data, observations, and written responses.

8. SEPUP designs curriculum using the best of research and practice
   SEPUP first identifies research-based techniques that can help students learn. These techniques are integrated into the development of the curriculum, which is then trial-tested by classroom teachers and their students. Only after addressing the input of teachers, scientists, and other experts are the materials commercially published.

9. Explicit connections to other disciplines, such as technology and literacy
   SEPUP materials provide students with opportunities to learn science utilizing relevant history, technology, mathematics, and language.