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Number and Operations:	
Understand numbers, ways of representing numbers, relationships among numbers, and number systems.	
a) Develop a deeper understanding of very large and very small numbers and of various representations of them	While actual numbers are not employed in *Cross-Trainer* ™, the program places students in problem-solving environments where they have the opportunity to construct their own understanding of these concepts. Specifically these skills are addressed in: *Cubes, Tangrams.*
b) Compare and contrast the properties of numbers and number systems, including the rational and real numbers, and understand complex numbers as solutions to quadratic equations that do not have real solutions	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
c) Understand vectors and matrices as systems that have some of the properties of the real-number system	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
d) Use number-theory arguments to justify relationships involving whole numbers	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
Understand meanings of operations and how they relate to one another.	
a) Judge the effects of such operations as multiplication, division, and computing powers and roots on the magnitudes of quantities	*Cubes, Tangrams*
b) Develop an understanding of properties of, and representations for, the addition and multiplication of vectors and matrices	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
c) Develop an understanding of permutations and combinations as counting techniques	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
Compute fluently and make reasonable estimates.	

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a) Develop fluency in operations with real numbers, vectors, and matrices, using mental computation or paper-and-pencil calculations for simple cases and technology for more-complicated cases	While actual numbers are not employed in *Cross-Trainer* ™, the program places students in problem-solving environments where they have the opportunity to construct their own understanding of these concepts. Specifically these skills are addressed in: *Cubes, Tangrams, Spatial Delivery*
b) Judge the reasonableness of numerical computations and their results	While actual numbers are not employed in *Cross-Trainer* ™, the program places students in problem-solving environments where they have the opportunity to construct their own understanding of these concepts. Specifically these skills are addressed in: *Cubes, Tangrams*
Algebra:	
Understand patterns, relations, and functions.	
a) Generalize patterns using explicitly defined and recursively defined functions	*Cubes, Flips, Tangrams, Waterworld*
b) Understand relations and functions and select, convert flexibly among, and use various representations for them	*Cubes*
c) Analyze functions of one variable by investigating rates of change, intercepts, zeros, asymptotes, and local and global behavior	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
d) Understand and perform transformations such as arithmetically combining, composing, and inverting commonly used functions, using technology to perform such operations on more-complicated symbolic expressions	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.

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e) Understand and compare the properties of classes of functions, including exponential, polynomial, rational, logarithmic, and periodic functions	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
f) Interpret representations of functions of two variables	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
Represent and analyze mathematical situations and structures using algebraic symbols.	
a) Understand the meaning of equivalent forms of expressions, equations, inequalities, and relations	While actual numbers are not employed in *Cross-Trainer* ™, the program places students in problem-solving environments where they have the opportunity to construct their own understanding of these concepts. Specifically these skills are addressed in: *Cubes, Tangrams*
b) Write equivalent forms of equations, inequalities, and systems of equations and solve them with fluency—mentally or with paper and pencil in simple cases and using technology in all cases	While actual numbers are not employed in *Cross-Trainer* ™, the program places students in problem-solving environments where they have the opportunity to construct their own understanding of these concepts. Specifically these skills are addressed in: *Cubes, Tangrams*
c) Use symbolic algebra to represent and explain mathematical relationships	While actual numbers are not employed in *Cross-Trainer* ™, the program places students in problem-solving environments where they have the opportunity to construct their own understanding of these concepts. Specifically these skills are addressed in: *Cubes, Tangrams*
e) Use a variety of symbolic representations, including recursive and parametric equations, for functions and relations	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.

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f) Judge the meaning, utility, and reasonableness of the results of symbol manipulations, including those carried out by technology	While actual numbers are not employed in *Cross-Trainer* ™, the program places students in problem-solving environments where they have the opportunity to construct their own understanding of these concepts. Specifically these skills are addressed in: *Cubes, Spatial Delivery Tangrams*
Use mathematical models to represent and understand quantitative relationships	
a) Identify essential quantitative relationships in a situation and determine the class or classes of functions that might model the relationships	While actual numbers are not employed in *Cross-Trainer* ™, the program places students in problem-solving environments where they have the opportunity to construct their own understanding of these concepts. Specifically these skills are addressed in: *Cubes, Flips, Tangrams*
b) Use symbolic expressions, including iterative and recursive forms, to represent relationships arising from various contexts	While actual numbers are not employed in *Cross-Trainer* ™, the program places students in problem-solving environments where they have the opportunity to construct their own understanding of these concepts. Specifically these skills are addressed in: *Cubes, Flips, Tangrams*
c) Draw reasonable conclusions about a situation being modeled	*Cubes, Flips, Tangrams, Waterworld*
Analyze change in various contexts	
a) Approximate and interpret rates of change from graphical and numerical data	*Spatial Delivery*
Geometry:	
Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships	
a) Analyze properties and determine attributes of two- and three-dimensional objects	*Cubes, Flips, Spatial Delivery. Tangrams, Waterworld*

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b) Explore relationships (including congruence and similarity) among classes of two- and three-dimensional geometric objects, make and test conjectures about them, and solve problems involving them	*Cubes, Flips, Spatial Delivery, Tangrams, Waterworld*
c) Establish the validity of geometric conjectures using deduction, prove theorems, and critique arguments made by others	*Cubes, Tangrams*
d) Use trigonometric relationships to determine lengths and angle measures	*Flips, Tangrams*
Specify locations and describe spatial relationships using coordinate geometry and other representational systems	
a) Use Cartesian coordinates and other coordinate systems, such as navigational, polar, or spherical systems, to analyze geometric situations	While actual numbers are not employed in *Cross-Trainer* ™, the program places students in problem-solving environments where they have the opportunity to construct their own understanding of these concepts. Specifically these skills are addressed in: *Cubes, Flips, Tangrams*
b) Investigate conjectures and solve problems involving two- and three-dimensional objects represented with Cartesian coordinates	While actual numbers are not employed in *Cross-Trainer* ™, the program places students in problem-solving environments where they have the opportunity to construct their own understanding of these concepts. Specifically these skills are addressed in: *Cubes, Spatial Delivery*
Apply transformations and use symmetry to analyze mathematical situations	
a) Understand and represent translations, reflections, rotations, and dilations of objects in the plane by using sketches, coordinates, vectors, function notation, and matrices	While actual numbers are not employed in *Cross-Trainer* ™, the program places students in problem-solving environments where they have the opportunity to construct their own understanding of these concepts. Specifically these skills are addressed in: *Cubes, Flips, Tangrams, Spatial Delivery*

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b) Use various representations to help understand the effects of simple transformations and their compositions	*Cubes, Flips, Tangrams, Waterworld*
Use visualization, spatial reasoning, and geometric modeling to solve problems	
a) Draw and construct representations of two- and three-dimensional geometric objects using a variety of tools	*Cubes, Flips, Spatial Delivery, Tangrams, Waterworld*
b) Visualize three-dimensional objects and spaces from different perspectives and analyze their cross sections	*Cubes, Spatial Delivery*
c) Use vertex-edge graphs to model and solve problems	While actual numbers are not employed in *Cross-Trainer* ™, the program places students in problem-solving environments where they have the opportunity to construct their own understanding of these concepts. Specifically these skills are addressed in: *Cubes, Flips, Tangrams, Spatial Delivery*
d) Use geometric models to gain insights into, and answer questions in, other areas of mathematics	*Cubes, Flips, Tangrams, Spatial Delivery, Waterworld*
e) Use geometric ideas to solve problems in, and gain insights into, other disciplines and other areas of interest such as art and architecture	*Cubes, Flips, Spatial Delivery, Tangrams, Waterworld*
Measurement:	
Understand measurable attributes of objects and the units, systems, and processes of measurement	
a) Make decisions about units and scales that are appropriate for problem situations involving measurement	*Cubes, Tangrams*
Apply appropriate techniques, tools, and formulas to determine measurements	
a) Analyze precision, accuracy, and approximate error in measurement situations	*Cubes, Spatial Delivery, Tangrams*

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b) Understand and use formulas for the area, surface area, and volume of geometric figures, including cones, spheres, and cylinders	While actual numbers are not employed in *Cross-Trainer* ™, the program places students in problem-solving environments where they have the opportunity to construct their own understanding of these concepts. Specifically these skills are addressed in: *Cubes, Flips, Spatial Delivery, Tangrams*
c) Apply informal concepts of successive approximation, upper and lower bounds, and limit in measurement situations	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
d) Use unit analysis to check measurement computations	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
Data Analysis and Probability:	
Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.	
a) Understand the differences among various kinds of studies and which types of inferences can legitimately be drawn from each	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
b) Know the characteristics of well-designed studies, including the role of randomization in surveys and experiments	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
c) Understand the meaning of measurement data and categorical data, of univariate and bivariate data, and of the term variable	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
d) Understand histograms, parallel box plots, and scatterplots and use them to display data	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
e) Compute basic statistics and understand the distinction between a statistic and a parameter	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
Select and use appropriate statistical methods to analyze data	

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a) For univariate measurement data, be able to display the distribution, describe its shape, and select and calculate summary statistics	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
b) For bivariate measurement data, be able to display a scatterplot, describe its shape, and determine regression coefficients, regression equations, and correlation coefficients using technological tools	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
c) Display and discuss bivariate data where at least one variable is categorical	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
d) Recognize how linear transformations of univariate data affect shape, center, and spread	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
e) Identify trends in bivariate data and find functions that model the data or transform the data so that they can be modeled	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
Develop and evaluate inferences and predictions that are based on data	
a) Use simulations to explore the variability of sample statistics from a known population and to construct sampling distributions	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
b) Understand how sample statistics reflect the values of population parameters and use sampling distributions as the basis for informal inference	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
c) Evaluate published reports that are based on data by examining the design of the study, the appropriateness of the data analysis, and the validity of conclusions	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
d) Understand how basic statistical techniques are used to monitor process characteristics in the workplace	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.

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Understand and apply basic concepts of probability	
a) Understand the concepts of sample space and probability distribution and construct sample spaces and distributions in simple cases	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
b) Use simulations to construct empirical probability distributions	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
c) Compute and interpret the expected value of random variables in simple cases	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
d) Understand the concepts of conditional probability and independent events	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
e) Understand how to compute the probability of a compound event	This specific skill is not addressed by *Cross Trainer* ™: Visual Spatial.
Problem Solving:	
a) Build new mathematical knowledge through problem solving	*Cubes, Flips, Tangrams, Spatial Delivery, Waterworld*
b) Solve problems that arise in mathematics and in other contexts	*Cubes, Flips, Tangrams, Spatial Delivery, Waterworld*
c) Apply and adapt a variety of appropriate strategies to solve problems	*Cubes, Flips, Tangrams, Spatial Delivery, Waterworld*
d) Monitor and reflect on the process of mathematical problem solving	*Cubes, Flips, Tangrams, Spatial Delivery, Waterworld*
Reasoning and Proof:	
a) Recognize reasoning and proof as fundamental aspects of mathematics	*Cubes, Flips, Tangrams, Spatial Delivery, Waterworld*
b) Make and investigate mathematical conjectures	*Cubes, Flips, Tangrams, Spatial Delivery, Waterworld*
c) Develop and evaluate mathematical arguments and proofs	*Cubes, Flips, Tangrams, Spatial Delivery, Waterworld*
d) Select and use various types of reasoning and methods of proof	*Cubes, Flips, Tangrams, Spatial Delivery, Waterworld*
Communication:	

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a) Organize and consolidate their mathematical thinking through communication	*Cubes, Flips, Tangrams, Spatial Delivery, Waterworld*
b) Communicate their mathematical thinking coherently and clearly to peers, teachers, and others	*Cubes, Flips, Tangrams, Spatial Delivery, Waterworld*
c) Analyze and evaluate the mathematical thinking and strategies of others	*Cubes*
d) Use the language of mathematics to express mathematical ideas precisely	*Cubes, Flips, Tangrams*
Connections:	
a) Recognize and use connections among mathematical ideas	*Cubes, Flips, Tangrams, Spatial Delivery, Waterworld*
b) Understand how mathematical ideas interconnect and build on one another to produce a coherent whole	*Cubes, Flips, Tangrams, Spatial Delivery, Waterworld*
c) Recognize and apply mathematics in contexts outside of mathematics	*Cubes, Flips, Tangrams, Spatial Delivery, Waterworld*
Representation:	
a) Create and use representations to organize, record, and communicate mathematical ideas	*Cubes, Flips, Tangrams, Spatial Delivery, Waterworld*
b) Select, apply, and translate among mathematical representations to solve problems	*Cubes, Flips, Tangrams, Spatial Delivery, Waterworld*
c) Use representations to model and interpret physical, social, and mathematical phenomena	*Cubes, Flips, Tangrams*