

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 combine to 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.

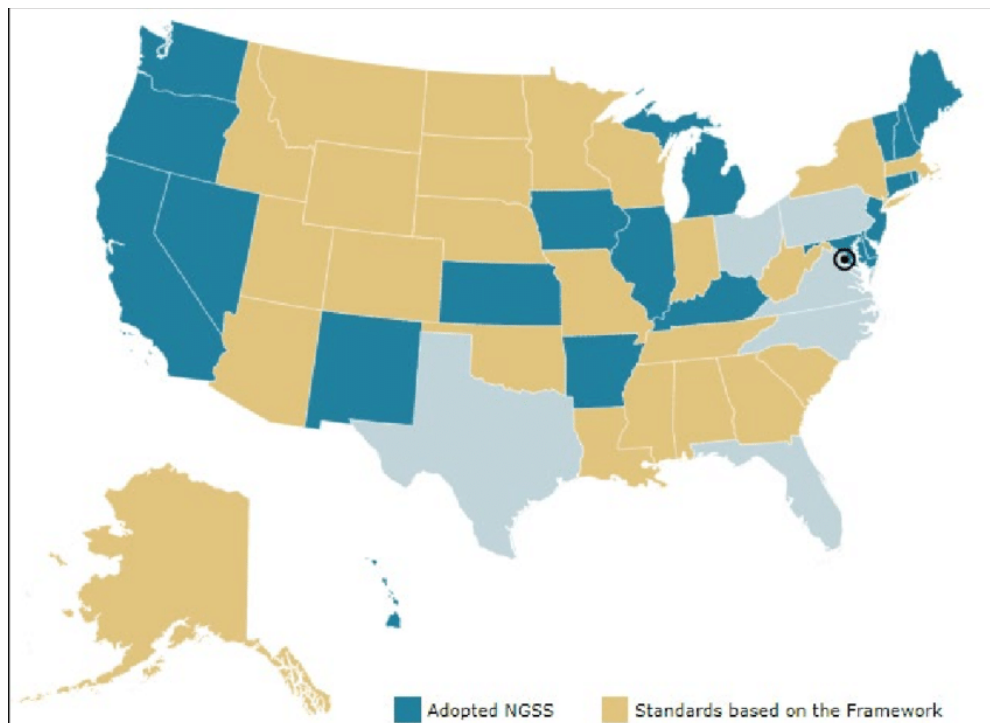
2. Framework:

- **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. Florida type of Standards:

- **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.



Book No.	Framework (DCI)	NGSS PEs	Florida NGSSS	Typical grade band
Book 2	PS1.A.	MS-PS1-1; MS-PS1-3.	SC.8. P.8.6. P.8.7; SC.912. P.8.4	MS (6–8).
Book 3	PS1.A; PS1.B	MS-PS1-1; MS-PS1-3; HS-PS1-2.	SC.8. P.8.7; SC.912.	MS with HS tie-ins.
Book 4	PS1.A; PS1.B	MS-PS1-1; MS-PS1-4; HS-PS1-2	SC.8. P.8.7. SC.912.	MS; useful for HS review.
Book 5	PS1.A; PS1.B.	MS-PS1-1; MS-PS1-3.	SC.8. P.8.6. P.8.7; SC.912. P.8.4.	Upper elementary → MS (review).
Book 6	PS1.A; PS1.B.	MS-PS1-1; HS-PS1-2.	SC.8. P.8.5. P.8.7; SC.912. P.8.4.	MS with HS connections.
Book 7	PS1.A; PS1.B.	MS-PS1-1; HS-PS1-2.	Upper elementary → Middle school.	Upper elementary → MS (review). (Grades 4–8)
Book 8	PS1. (Matter & interactions) PS1. (chemistry concepts).	MS-PS1-1; MS-PS1-2; MS-PS1-3 (and HS extensions if depth increases).	Middle-school physical science codes (example: SC.8.P.8.x).	Grades 4–8 (typical).
Book 9	PS1 / possible ESS or PS2 tie-ins depending on topic (series covers solids, electricity, astronomy in other volumes).PS1.B Chemical Reactions (connections) .Scale.	MS-PS1-1; MS-PS1-2; MS-PS1-3 (inferred). (gather info on properties & reactions).	Middle-school physical science codes (e.g., SC.8.P.x).	Grades 4–9 (inference).

Book 10	PS1. (Matter & interactions) . PS1.A. Structure and Properties of Matter.PS1.B Chemical Interactions (conceptual link). PS3.A Definitions of Energy; PS3.B Conservation.	MS-PS1-2 / MS-PS1-3 (properties & interactions).MS-PS3-2 / MS-PS3-3 (energy transfer, electrical circuits).	SC.8.P.x.	Grades 4–9 (default: MS 6–8).
Book 11	PS1 Structure and Properties of Matter. PS1.B Chemical Interactions. PS3 Energy. ETS Connections	may include PS1.B/PS1.C. MS-PS1-1. MS-PS1-2; MS-PS1-3.MS-PS3-2; MS-PS3-3.MS-ETS1-1	SC.8.P.8.x. SC.8.P.x	Grades 4–9 (place by PE level).
Book 12	PS1 Structure and Properties of Matter. PS1.B Chemical Interactions. Crosscutting Concepts: Structure and Function. HS extension PS1 and ETS. PS1 family PS1.B/PS1.C.	MS-PS1-1 Develop models to describe atomic composition and structure. MS-PS1-2; MS-PS1-3 Analyze properties of substances and how they change. HS-PS1-6; HS-ETS1-2 (if deeper quantum or catalytic mechanism is taught).	Middle-school physical science codes (SC.8.P.8.x). Advanced treatment of subshell contraction, electron-transfer facilitation, and catalyst design maps onto HS PEs and engineering design tasks.	Grades 4–9 (default: MS 6–8).
Book 13	PS1. (or related PS2/ESS if topic differs). PS1.B/PS1.C. Chemical Interactions. PS1 family; may include	MS-PS1-1. MS-PS1-2; MS-PS1-3. MS-PS3-2; MS-PS3-3.MS-ETS1-1	SC.8.P.8.x .SC.8.P.x.	Grades 4–9 (place by PE level).
Book 14	PS1. (Matter & interactions). PS1 family; may include PS1.B/PS1.C.	MS-PS1-2 / HS-PS1-6 (extension). MS-PS1-1 Develop models of atoms and isotopes.	Florida physical science standards. Middle-school physical science codes (district crosswalk).	Grades 4–9.

Book 15	PS1. (Matter & interactions) PS1.B Chemical Interactions PS3 Energy Connections. PS1 family; may include PS1.B/PS1.C.	MS-PS1-1: Develop models of atoms and molecules. MS-PS1-2; MS-PS1-3: Analyze properties of substances and how they change. MS-PS3-2 Energy transfer in systems. MS-ETS1-1 Define problems and design solutions.	Explain valence electrons, Group 13 behavior, and atomic models. Contrasts oxidation (burning) with passivation (oxide film) as observable chemical phenomena. Links exothermic oxidation (burning) and protective oxide formation to energy concepts.	Grades 4–9.
Book 16	PS1. (Matter & interactions) PS3 Energy. ETS Engineering. PS1 family; may include PS1.B/PS1.C.	MS-PS1-1; MS-PS1-3. MS-PS3-2.MS-ETS1-1 / MS-ETS1-2.	Florida physical science standards. Middle-school physical science codes (district crosswalk).	Grades 4–9.
Book 17	PS1. (Matter & interactions). PS1 family; may include PS1.B/PS1.C.	MS-PS1-1; MS-PS1-3. MS-PS3-2.MS-ETS1-1 / MS-ETS1-2.	Florida physical science standards. Middle-school physical science codes (district crosswalk). SC.8.P.8.x .SC.8.P.x. Florida physical science standards. Middle-school physical science codes (district crosswalk).	Grades 4–9.
Book 18	PS1. (Matter & interactions) .	MS-PS1 family (or related DCI if topic differs).	MS-level PEs; HS tie-ins possible (inference).	Grades 4–9.
Book 19	PS1. (Matter & interactions) .	MS-PS1-1 (matter & bonding).	MS-PS1 series; HS-PS1-2 possible.	Grades 4–9.
Book 20	PS1. (Matter & interactions) .	MS-PS1-1 or adjacent DCIs (depends on topic).	MS PEs; check publisher sheet for exact codes.	Grades 6–9 (pilot as MS).

Book 21	PS1. (Matter & interactions)	MS-PS1-1 (series core).	MS-PS1 PEs; HS connections possible.	Grades 6–8; HS enrichment if HS PEs listed.
Book 22	PS1.A	MS-PS1-1 (review of 6–21 topics).	MS-PS1 PEs; HS connections possible.	MS / Grades 6–8.
Book 23	PS1.A.	MS-PS1-1; HS-PS1-3	SC.8.P.8.4; SC.912.P.8.7	MS with HS tie-ins (6–8; enrichment 9–12).
Book 24	PS1.A.	MS-PS1-1; HS-PS1-3.	SC.8.P.8.4; SC.912.P.8.7.	MS with HS tie-ins (6–8; enrichment 9–12).
Book 25	ESS1.A; ESS1.B; PS2.B.	MS-ESS1-2; HS-ESS1-2.	SC.8.E.5.4; SC.912.E.5.2.	MS for NGSS PE; HS content appropriate for 9–12.
Book 26	PS1.A; ESS1.B	MS-PS1-1; MS-ESS1-3.	SC.8.P.8.4; SC.912.E.5.3	MS (6–8); some HS connections.
Book 27	PS1.A / PS1.B.	MS-PS1-1; MS-PS1-3 (possible).	SC.8.P.8.x; SC.912.P.8.x.	Middle school (Grades 6– 8).
Book 28	PS1.A.	MS-PS1-1; MS-PS1-4 (possible).	SC.8.P.8.x; SC.912.P.8.x.	Middle school (6– 8).
Book 29	PS1.A; crosscutting concepts.	MS-PS1 series; HS-PS1-2 (tie-in possible).	SC.8.P.8.x; SC.912.P.8.x.	MS with HS enrichment.
Book 30	PS1.A / PS1.B.	MS-PS1-1; MS-PS1-3.	SC.8.P.8.x; SC.912.P.8.x.	Middle school (6–8)
Book 31	PS1.A / PS1.B	MS-PS1 PEs; MS-ESS PEs if topic is Earth/space	SC.8.P.8.x; SC.8.E.x	Middle school (6–

8); topic dependent.

Book 32	PS1.A / PS1.B	MS-PS1 PEs; MS-ESS PEs if topic is Earth/space	SC.8.P.8.x; SC.8.E.x; SC.912. P.8.x.P.8.4; SC.912.E.5.3;SC.912.P.8.7	Grades 6–8 (default); Grades 4–9 usable depending on PE level.
Book 33	PS1.A / PS1.B ESS2.A / ESS2.B (Earth's materials; water cycle) MS-ESS2-1 (Develop a model to describe cycling of Earth's materials; includes crystallization, melting).MS-ESS2-2 (Explain geoscience processes changing Earth's surface).	MS-ESS2-4 (Develop a model to describe the cycling of water through Earth's systems).MS-ESS2-1 (Develop a model to describeMS-ESS2-2 (explain geoscience processes changing Earth's surface) cycling of Earth's materials; includes crystallization, melting).	SC.8.E.5.4 (Florida middle-school Earth/space standards; example).SC.8.E.5.4 / related SC.8.E.x SC/8.E.x	Grades 6–8 (default); Grades 4–9 usable depending on PE level.

	PS1.A / PS1.B ESS2.A / ESS2.B (Earth's materials; water cycle). ESS2.A (cycling of Earth's materials) Crosscutting: Stability & Change.	PS1.A / PS1.B (materials) SS2-4 Develop a model to describe the cycling of water through Earth's systems; MS-ESS2-2 Explain how geoscience processes change Earth's Crosswalk to Florida middle-school Earth standards; district may request evidence of student tasks aligned to SC codes. MS-ESS2-5 / MS-ESS2-6 (weather/climate interactions; energy transfer) — use book phenomena to teach energy balance and atmospheric circulation. surface.	SC.8.E.x Earth/space standards; map publisher NGSS PEs to the closest SC.8.E codes during district review.	Grades 6–8 (default); Grades 4–9 usable depending on PE level.
Book 35	PS1.A / PS1.B LS1.C Organization for matter & energy flow in organisms LS2.A / LS2.B Interdependent relationships; matter & energy cycling ESS2 / Crosscutting Patterns; systems models.	PS1.A / PS1.B (matter & interactions) MS-LS1-6 Construct an explanation for the role of photosynthesis in cycling matter & energy. MS-LS2-3; MS-LS2-4 Develop models of matter/energy flow; MS-ESS2-2 / MS-ESS2-4 (where ocean processes are emphasized) argue how ecosystem changes affect populations.	SC.8.E.x Earth/space standards; map publisher NGSS PEs to the closest SC.8.E codes during district review.	Grades 6–8 (default); Grades 4–9 usable depending on PE level.

Book 36	PS1.A / PS1.B ESS3.C Human Impacts on Earth Systems LS2.A/B Ecosystems; matter & energy flow. Crosscutting: Cause & Effect; Systems.	PS1.A / PS1.B (matter & interactions). MS-ESS3-4 Construct an argument with evidence about human impacts. MS-LS2-4 Construct an argument that changes to ecosystems affect populations.	SC.8.E.5.x / SC.8.N.1.x (district crosswalk). SC.8.L.17.x (local mapping). Aligns to Florida inquiry expectations.	Grades 6–8 (default); Grades 4–9 usable depending on PE level. 6–8 (extendable to 9–12).
Book 37	PS1.A / PS1.B ESS3.C Human Impacts on Earth Systems. LS2.A/B Ecosystems; matter & energy flow. Crosscutting: Cause & Effect; Systems.	PS1.A / PS1.B (inference). MS-ESS3-4 Construct an argument with evidence about human impacts. MS-LS2-4 Construct an argument that changes to ecosystems affect the populations. NGSS practices: Engaging in argument from evidence; analyzing data.	MS-PS1-1; MS-PS1-3; HS ties possible (inference). SC.8.E.5.x / SC.8.N.1.x (district crosswalk). SC.8.L.17.x (local mapping). Aligns to Florida inquiry expectations.	Grades 6–8 (default). 6–8 (extendable to 9–12).
Book 38	PS1.A / PS1.B. ESS3.C Human Impacts on Earth Systems. LS2.A/B Ecosystems; matter & energy flow. Crosscutting: Systems and System Models; Cause & Effect. ETS (Socio-scientific/Engineering connections)	PS1 family (inference). MS-ESS3-3; MS-ESS3-4 (construct arguments about human impacts; evaluate solutions). MS-LS2-4 (construct an argument that changes to ecosystems affect populations). Engaging in argument from evidence; Developing & using models. MS-ETS1-1 / MS-ETS1-2 (define problems; design solutions).	MS-PS1 series; HS-PS1-2 possible (inference). SC.8.E.x / SC.8.N.x (district crosswalk required). Aligns to Florida inquiry expectations. Aligns to Florida engineering/inquiry standards.	Grades 6–8; 4–9 usable.

Book 39	PS1.A / PS1.B. ESS3.C Human Impacts on Earth Systems. LS2.A/B Ecosystems and Interactions. ESS2 Earth Systems and Climate Connections. ETS Connections.	PS1 or topic-dependent. MS-ESS3-4. MS-LS2-4. MS-ETS1-1 / MS-ETS1-2.	MS PEs (inference). SC.8.E.x (district crosswalk). SC.8.L.x (district crosswalk).	Grades 6–8; reading age 10–16 listed on retailer.
Book 40	PS1.A / PS1.B. ESS3.C Human Impacts on Earth Systems. LS2.A/B Ecosystems and Interactions. ESS2 Earth Systems and Climate Connections. ETS Connections.	PS1 family (inference). MS-ESS3-4. MS-LS2-4. MS-ESS2-2.	MS-level PEs likely (inference). SC.8.E.x (district crosswalk). SC.8.L.x (district crosswalk).	Grades 6–8 (default).
Book 41	PS1.A / PS1.B. ESS3.C Human Impacts on Earth Systems. LS2.A/B Ecosystems and Interactions. ESS2 Earth Systems and Climate Connections. ETS Connections.	PS1 family (inference). MS-ESS3-3; MS-ESS3-4. MS-ESS2-2; MS-ESS2-4. MS-LS2-4. MS-ETS1-1; MS-ETS1-2. SC.8.E.x.	MS PEs; HS enrichment if HS PEs listed (inference). SC.8.E.x (district crosswalk). SC.8.L.x. Aligns to Florida inquiry/engineering expectations.	Grades 6–8; topic dependent. Species and food-web impacts described in the story support modeling population changes.

The *Tom-the-Atom* series (Books 1–41) provides strong, phenomenon-rich anchors for the NRC Framework and NGSS three-dimensional instruction across **middle school (primary)** and **high school (extensions)**.

- **Books 1–21** → best used for **atomic structure, periodic trends, bonding, and matter** (Framework PS1; NGSS MS-PS1 and HS-PS1 extensions).
- **Books 23–31** → natural fit for **states of matter, crystallinity, and materials structure** (Framework PS1; NGSS MS/HS physical-properties and materials PEs).
- **Books 32–41** → map to **polymers, materials engineering, and human/environmental impacts (pollution, ocean systems)** (Framework ESS and PS; NGSS MS-ESS3, MS-LS2, MS-ETS and HS extensions).