

ELEMENTARY
INVESTIGATION 5
WHAT ARE THE RISKS?

- CCS 3.2** (Writing) All students will write in clear, concise, organized language that varies in content and form for different audiences and purposes.
- B.2 Grade 4 Create narrative pieces, such as memoir or personal narrative that contain description and relate ideas, observations, or recollections of an event or experience.
- CCS 4.1** (Number and numerical operations) All students will develop number sense and will perform standard numerical operations and estimations on all types of numbers in a variety of ways.
- C.2 Grade 6 Recognize when an estimate is appropriate, and understand the usefulness of an estimate as distinct from an exact answer
- C.3 Grade 6 Determine the reasonableness of an answer by estimating the result of operations.
- CCS 4.2** (Geometry and measurement) All students will develop spatial sense and the ability to use geometric properties, relationships, and measurement to model, describe and analyze phenomena.
- D.4 Grade 4 Incorporate estimation in measurement activities (e.g., estimate before measuring).
- CCS 4.3** (Patterns and algebra) All students will represent and analyze relationships among variable quantities and solve problems involving patterns, functions, and algebraic concepts and processes.
- A.1 Grade 4 Recognize, describe, extend, and create patterns.
- Descriptions using words, number sentences/expressions, graphs, tables, variables (e.g., shape, blank, or letter)
 - Sequences that stop or that continue infinitely
- B.1 Grade 4 Use concrete and pictorial models to explore the basic concept of a function.
- Input/output tables, T-charts
 - Combining two function machines
 - Reversing a function machine

- CCS 4.4** (Data analysis, probability, and discrete mathematics) All students will develop an understanding of the concepts and techniques of data analysis, probability, and discrete mathematics, and will use them to model situations, solve problems, and analyze and draw appropriate inferences from data
- A.1 Grade 2 Collect, generate, record, and organize data in response to questions, claims, or curiosity.
- Data collected from students' everyday experiences
 - Data generated from chance devices, such as spinners and dice
- A.2 Grade 4 Read, interpret, construct, analyze, generate questions about, and draw inferences from displays of data.
- B.2 Grade 4 Determine probabilities of simple events based on equally likely outcomes and express them as fractions.
- B.5 Grade 6 Recognize and understand the connections among the concepts of independent outcomes, picking at random, and fairness.

- CCS 4.5** (Mathematical processes) All students will use mathematical processes of problem solving, communication, connections, reasoning, representations, and technology to solve problems and communicate mathematical ideas.
- A.1 Grade All Learn mathematics through problem solving, inquiry, and discovery.
- A.2 Grade All Solve problems that arise in mathematics and in other contexts (cf. workplace readiness standard 8.3).
- Open-ended problems
 - Non-routine problems
 - Problems with multiple solutions
 - Problems that can be solved in several ways
- A.4 Grade All Pose problems of various types and levels of difficulty.
- A.5 Grade All Monitor their progress and reflect on the process of their problem solving activity.
- B.1 Grade All Use communication to organize and clarify their mathematical thinking.
- Reading and writing
 - Discussion, listening, and questioning
- B.4 Grade All Use the language of mathematics to express mathematical ideas precisely.

- C.3 Grade All Recognize that mathematics is used in a variety of contexts outside of mathematics.
- D.2 Grade All Use reasoning to support their mathematical conclusions and problem solutions.
- D.4 Grade All Rely on reasoning, rather than answer keys, teachers, or peers, to check the correctness of their problem solutions.
- D.5 Grade All Make and investigate mathematical conjectures.
 - Counter examples as a means of disproving conjectures
 - Verifying conjectures using informal reasoning or proofs.

CCS 5.3 (Mathematical applications) All students will integrate mathematics as a tool for problem-solving in science, and as a means of expressing and/or modeling scientific theories.

- A.1 Grade 4 Determine the reasonableness of estimates, measurements, and computations of quantities when doing science.
- B.1 Grade 4 Select appropriate measuring instruments based on the degree of precision required.