

Tom the Atom, Book Series Standards and Curriculum in the USA.

Series overview

Tom-the-Atom is a charming, illustrated series that invites young readers into the microscopic world of atoms and materials. Through vivid characters and engaging stories, the books build a clear, intuitive understanding of how atoms form everything around us — from the rocks beneath our feet to the plastics in our oceans — and how those materials shape the planet and our lives.

Books 1–21: Foundations of the Atom World. These volumes introduce the essential concepts, rules, and principles of atomic behavior. Readers learn to “read” the characters of the periodic table, recognize patterns in atomic properties, and develop the conceptual tools needed to understand the 94 naturally occurring elements.

Books 23–31: Crystallinity and the Nature of Solids. This block explores crystallinity — the defining feature of many solids — and explains how atoms and molecules arrange themselves into the solid, liquid, and gaseous forms we observe. Students discover how material structure determines properties and how those materials are distributed across the universe.

Books 32–41: Polymers, Plastics, and Planetary Consequences These books focus on polymers: their structure, remarkable uses, and the roles they play in modern life. The series then broadens to examine pollution — especially plastic pollution — and its cascading effects on land, air, rivers, and oceans. Readers are guided to understand the science behind the problem and the human choices that can protect Earth’s future.

Teachers are aware that among the fifty states of the Union, there are about three central Standards/Curricula practiced in Middle School and High School: those based on the Framework (NRC), NGSS, and a variation of those two guidelines adopted by Florida and the other six states (NGS). We briefly describe each Book and how each Standard fits below.

The 50 states in the US have adopted three primary types of standards/curricula:

1. **NGSS (Next Generation Science Standards):**

- **Focus:** Science education for K-12 students.
- **Structure:** Emphasizes three dimensions: disciplinary core ideas, science and engineering practices, and crosscutting concepts.
- **Adoption:** Developed by a consortium of states and organizations and adopted by many states across the U.S.

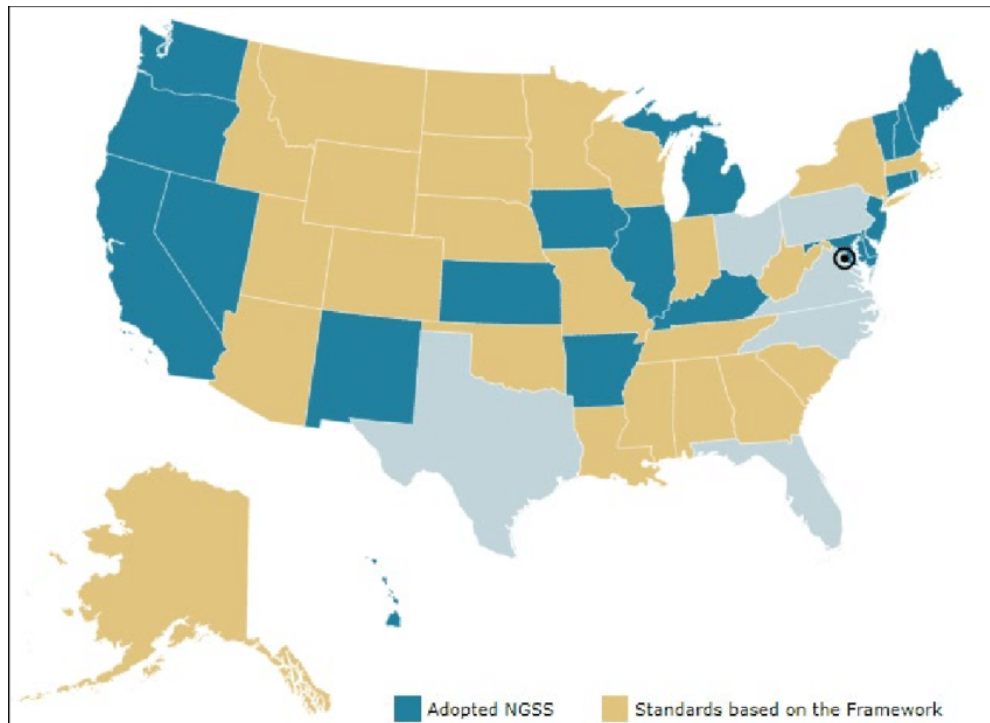
2. **Framework:**

- **Focus:** General guidelines for educational course design and curriculum development.
- **Structure:** Provides a conceptual map for planning or revising courses, aligning learning goals with classroom activities, and integrating assessment into learning.
- **Examples:** Teaching and learning frameworks like Backward Design, which starts with desired end goals and plans backward to create learning experiences.

3. **NGSSS**

- **Focus:** Comprehensive standards for K-12 education in Florida, including science, mathematics, English language arts, and social studies.
- **Structure:** Specific to Florida's educational requirements and assessments.
- **Adoption:** Developed and adopted by the Florida Department of Education.

2023 still does not have precisely the same guidelines as the NGSS, nor has it openly adopted a STEM program to implement those guidelines (NGSS or others) in the curriculum. However, the differences in procedures and the adoption of STEM or similar educational tools to fulfill their policies are closing. We observe that all states acknowledge the importance of introducing science, technology, engineering, and mathematics concepts to students from an early age across all grades from K to 12. There are three main standards. 20 states adopted the Next Generation Science Standards (NGSS); Florida modified the standard and produced the Next Generation Sunshine State Standard (NGSSS); and 24 States adopted the Framework, or Disciplinary Core Ideas (DCI)-Based Standards (here referred to as the Framework). Texas (Texas Essential Knowledge and Skills (TEKS)) and Puerto Rico (Puerto Rico Core Standards (PTCS)) have their own standards that are not included in our analysis.



Book No.	Framework (DCI)	NGSS	Florida NGSSS	Typical grade
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Book 1	Introduction of main characters.	Introduction of main characters.	Introduction of main characters.	
Book 2	PS1.A. Structure and Property of Matter	MS-PS1-1: Atoms and Molecules. MP-PS1-2: Properties of Substances. MS-PS1-3: Atoms. Molecules and materials.	SC.7.E.6.1: Layers of Earth. SC.8.P.4: Matter: elements, compounds, mixtures. SC. 8.P.6 Atomic theory.	MS (6–8).
Book 3	PS1.A. Structure and Property of Matter	MS-PS1-1: Atoms and Molecules. MP-PS1-2: Properties of Substances. MS-PS1-3: Atoms. Molecules and materials.	SC.7.E.6.1: Layers of Earth. SC.8.P.4: Matter: elements, compounds, mixtures. SC. 8.P.6 Atomic theory. SC.912.P.8.4 Atoms structure, SC.912.P.8.5: atoms in Periodic Table.	MS (6–8).
Book 4	PS1.A. Structure and Property of Matter	MS-PS1-1: Atoms and Molecules. MP-PS1-2: Properties of Substances. MS-PS1-3: Atoms. Molecules and materials.	SC.7.E.6.1: Layers of Earth. SC.8.P.4: Matter: elements, compounds, mixtures. SC. 8.P.6: Atomic theory. SC.912.P.8.4: Atom structure; SC.912.P.8.5: atoms in the Periodic Table.	MS (6–8).
Book 5	PS1.A. Structure and Property of Matter	MS-PS1-1: Atoms and Molecules. MP-PS1-2: Properties of Substances. MS-PS1-3: Atoms. Molecules and materials.	SC.7.E.6.1: Layers of Earth. SC.8.P.4: Matter: elements, compounds, mixtures. SC. 8.P.6: Atomic theory. SC.912.P.8.4: Atomic structure, SC.912.P.8.5: atoms in the Periodic Table.	MS (6–8).
Book 6	PS1.A. Structure and Property of Matter	MS-PS1-1: Atoms and Molecules. MP-PS1-2: Properties of Substances. MS-PS1-3: Atoms. Molecules and materials.	SC.7.E.6.1: Layers of Earth. SC.8.P.4: Matter: elements, compounds, mixtures. SC. 8.P.6 and . SC. 8.P,7 : Atomic theory.	MS (6–8).
Book 7	PS1.A. Structure and Property of Matter. PS1.B Chemical Interactions.	MS-PS1: Atoms and Molecules. MP-PS1-2: Properties of Substances.	SC.7.E.6.1: Layers of Earth. SC.8.P.4: Matter: elements, compounds, mixtures. SC. 8.P.6 Atomic theory. SC.912.P.8.4 Atoms structure, SC.912.P.8.5: atoms in Periodic Table.	MS (7–8).
Book 8	PS1.A. Structure and Property of Matter. PS1.B Chemical Interactions.	MS-PS1: Atoms and Molecules. MP-PS1-2: Properties of Substances.	SC.7.E.6.1: Layers of Earth. SC.8.P.4: Matter: elements, compounds, mixtures. SC. 8.P.6 Atomic theory. SC.912.P.8.4 Atoms structure, SC.912.P.8.5:	MS (7–8).

			atoms in Periodic Table.	
Book 9	PS1.A. Structure and Property of Matter. PS1.B Chemical Interactions.	MS-PS1: Atoms and Molecules. MP-PS1-2: Properties of Substances.	SC.7.E.6.1: Layers of Earth. SC.8.P.4: Matter: elements, compounds, mixtures. SC. 8.P.6 Atomic theory. SC.912.P.8.4 Atoms structure.	MS (7–8).
Book 10	PS1.A. Structure and Property of Matter. PS1.B Chemical Interactions.	MS-PS1: Atoms and Molecules. MP-PS1-2: Properties of Substances.	SC.7.E.6.1: Layers of Earth. SC.8.P.4: Matter: elements, compounds, mixtures. SC. 8.P.6 Atomic theory. SC.912.P.8.4 Atoms structure, SC.912.P.8.5: atoms in Periodic Table.	MS (7–8).
Book 11	PS1.A. Structure and Property of Matter, ESS2.A: Earth Materials and Systems.	MS-PS1: Atoms and Molecules. MP-PS1-2: Properties of Substances. MS-PS1-3: Atoms. Molecules and materials. MS-ESS2-1: Cycling Earth Materials and Energy.	SC.7.E.6.1: Layers of Earth. SC.8.P.4: Matter: elements, compounds, mixtures. SC. 8.P.6 Atomic theory. SC.912.P.8.4 Atoms structure, SC.912.P.8.5: atoms in Periodic Table.	MS (7).
Book 12	PS1.A. Structure and Property of Matter. PS1.B Chemical Interactions.	MS-PS1-3: Atoms. Molecules and materials. HS-PS1-5: Reactions. HS-PS1-3: Structures, electrical forces.	SC. 8.P.6 Atomic theory. SC.912. P.8.4: Atomic structure; SC.8.P.7: Bonds. SC.912. P.8.5: Atoms in the Periodic Table. SC.912. P.8.10: Oxidation-reduction. SC.912. P.10.11: Reactions.	MS (8).
Book 13	PS1.A. Structure and Property of Matter. PS1.B Chemical Interactions.	MS-PS1-3: Atoms. Molecules and materials. HS-PS1-5: Reactions. HS-PS1-3: Structures, electrical forces.	SC. 8.P.6 Atomic theory. SC.912. P.8.4: Atomic structure; SC.8.P.7: Bonds. SC.912.P.8.5: Atoms in the Periodic Table. SC.912. P.8.10: Oxidation-reduction. SC.912. P.10.11: Reactions.	MS (8).
Book 14	PS1.A. Structure and Property of Matter. PS1.B Chemical Interactions.	MS-PS1-3: Atoms. Molecules and materials. HS-PS1-5: Reactions. HS-PS1-3: Structures, electrical forces.	SC. 8.P.6 Atomic theory. SC.912. P.8.4: Atomic structure; SC.8.P.7: Bonds. SC.912.P.8.5: Atoms in the Periodic Table. SC.912. P.8.10: Oxidation-reduction. SC.912. P.10.11: Reactions.	MS (8).
Book 15	PS1.A. Structure and Property of Matter. PS1.B Chemical Interactions.	MS-PS1-3: Atoms. Molecules and materials. HS-PS1-5: Reactions. HS-PS1-3: Structures, electrical forces.	SC. 8.P.6 Atomic theory. SC.912. P.8.4: Atomic structure; SC.8.P.7: Bonds. SC.912. P.8.5: Atoms in the Periodic Table. SC.912. P.8.10:	MS (8).

			Oxidation-reduction. SC.912. P.10.11: Reactions.	
Book 16	PS1.A. Structure and Property of Matter. PS1.B Chemical Interactions.	MS-PS1-3: Atoms. Molecules and materials. HS-PS1-5: Reactions. HS-PS1-3: Structures, electrical forces.	SC. 8.P.6 Atomic theory. SC.912. P.8.4: Atomic structure; SC.8.P.7: Bonds. SC.912.P.8.5: Atoms in the Periodic Table. SC.912. P.8.10: Oxidation-reduction. SC.912. P.10.11: Reactions.	MS (8).
Book 17	LS1.C: Organization of Matter. ESS2.A: Earth Systems.	MS-LS2-3: Ecosystems. MS-ESS2-1: Cycling Earth Materials and Energy. HS-ESS2-6: Carbon/Nitrogen cycle. HS-LS1-7: Cellular Energy	SC. 7.L.2 Cycles. SC.912.P.18.4 Atomic structure, SC.912.P.8.5: atoms in the Periodic Table. SC.912. L.17.9: nutrient cycles. SC.912.L18.7: photosynthesis.	MS (7-8).
Book 18	PS1.A. Structure and Property of Matter. PS1.B Chemical Interactions.	MS-PS1-3: Atoms. Molecules and materials. MS-ESS2-1: Cycling Earth Materials and Energy. HS-PS1-1: Periodic Table, Valence. HS-PS1-2: Atoms: electron states. HS-PS1-3: Structures, electrical forces, HS-ESS2-2 Geoscience. HS-PS2-6: molecular structure.	SC. 8.P.6 Atomic theory. SC.8.P.9.7: Bonding. SC.912.P.8.4 Atomic structure, SC.912.P.8.5: atoms in the Periodic Table. SC.912.P.8.10: Oxidation-reduction. SC.912. E.6.1: Earth surface.	MS (8–10).
Book 19	PS1.A. Structure and Property of Matter. PS1.B Chemical Interactions.	MS-PS1-3: Atoms. Molecules and materials. MS-ESS2-1: Cycling Earth Materials and Energy. HS-PS1-1: Periodic Table, Valence. HS-PS1-2: Atoms: electron states. HS-PS1-3: Structures, electrical forces, HS-ESS2-2 Geoscience. HS-PS2-6: molecular structure.	SC. 8.P.6 Atomic theory. SC.8.P.9.7: Bonding. SC.912.P.8.4: Atomic structure, SC.912.P.8.5: atoms in the periodic table. SC.912.P.8.10: Oxidation-reduction. SC.912.E.6.1: Earth's surface.	MS (8–10).
Book 20	PS1.A. Structure and Property of Matter. PS1.B Chemical Interactions.	MS-PS1-3: Atoms. Molecules and materials. MS-ESS2-1: Cycling Earth Materials and Energy. HS-PS1-1: Periodic Table, Valence. HS-PS1-2: Atoms: electron states. HS-PS1-3: Structures, electrical forces, HS-ESS2-2 Geoscience. HS-PS2-6: molecular structure.	SC. 8.P.6 Atomic theory. SC.8.P.9.7: Bonding. SC.912.P.8.4 Atoms structure, SC.912.P.8.5: atoms in Periodic Table. SC.912.P.8.10 : Oxidation-reduction. SC.912.E.6.1: Earth surface.	MS (8–10).
Book 21	PS1.A. Structure and Property of Matter.	MS-PS1-1: Atoms. Molecules and materials. HS=PS1-1: Periodic Table.	SC. 8.P.5: Periodic Table. SC.912.P.8.4 Atoms structure, SC.912.P.8.5:	MS (8–10).

		HS-PS1-1: Atoms: electron state configuration.	atoms in Periodic Table.	
Book 22	PS1.A. PS1.B, PS3.B.	MS-PS1-1 (review of 6–21 topics). MS-PS1-2: Properties change. HS-PS1-1: Valence electrons.	MS-PS1 PEs; HS connections possible.	MS with HS tie-ins (7–8 enrichment) and 9–10.
Book 23	PS1.A. ESS2.A	MS-PS1-1; HS-PS1-3, HS-ESS2-2	SC.8.P.8.1; SC.912.P.8.6; SC.912.P.8.7; SC.912.P.8.12	MS with HS tie-ins (7–8 enrichment) and 9–10.
Book 24	PS1.A. ESS2.A	MS-PS1-1; HS-PS1-3, HS-ESS2-2	SC.8.P.8.1; SC.912.P.8.6; SC.912.P.8.7; SC.912.P.8.12	MS with HS tie-ins (7–8 enrichment) and 9–10.
Book 25	PS1.A. ESS2.A	MS-PS1-1; HS-PS1-3, HS-ESS2-2	SC.8.P.8.1; SC.912. P.8.6; SC.912. P.8.7; SC.912.P.8.12	MS with HS tie-ins (7–8 enrichment) and 9–10.
Book 26	PS1.A. ESS2.A	MS-PS1-1; HS-PS1-3, HS-ESS2-2	SC.8.P.8.1; SC.912.P.8.6; SC.912.P.8.7; SC.912. P.8.12	MS with HS tie-ins (7–8 enrichment) and 9–10.
Book 27	ESS1.B : Earth and Solar. ESS2.A: (Earth Materials. PS1.A : Properties of Matter,	MS-PS1-1ESS1-3: Solar System and composition. MS-ESS2-1: Rocks and minerals; HS-ESS2-1: Geological forces.	SC.7.E.6.1; SC.912.E.6.1; SC.7. E.6.5.	MS with HS tie-ins (7–8 enrichment) and 9–10.
Book 28	ESS1.B : Earth and Solar. ESS2.A: (Earth Materials. PS1.A : Properties of Matter,	MS-PS1-1ESS1-3: Solar System and composition. MS-ESS2-1: Rocks and minerals; HS-ESS2-1: Geological forces.	SC.7.E.6.1; SC.912.E.6.1; SC.7.E.6.5.	MS with HS tie-ins (7–8 enrichment) and 9–10.
Book 29	ESS1.B: Earth and Solar. ESS2.A: (Earth Materials. PS1.A : Properties of Matter,	MS-PS1-1ESS1-3: Solar System and composition. MS-ESS2-1: Rocks and minerals; HS-ESS2-1: Geological forces.	SC.7.E.6.1; SC.912.E.6.1; SC.7.E.6.5.	MS with HS tie-ins (7–8 enrichment) and 9–10.
Book 30	ESS1.B : Earth and Solar. ESS2.A: (Earth Materials. PS1.A : Property of Matter,	MS-PS1-1ESS1-3: Solar System and composition. MS-ESS2-1: Rocks and minerals; HS-ESS2-1: Geological forces.	SC.7.E.6.1; SC.912.E.6.1; SC.7.E.6.5.	MS with HS tie-ins (7–8 enrichment) and 9–10.
Book 31	ESS1.B : Earth and Solar. ESS2.A: (Earth Materials. PS1.A : Properties of Matter,	MS-PS1-1ESS1-3: Solar System and composition. MS-ESS2-1: Rocks and minerals; HS-ESS2-1: Geological forces.	SC.7.E.6.1; SC.912.E.6.1; SC.7.E.6.5.	MS with HS tie-ins (6–7 enrichment) and 8, 9.
Book 32	PS1.A , ESS2.A.	MS-PS1-1; MS-ESS2-1.	SC.7.E.6.5; SC.912.E.6.2	MS with HS tie-ins (6–7

				enrichment) and 8, 9.
Book 33	ESS2.C; ESS2.D; ESS3.D.	MS-ESS2-4 ; MS-ESS3-5 ; HS-ESS2-4.	SC.6.E.7.4 ; SC.912..E.7.3 ; SC.912.E.7.4	MS with HS tie-ins (6–7 enrichment) and 8, 9.
Book 34	ESS2.C; ESS2.D; ESS3.D.	MS-ESS2-4 ; MS-ESS3-5 ; HS-ESS2-4.	SC.6.E.7.4 ; SC.912..E.7.3 ; SC.912.E.7.4	MS with HS tie-ins (6–7 enrichment) and 8, 9.
Book 35	LS1.C; LS2.B; ESS2.E	MS-LS2-3 ; HS-LS1-5, HS-ESS2-27 .	SC.7.L.17.1; SC.912.L.17.10; SC.912.L.18.7	MS with HS tie-ins (6–7 enrichment) and 8, 9.
Book 36	LS1.C; LS2.B; ESS2.E	MS-LS2-3 ; HS-LS1-5, HS-ESS2-27 .	SC.7.L.17.1; SC.912.L.17.10; SC.912.L.18.7	MS with HS tie-ins (6–7 enrichment) and 8, 9.
Book 37	LS1.C; LS2.B; ESS2.E	MS-LS2-3 ; HS-LS1-5, HS-ESS2-27 .	SC.7.L.17.1; SC.912.L.17.10; SC.912.L.18.7	MS with HS tie-ins (6–7 enrichment) and 8, 9.
Book 38	LS1.C; LS2.B; ESS2.E	MS-LS2-3 ; HS-LS1-5, HS-ESS2-27 .	SC.7.L.17.1; SC.912.L.17.10; SC.912.L.18.7	MS with HS tie-ins (6–7 enrichment) and 8, 9.
Book 39	ESS3.C; ESS3.D.	MS-ESS3-4. HS-ESS3-4. HS-ESS3-6.	SC.8.N.4.1; SC.912.L.17.16; SC.912.L.17.20.	MS with HS tie-ins (6–7 enrichment) and 8, 9.
Book 40	ESS3.C; ESS3.D.	MS-ESS3-4. HS-ESS3-4. HS-ESS3-6.	SC.8.N.4.1; SC.912.L.17.16; SC.912.L.17.20.	MS with HS tie-ins (6–7 enrichment) and 8, 9.
Book 41	ESS3.C; ESS3.D.	MS-ESS3-4. HS-ESS3-4. HS-ESS3-6.	SC.8.N.4.1; SC.912.L.17.16; SC.912.L.17.20.	MS with HS tie-ins (6–7 enrichment) and 8, 9..