Key Concepts and Learning Standards

Too Small to See introduces fundamental concepts in nanoscale science and engineering, focusing on the processes by which materials are manipulated on the molecular scale to generate very small structures and devices. The exhibition and accompanying educational materials are designed for families and school groups with children ages 8-13.

Key Concepts

- All things are made of atoms.
- Atoms bond together and form molecules.
- Atoms and molecules are always moving.
- There are one billion nanometers in a meter.
- Nanotechnology is making new materials and tiny devices smaller than 100 nanometers in size.
- Nanotechnology allows scientists to make new things like smaller, faster computer chips and new medicines for diseases, such as cancer.

National Science Education Standards

Too Small to See addresses a number of National Science Education Standards (NSES). NSES Content Standards for Grades K-4, Grades 5-8, and Grades 9-12 are provided below.

To cross-reference with local standards, you can access the NSES standards online, or order a print publication:

- National Resource Council, 1995. *National Science Education Standards.* Washington, DC: National Academy Press.
- http://books.nap.edu/readingroom/books/nses/overview.html#content

Too Small to See: NSES Content Standards, Grades K-4

Unifying concepts and processes
- Systems, order, and organization
- Evidence, models, and explanation
- Change, constancy, and measurement
- Form and function

Science as inquiry
- Understandings about scientific inquiry

Physical science
- Properties of objects and materials

Earth and space science
- Properties of earth materials

Science and technology
- Understandings about science and technology

Science in personal and social perspectives
- Science and technology in local challenges

History and nature of science
- Science as a human endeavor

Too Small to See: NSES Content Standards, Grades 5-8

Unifying concepts and processes
- Systems, order, and organization
- Evidence, models, and explanation
- Change, constancy, and measurement
- Form and function

Science as inquiry
- Understandings about scientific inquiry

Physical science
- Properties and changes of properties in matter

Science and technology
- Understandings about science and technology

Science in personal and social perspectives
- Science and technology in society

History and nature of science
- Science as a human endeavor
- Nature of science
- History of science

Too Small to See: NSES Content Standards, Grades 9-12

Unifying concepts and processes
- Systems, order, and organization
- Evidence, models, and explanation
- Change, constancy, and measurement

Science as inquiry
- Understandings about scientific inquiry

Physical science
- Structure of atoms
- Structure and properties of matter

Science and technology
- Understandings about science and technology

Science in personal and social perspectives
- Science and technology in local, national, and global challenges

History and nature of science
- Science as a human endeavor
- Nature of scientific knowledge
- Historical perspectives

Too Small to See

NSES Content Standards	*Grades K-4*	*Grades 5-8*	*Grades 9-12*
Unifying concepts and processes	• Systems, order, and organization • Evidence, models, and explanation • Change, constancy, and measurement • Form and function	• Systems, order, and organization • Evidence, models, and explanation • Change, constancy, and measurement • Form and function	• Systems, order, and organization • Evidence, models, and explanation • Change, constancy, and measurement
Science as inquiry	• Understandings about scientific inquiry	• Understandings about scientific inquiry	• Understandings about scientific inquiry
Physical science	• Properties of objects and materials	• Properties and changes of properties in matter	• Structure of atoms • Structure and properties of matter
Earth and space science	• Properties of earth materials		
Science and technology	• Understandings about science and technology	• Understandings about science and technology	• Understandings about science and technology
Science in personal and social perspectives	• Science and technology in local challenges	• Science and technology in society	• Science and technology in local, national, and global challenges
History and nature of science	• Science as a human endeavor	• Science as a human endeavor • Nature of science • History of science	• Science as a human endeavor • Nature of scientific knowledge • Historical perspectives