Research cannot and does not identify the right or best way to teach, nor does it suggest certain instructional practices should always or should never be used. But research can...
Analogies
Using analogies in the teaching of science results in the development of conceptual understandings by enabling the learner to compare something familiar with something unfamiliar.

Collaborative communication of scientific ideas
Providing opportunities for students to discuss, debate, and defend conclusions, explanations and ideas enhances their conceptual understanding.

Collaborative learning
Using collaborative learning for classroom and laboratory instruction improves student achievement, attitudes, and on-task behavior.

Concept mapping
The use of student-generated and teacher-generated concept maps for teaching science concepts results in improved student achievement and more positive student attitudes.

Conceptual understanding in problem solving
Understanding concepts qualitatively enables students to solve quantitative problems in biology, physics, and chemistry more effectively.

Inquiry-based instructional strategies
Using inquiry-based instruction and open-ended investigations helps students develop understanding of scientific concepts.

Making science relevant
Relating science to modern technology and societal issues results in an increase in the number of students taking additional science courses and advanced-level courses, as well as a change in students' attitudes toward science and their understanding of the nature of science.

Real-life situations
Using real-life situations in science instruction through the use of technology or actual observation increases student interest in science, problem-solving skills, and achievement.

Simulations
Using models, labs and computer simulations to represent real-world situations enables students to become more reflective problem-solvers and to increase their conceptual understanding.

Unexpected events
Using unexpected events in science instruction results in cognitive conflict that enhances students' conceptual understanding as well as their attitudes toward critical-thinking activities.

SCIENCE Qualities of Best Practices

• Incorporates inquiry both as instructional strategy and as a skill to be learned
• Focuses the curriculum on state standards, benchmarks and vertically aligned “power” outcomes
• Connects science to other school subjects
• Focuses on understanding, not acquisition of information
• Includes opportunities for science discussion and debate
• Provides activities that investigate and analyze science questions over extended periods of time
• Applies results of experiments to scientific arguments and explanations