

Timeline of Mathematics Research Questions

ELC-5096

Common Core Standards

CCSS Code	Grade & Domain	Why the standard is met
Standards for Mathematical Practice (MP1–MP8)	K-12	Every investigation asks learners to make sense of novel problems, reason quantitatively, construct arguments, model, use tools (algebra tiles, coordinate grids), attend to precision, look for structure (e.g., Fibonacci), and generalize.
4.OA.C.5	4 – Operations & Algebraic Thinking	Students analyze and generate the Fibonacci pattern, then explain its rule in words and visuals.
4.MD.A.3	4 – Measurement & Data	Archimedes tasks require applying area/volume formulas to real objects and justifying solutions.
4.G.A.1–2	4 – Geometry	Euclid flowcharts/timelines classify and draw lines, angles, and two-dimensional figures.
5.OA.B.3	5 – Operations & Algebraic Thinking	Learners create input–output representations of patterns (e.g., Fibonacci in nature).
5.G.A.1–2	5 – Geometry	Cartesian-geometry board game has students plot ordered pairs and interpret coordinate relationships.
5.MD.C.5	5 – Measurement & Data	3-D models of spheres/cylinders connect volume to multiplication and addition.
6.NS.C.6–8	6 – Number System	Students locate points in all four quadrants while building coordinate-based games/simulations.
6.EE.A.2 & 6.EE.C.9	6 – Expressions & Equations	Al-Khwarizmi lessons translate words ↔ equations and use graphs to show two-variable relationships.
6.G.A.2–3	6 – Geometry	Archimedes volume investigations compute volume of right prisms and connect nets to 3-D figures.
6.SP.A.1 & 6.SP.B.4	6 – Statistics & Probability	Field-study data (pine-cone counts, petal numbers) illustrate statistical questions and display results.

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RI.4–6.3 & RI.4–6.7	Reading Informational Text	Students determine cause-effect of historical math events and integrate timelines, charts, and photos with text.
W.4–6.2, W.4–6.7–8	Writing	Each task culminates in explanatory or research writing that uses evidence from multiple sources and cites them.
SL.4–6.1, SL.4–6.4–5	Speaking & Listening	Learners plan and deliver role-plays, demos, and oral analyses with multimedia supports.
RH.6-8.1 & RH.6-8.4	Literacy in History/Social Studies	Older students analyze primary/secondary sources on mathematical milestones and use domain-specific vocabulary.

Framework	Relevant Practices / Codes	Curriculum Connection
NGSS Science & Engineering Practices	Asking Questions; Planning & Carrying Out Investigations; Using Mathematics & Computational Thinking; Developing Models	3-D Archimedes models, field data collection, and computational simulations of coordinate systems.
C3 Framework for Social Studies	D2.His.1–14 (Historical Inquiry & Analysis)	Timeline work asks students to analyze significance, causation, and alternate histories of mathematical events.
ISTE Standards for Students	1.3 Knowledge Constructor; 1.4 Innovative Designer; 1.5 Computational Thinker; 1.6 Creative Communicator	Learners research digital sources, design interactive games, and present multimedia galleries.
National Core Arts Standards (Visual Arts & Media Arts)	Creating & Presenting	Poster galleries, graphic novels, board-game art, and fractal visualizations integrate artistic processes.
NCTM Process Standards (Pre-CCSS but still referenced)	Problem Solving; Reasoning & Proof; Communication; Connections; Representation	The entire question set embodies these enduring mathematical habits of mind.