
SUMMARY OF THE 10 ESSENTIAL SCIENCE IMPROVEMENT RECOMMENDATIONS

1. Identify what pre-conceptions and misperceptions students bring with them into the classroom about the nature of the scientific world around them.	An important instructional value in successful science instruction is the ability to determine the misconceptions and assumptions that students carry with them into the classroom lesson. These assumptions are very difficult to determine. They are even more difficult to “undo”.
2. Be clear about the science topics that Colorado students are expected to know at each grade level.	The Assessment Frameworks are the elements of the state standards that are the exclusive science topics, which make up the state test questions. One of the most apparent differences between classrooms, which have stronger student science performance, and those classrooms that have low student science performance is teacher and student knowledge of these science elements.
3. Build a focused and intentional district curriculum of concepts, knowledge and skills to avoid a shallow and excessively broad span of topics each year.	Students in other countries study science in greater depth. The United States science curricula is often numerous in topics and thin about the meaningfulness of principles.
4. Guarantee that all students, each year, are deeply engaged in rigorous and developmentally appropriate life, physical and earth/space science instruction.	Robust national and state science instruction is tempered by both tepid elementary school teacher’s beliefs and minimum comfort in the field of science and a concurrent belief in many communities that science is not for all students.
5. Be clear about what specific proficient student work looks like in science at each grade level.	The degree to which students can demonstrate what they know is very often underestimated. Do you know what work that is typical of a partially proficient scoring student looks like at each grade level? Half of the reported grades given in Colorado classrooms are far more generous than what the state assessment considers grade level work.
6. Insist on a balance of explicit teacher-directed science instruction and teacher-guided student inquiry into science	Science is about discovering and uncovering the natural world around us. Science instruction research, however, demonstrates the importance of having students end their exploring with a certainty about the conclusions teachers intend students to have at the end.
7. Diagnose what your students understand about the lesson of the day with lab based activities, writing tasks and proofs	The chief characteristic of a great science teacher includes asking students the best questions.
8. Check school and teacher beliefs and dispositions about how many students can or should know science.	Teaching a science lesson in order to cover the topic was once the job description. Teaching a science lesson with the requirement all students become engaged and proficient in the concepts makes for an entirely different science lesson. Teachers with a productive disposition help students to see science as sensible, useful and doable.
9. Recruit and develop teachers with knowledge of science concepts, learning and instruction.	Many elementary and middle school teachers do not feel they have sufficient understanding of the science they teach. While knowledge of science is a critical factor in teaching science, it is not sufficient to guarantee effective instruction.
10. Ensure that other subject areas are reinforced and used in science instruction.	Mathematics is the language of science. Science research is dependent on reading skills. Proficient writing skills are necessary to convey scientific findings.. Science is a critical culminating focus for all the core subjects.