

TEACHER'S GUIDE

SCIENCE LAB 4th Grade Diagnostic

(Criterion-Referenced, Objective-Based Exam)

Objective	# Out of:
Nature of Science	1
Life Science	4
Physical Science	9
Earth Science	5
TOTAL	20

Diagnostic Exam:

*Grade 4 Criterion-Referenced Response Items
Understanding Elementary Science Assessment
The Charles A. Dana Center (University of Texas at Austin)*

Use of Diagnostics

- Diagnose student academic level at the beginning of the year.
- Track student progress for each objective covered and unit taught.
- Measure end of year gains through final mastery exam.

Diagnostic Administration

- The diagnostic should be able to be given within a science lab period. The diagnostic should not take longer than 45 minutes to complete.
- Make sure that the students completely bubble in their answer choice on their exam and on the scantron sheet as well.
- Remember to remind a student to do the best he or she can while not answering the questions he or she does NOT know. Remind the student NOT to guess.

Texas Essential Knowledge & Skills 4th Grade Science

(1) Scientific processes. The student conducts field and laboratory investigations following home and school safety procedures and environmentally appropriate and ethical practices. The student is expected to:

(A) demonstrate safe practices during field and laboratory investigations; and

(B) make wise choices in the use and conservation of resources and the disposal or recycling of materials.

(2) Scientific processes. The student uses scientific inquiry methods during field and laboratory investigations. The student is expected to:

(A) plan and implement descriptive investigations including asking well-defined questions, formulating testable hypotheses, and selecting and using equipment and technology;

(B) collect information by observing and measuring;

(C) analyze and interpret information to construct reasonable explanations from direct and indirect evidence;

(D) communicate valid conclusions; and

(E) construct simple graphs, tables, maps, and charts to organize, examine, and evaluate information.

(3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to:

(A) analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information;

(B) draw inferences based on information related to promotional materials for products and services;

(C) represent the natural world using models and identify their limitations;

(D) evaluate the impact of research on scientific thought, society, and the environment; and

(E) connect Grade 4 science concepts with the history of science and contributions of scientists.

(4) Scientific processes. The student knows how to use a variety of tools and methods to conduct science inquiry. The student is expected to:

(A) collect and analyze information using tools including calculators, safety goggles, microscopes, cameras, sound recorders, computers, hand lenses, rulers, thermometers, meter sticks, timing devices, balances, and compasses; and

(B) demonstrate that repeated investigations may increase the reliability of results.

(5) Science concepts. The student knows that complex systems may not work if some parts are removed. The student is expected to:

(A) identify and describe the roles of some organisms in living systems such as plants in a schoolyard, and parts in nonliving systems such as a light bulb in a circuit; and

(B) predict and draw conclusions about what happens when part of a system is removed.

(6) Science concepts. The student knows that change can create recognizable patterns. The student is expected to:

(A) identify patterns of change such as in weather, metamorphosis, and objects in the sky;

(B) illustrate that certain characteristics of an object can remain constant even when the object is rotated like a spinning top, translated like a skater moving in a straight line, or reflected on a smooth surface; and

(C) use reflections to verify that a natural object has symmetry.

(7) Science concepts. The student knows that matter has physical properties. The student is expected to:

(A) observe and record changes in the states of matter caused by the addition or reduction of heat; and

(B) conduct tests, compare data, and draw conclusions about physical properties of matter including states of matter, conduction, density, and buoyancy.

(8) Science concepts. The student knows that adaptations may increase the survival of members of a species. The student is expected to:

(A) identify characteristics that allow members within a species to survive and reproduce;

(B) compare adaptive characteristics of various species; and

(C) identify the kinds of species that lived in the past and compare them to existing species.

(9) Science concepts. The student knows that many likenesses between offspring and parents are inherited or learned. The student is expected to:

(A) distinguish between inherited traits and learned characteristics; and

(B) identify and provide examples of inherited traits and learned characteristics.

(10) Science concepts. The student knows that certain past events affect present and future events. The student is expected to:

(A) identify and observe effects of events that require time for changes to be noticeable including growth, erosion, dissolving, weathering, and flow; and

(B) draw conclusions about "what happened before" using fossils or charts and tables.

(11) Science concepts. The student knows that the natural world includes earth materials and objects in the sky. The student is expected to:

- (A) test properties of soils including texture, capacity to retain water, and ability to support life;
- (B) summarize the effects of the oceans on land; and
- (C) identify the Sun as the major source of energy for the Earth and understand its role in the growth of plants, in the creation of winds, and in the water cycle.

