

How to Use Alaska Science Standards, GLE's and STEP Resources

Alaska's science content standards were developed in 1993 as broad statements of what K-12 students should know and be able to do. They were later revised and updated, and Science Performance Standards/ Grade Level Expectations for students in grades 3-11 were added to fulfill requirements of the No Child Left Behind Act of 2001 (NCLB).

A complete copy of Alaska's Science Content Standards and Science Performance Standards/Grade Level Expectations is included (on page _____, at the back of the binder?)

The seven content standards for Science are:

A: Science as Inquiry and Process

A student should understand and be able to apply the processes and applications of scientific inquiry.

B: Concepts of Physical Science

A student should understand and be able to apply the concepts, models, theories, universal principles, and facts that explain the physical world.

C: Concepts of Life Science

A student should understand and be able to apply the concepts, models, theories, facts, evidence, systems, and processes of life science.

D: Concepts of Earth Science

A student should understand and be able to apply the concepts, processes, theories, models, evidence, and systems of earth and space sciences.

E. Science and Technology

A student should understand the relationships among science, technology, and society.

F: Cultural, Social, Personal Perspectives and Science

A student should understand the dynamic relationships among scientific, cultural, social, and personal perspectives.

G: History and Nature of Science

A student should understand the history and nature of science.

(I think this part might look nice in a "box" or some other kind of graphic where it's visible but doesn't interrupt the flow of the text)

While the standards are broad statements applying to a students' overall education, the Performance Standards/Grade Level Expectations (GLEs) are specific statements that further define the content standards. They articulate what all students should know and be able to do at the end of each given grade level.

The GLEs have two purposes. First, they were intended to provide a road map for the development of test items for the state's Standards Based Assessment (SBA) in science that is required for students in grades 4, 8, and 10. Secondly, they are used by school districts to align and develop curricula.

The GLEs indicate core content to be mastered by the end of a given grade; they are not intended to represent the entire curriculum. Content can and should be added and enriched as appropriate for a district program, school, or student. It may be necessary to introduce some skills at an earlier grade in order for students to achieve mastery at a given level. Similarly, skills will need to be maintained after mastery has occurred at a given grade level.

The SCAN (Science Curriculum Alignment Network) resources have been designed in alignment with Alaska's science standards and GLEs. If the resources are used as designed, students should have the opportunity to learn ALL of the core content specified by the GLEs for science as they progress from Kindergarten through Grade 12.

It's important to note that the SCAN framework was developed using "grade bands" rather than single grades, to define a scope and sequence for learning science. The Physical Science, Life Science, and Earth Science standards (B,C,D) have each been split up into three parts, so that it will take students 3 years to cover all of the content. Thus, a fifth grade student (for example) will not be presented with content aligned to ALL of the fifth grade GLEs during his or her fifth grade year, but will have in-depth instruction for about one third of those GLEs that year. During the three years preceding the end of the fifth grade, however, all of the content for the 3rd-5th grade GLEs will have been covered for that student.

While there are many advantages to three-year, spiraling nature of the SCAN curriculum framework, one disadvantage is that students who are required to take the SBAs at 4th or at 10th grade may not have encountered all of the content they will need for the tests. For example, a fourth grade student may have studied the Life Science concepts related to Adaptations in third grade, and the concepts related to Biodiversity in fourth grade, and be slated to study the concept of Interdependence in fifth grade, after they have taken the test. Although they will have studied Interdependence during the second grade, they may not have been ready yet at that point to grasp the tested concepts at a sufficiently sophisticated level. Teachers may wish to provide some additional targeted instruction and review prior to the tests for students in that situation.

As is customary in multi-graded classrooms, teachers will need to differentiate for students within their grade band. While students across many grades can participate together in science projects, field trips, and other science experiences, it is not generally recommended that students participate in SCAN lessons outside of their own grade band. The lessons are designed so that students can master the concepts at the appropriate level, and build on those when they get to the next level. Scheduling should allow for separate instruction at the K-2, 3-5, 6-8, and 9-12 levels, rather than teaching students in wide-ranging elementary and secondary groups.

It is recommended that elementary students have science instruction at least 2 or 3 days per week, and that secondary students study science daily. The SCAN resources include an average of 25-30 lessons per grade band per year. Most lessons can be accomplished in one class period, with some exceptions at the upper grade levels. Thus, there should be plenty of time allocated for science instruction beyond the time it takes to complete the SCAN lessons. That time can be used for community-based projects, science fair projects, review, additional instruction to help students grasp the concepts, field trips, and more in-depth study in areas that interest the students. Students may also do additional activities to hone their literacy and math skills as they apply those skills to science.

At the beginning of each strand, for each grade band, the SCAN resource describes in detail the relevant concepts that students are expected to master. Selected Benchmarks from the American Association for the Advancement of Science's *Benchmarks for Science Literacy* are also listed. Published in 1993 as part of AAAS' Project 2061, the *Benchmarks for Science Literacy* makes recommendations about what students should know and be able to do at each grade level. It is based on three years of work with the input of over 1300 teachers, scientists, and consultants. Assessment items related to those concepts are included so that teachers can be sure they are addressing the appropriate content if and when they substitute their other lessons for any of those included in SCAN.

As with any curriculum resource, SCAN is not exhaustive and is not perfect for all situations. It is the hope of the developers that districts using SCAN will continue to add to and refine the resource for

their own purposes, and will provide ongoing support and professional development in the pursuit of exemplary science instruction for their students.