

Learners will explore mathematics as both the language of science and as a general way of reasoning about the world. Mathematics allow us to explore how things work, to understand why things work that way, and to investigate what we can do to make them work better. Mathematics provides skills for reasoning that improve our understanding and our communication across all fields of human endeavor. Towards this end we focus on mathematical skills, and how to reason and experiment with them, rather than on rote memorization and computation. Learners become skilled users of mathematics and its tools.

Topics and Themes

Establishing a Mathematical Mindset

Discovery

Observe patterns, make conjectures, look for equivalences and connections, test insights with technology tools.

Estimation

Develop rough guesses and intuitions about what an answer should look like, use intuitions as guidance towards solutions, and as check for errors.

Computational Thinking

Break down and organize a problem so it can be solved algorithmically, whether by hand or with computational tools.

Abstraction

Use mathematics to move from specific observations to general truths, use general methods to learn more about particular situations.

Infographics

Effective representation of information facilitates understanding; strategies for effective communication of quantitative information.

Smart Money

Use concepts like probability, expected value, and exponential growth to make intelligent financial decisions and avoid common errors.

Decision Analysis

Mathematics provides tools for making decisions, and also for analyzing ways in which mathematical confusions can lead to bad decisions.

Formal Reasoning

Mathematics provides opportunities through logic, geometry, and algebra for learners to see examples of valid arguments and also of where arguments break down.

Essential Skills

Learning How to do Mathematics

Use Properties of Units

Use properties of units carefully to assist in mathematical modeling and equation-building, obviating the need for rote memorization.

Use Mathematics as a Language

Express and analyze problems in science, engineering, health, and other fields using the language of mathematics; mathematics provides tools for making statements precise.

Construct Arguments & Reason Quantitatively

Construct mathematical arguments; reason logically in a quantitative context; justify conclusions and explain reasoning.

Make Mathematical Models

Create, simulate, analyze, and interpret mathematical models of real-world phenomena; simplify and draw conclusions.

Use Technology Strategically

Use spreadsheets, computational knowledge engines, graphing applications, computer algebra systems, computer code, and other mathematical tools.

Analyze and Interpret Data

Understand how to describe data, the connections between the different types of representations (numerical, graphical, tabular); determine which statistics to compare, which graphs to use, and how to draw meaningful conclusions from a data set.

Solve Equations, Inequalities, and Systems

Develop the critical algebraic, graphical, and numerical understanding necessary to solve problems, using traditional methods and modern tools, and how to interpret the solution to draw conclusions about the world.

Standards Addressed

CCSS Math Practice and Content

MP1-8; HSS.ID.A.1-4; HSS.IC.B.3,5,6; HSN.Q.A; HSS.CP.A.1-5; HSS.CP.B.6-9; HSS.MD.A.1-2, B.5-7; HSF.IF.C.7-9; HSF.BF.A.1; HSF.LE.A.1-4; HSF.LE.B.5; HSA.CED.A.1,4; HSA.SSE.A.1; HSA.REI.A.1-2; HSA.REI.B.3-4; HSA.REI.C.6-7; HSA.REI.D.10-12

Mathematics

FOUNDATION PHASE

Featured Quests



5 Activities

1 Artifact

Pay it Forward

How can exponential functions make things that start small grow very quickly?

math, algebra, movies, exponential



6 Activities

2 Artifacts

Wrong Message

How can you recognize and avoid misinterpreting data from misleading visualizations?

data analysis, analyzing and interpreting data, data



7 Activities

2 Artifacts

Mars Math Madness

What factors led the Mars Climate Orbiter to crash land on Mars?

NASA, mars, space, imperial, metric, scales, conversion, measurement, math



6 Activities

3 Artifacts

Right-Size Your Recipe

Your favorite recipe serves six. How do you make enough for just yourself?

math, cooking, estimating, food



7 Activities

1 Artifact

100x100 Burger

If you know the price of a burger with 100 patties, how do you find the price of just one patty?

one-variable, ratios, algebra, math

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