

Lexia Cross Trainer™: Visual-Spatial ©2005 correlated to Principals and Standards for School Mathematics Grade 3 through Grade 5	
Principals and Standards for School Mathematics Grade 3 through Grade 5	Lexia Cross Trainer™: Visual-Spatial ©2005

Number and Operations:	
<i>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</i>	
a) Understand the place-value structure of the base-ten number system and be able to represent and compare whole numbers and decimals	This specific skill is not addressed by <i>Cross Trainer™: Visual-Spatial</i> .
b) Recognize equivalent representations for the same number and generate them by decomposing and composing numbers	While actual numbers are not employed in <i>Cross-Trainer™</i> , 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: <i>Cubes, Flips, Tangrams</i>
c) Develop understanding of fractions as parts of unit wholes, as parts of a collection, as locations on number lines, and as divisions of whole numbers	While actual numbers are not employed in <i>Cross-Trainer™</i> , 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: <i>Cubes, Flips, Tangrams</i>
d) Use models, benchmarks, and equivalent forms to judge the size of fractions	<i>Cubes, Flips, Tangrams</i>
e) Recognize and generate equivalent forms of commonly used fractions, decimals, and percents	While actual numbers are not employed in <i>Cross-Trainer™</i> , 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: <i>Cubes, Flips, Tangrams</i>
f) Explore numbers less than 0 by extending the number line and through familiar applications	This specific skill is not addressed by <i>Cross Trainer™: Visual-Spatial</i> .
g) Describe classes of numbers according to characteristics such as the nature of their factors	This specific skill is not addressed by <i>Cross Trainer™: Visual-Spatial</i> .
<i>Understand meanings of operations and how they relate to one another.</i>	

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a) Understand various meanings of multiplication and division	While actual numbers are not employed in <i>Cross-Trainer™</i> , 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: <i>Cubes, Flips, Tangrams</i>
b) Understand the effects of multiplying and dividing whole numbers	This specific skill is not addressed by <i>Cross-Trainer™: Visual-Spatial</i> .
c) Identify and use relationships between operations, such as division as the inverse of multiplication, to solve problems	<i>Cubes, Flips, Tangrams</i>
d) Understand and use properties of operations, such as the distributivity of multiplication over addition	<i>Cubes, Tangrams</i>
<i>Compute fluently and make reasonable estimates.</i>	
a) Develop fluency with basic number combinations for multiplication and division and use these combinations to mentally compute related problems, such as 30×50	While actual numbers are not employed in <i>Cross-Trainer™</i> , 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: <i>Cubes, Flips, Tangrams</i>
b) Develop fluency in adding, subtracting, multiplying, and dividing whole numbers	<i>Cubes, Flips, Tangrams</i>
c) Develop and use strategies to estimate the results of whole-number computations and to judge the reasonableness of such results	<i>Tangrams</i>
d) Develop and use strategies to estimate computations involving fractions and decimals in situations relevant to students' experience	<i>Tangrams</i>
e) Use visual models, benchmarks, and equivalent forms to add and subtract commonly used fractions and decimals	<i>Tangrams</i>

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f) Select appropriate methods and tools for computing with whole numbers from among mental computation, estimation, calculators, and paper and pencil according to the context and nature of the computation and use the selected method or tools	<i>Cubes, Flips, Tangrams, Waterworld</i>
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Algebra:

Understand patterns, relations, and functions.

a) Describe, extend, and make generalizations about geometric and numeric patterns	<i>Tangrams</i>
b) Represent and analyze patterns and functions, using words, tables, and graphs	<i>Cubes, Flips, Tangrams, Waterworld</i>

Represent and analyze mathematical situations and structures using algebraic symbols.

a) Identify such properties as commutativity, associativity, and distributivity and use them to compute with whole numbers	<i>Tangrams</i>
b) Represent the idea of a variable as an unknown quantity using a letter or a symbol	<i>Tangrams, Cubes</i>
c) Express mathematical relationships using equations	This specific skill is not addressed by <i>Cross Trainer™: Visual-Spatial</i> .

Use mathematical models to represent and understand quantitative relationships

a) Model problem situations with objects and use representations such as graphs, tables, and equations to draw conclusions	<i>Cubes, Flips, Tangrams</i>
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Analyze change in various contexts

a) Investigate how a change in one variable relates to a change in a second variable	<i>Spatial Delivery, Waterworld</i>
b) Identify and describe situations with constant or varying rates of change and compare them	<i>Spatial Delivery</i>

Geometry:

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<i>Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships</i>	
a) Identify, compare, and analyze attributes of two- and three-dimensional shapes and develop vocabulary to describe the attributes	<i>Cubes, Flips, Tangrams</i>
b) Classify two- and three-dimensional shapes according to their properties and develop definitions of classes of shapes such as triangles and pyramids	<i>Cubes, Flips, Tangrams</i>
c) Investigate, describe, and reason about the results of subdividing, combining, and transforming shapes	<i>Cubes, Flips, Tangrams</i>
d) Explore congruence and similarity	<i>Cubes, Flips, Tangrams, Waterworld</i>
e) Make and test conjectures about geometric properties and relationships and develop logical arguments to justify conclusions	<i>Cubes, Tangrams</i>
<i>Specify locations and describe spatial relationships using coordinate geometry and other representational systems</i>	
a) Describe location and movement using common language and geometric vocabulary	<i>Spatial Delivery</i>
b) Make and use coordinate systems to specify locations and to describe paths	<i>Spatial Delivery</i>
c) Find the distance between points along horizontal and vertical lines of a coordinate system	<i>Cubes, Spatial Delivery</i>
<i>Apply transformations and use symmetry to analyze mathematical situations</i>	
a) Predict and describe the results of sliding, flipping, and turning two-dimensional shapes	<i>Flips, Tangrams, Waterworld</i>
b) Describe a motion or a series of motions that will show that two shapes are congruent	<i>Flips, Tangrams</i>
c) Identify and describe line and rotational symmetry in two- and three-dimensional shapes and designs	<i>Cubes, Flips, Tangrams, Waterworld</i>

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<i>Use visualization, spatial reasoning, and geometric modeling to solve problems</i>	
a) Build and draw geometric objects	<i>Cubes, Flips, Tangrams</i>
b) Create and describe mental images of objects, patterns, and paths	<i>Cubes, Flips, Spatial Delivery, Tangrams, Waterworld</i>
c) Identify and build a three-dimensional object from two-dimensional representations of that object	<i>Cubes</i>
d) Identify and draw a two-dimensional representation of a three-dimensional object	<i>Cubes</i>
e) Use geometric models to solve problems in other areas of mathematics, such as number and measurement	<i>Cubes, Flips, Spatial Delivery, Tangrams, Waterworld</i>
f) Recognize geometric ideas and relationships and apply them to other disciplines and to problems that arise in the classroom or in everyday life	<i>Cubes, Flips, Spatial Delivery, Tangrams, Waterworld</i>
Measurement:	
<i>Understand measurable attributes of objects and the units, systems, and processes of measurement</i>	
a) Understand such attributes as length, area, weight, volume, and size of angle and select the appropriate type of unit for measuring each attribute	<i>Cubes, Tangrams</i>
b) Understand the need for measuring with standard units and become familiar with standard units in the customary and metric systems	While actual numbers are not employed in <i>Cross-Trainer™</i> , 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: <i>Cubes, Flips, Tangrams</i>
c) Carry out simple unit conversions, such as from centimeters to meters, within a system of measurement	This specific skill is not addressed by <i>Cross Trainer™: Visual-Spatial</i> .
d) Understand that measurements are approximations and how differences in units affect precision	<i>Spatial Delivery</i>

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e) Explore what happens to measurements of a two-dimensional shape such as its perimeter and area when the shape is changed in some way	<i>Cubes</i>
<i>Apply appropriate techniques, tools, and formulas to determine measurements</i>	
a) Develop strategies for estimating the perimeters, areas, and volumes of irregular shapes	<i>Cubes, Flips, Tangrams</i>
b) Select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles	<i>Cubes, Flips, Spatial Delivery, Tangrams</i>
c) Select and use benchmarks to estimate measurements	<i>Cubes, Flips, Spatial Delivery, Tangrams</i>
d) Develop, understand, and use formulas to find the area of rectangles and related triangles and parallelograms	While actual numbers are not employed in <i>Cross-Trainer™</i> , 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: <i>Cubes, Flips, Tangrams</i>
e) Develop strategies to determine the surface areas and volumes of rectangular solids	While actual numbers are not employed in <i>Cross-Trainer™</i> , 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: <i>Cubes, Flips, Tangrams</i>
Data Analysis and Probability:	
<i>Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them</i>	
a) Design investigations to address a question and consider how data-collection methods affect the nature of the data set	<i>Cubes, Flips, Tangrams, Waterworld</i>
b) Collect data using observations, surveys, and experiments	<i>Cubes, Spatial Delivery</i>

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c) Represent data using tables and graphs such as line plots, bar graphs, and line graphs	This specific skill is not addressed by <i>Cross Trainer™: Visual-Spatial</i> .
d) Recognize the differences in representing categorical and numerical data	This specific skill is not addressed by <i>Cross Trainer™: Visual-Spatial</i> .
<i>Select and use appropriate statistical methods to analyze data</i>	
a) Describe the shape and important features of a set of data and compare related data sets, with an emphasis on how the data are distributed	This specific skill is not addressed by <i>Cross Trainer™: Visual-Spatial</i> .
b) Use measures of center, focusing on the median, and understand what each does and does not indicate about the data set	This specific skill is not addressed by <i>Cross Trainer™: Visual-Spatial</i> .
c) Compare different representations of the same data and evaluate how well each representation shows important aspects of the data	This specific skill is not addressed by <i>Cross Trainer™: Visual-Spatial</i> .
<i>Develop and evaluate inferences and predictions that are based on data</i>	
a) Propose and justify conclusions and predictions that are based on data and design studies to further investigate the conclusions or predictions	This specific skill is not addressed by <i>Cross Trainer™: Visual-Spatial</i> .
<i>Understand and apply basic concepts of probability</i>	
a) Describe events as likely or unlikely and discuss the degree of likelihood using such words as <i>certain, equally likely, and impossible</i>	This specific skill is not addressed by <i>Cross Trainer™: Visual-Spatial</i> .
b) Predict the probability of outcomes of simple experiments and test the predictions	<i>Cubes, Flips, Spatial Delivery, Tangrams, Waterworld</i>
c) Understand that the measure of the likelihood of an event can be represented by a number from 0 to 1	This specific skill is not addressed by <i>Cross Trainer™: Visual-Spatial</i> .
Problem Solving:	
a) Build new mathematical knowledge through problem solving	<i>Cubes, Flips, Tangrams, Spatial Delivery, Waterworld</i>

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b) Solve problems that arise in mathematics and in other contexts	<i>Cubes, Flips, Tangrams, Spatial Delivery, Waterworld</i>
c) Apply and adapt a variety of appropriate strategies to solve problems	<i>Cubes, Flips, Tangrams, Spatial Delivery, Waterworld</i>
d) Monitor and reflect on the process of mathematical problem solving	<i>Cubes, Flips, Tangrams, Spatial Delivery, Waterworld</i>

Reasoning and Proof:

a) Recognize reasoning and proof as fundamental aspects of mathematics	<i>Cubes, Flips, Tangrams, Spatial Delivery, Waterworld</i>
b) Make and investigate mathematical conjectures	<i>Cubes, Flips, Tangrams, Spatial Delivery, Waterworld</i>
c) Develop and evaluate mathematical arguments and proofs	<i>Cubes, Flips, Tangrams, Spatial Delivery, Waterworld</i>
d) Select and use various types of reasoning and methods of proof	<i>Cubes, Flips, Tangrams, Spatial Delivery, Waterworld</i>

Communication:

a) Organize and consolidate their mathematical thinking through communication	<i>Cubes, Flips, Tangrams, Spatial Delivery, Waterworld</i>
b) Communicate their mathematical thinking coherently and clearly to peers, teachers, and others	<i>Cubes, Flips, Tangrams, Spatial Delivery, Waterworld</i>
c) Analyze and evaluate the mathematical thinking and strategies of others	<i>Cubes</i>
d) Use the language of mathematics to express mathematical ideas precisely	<i>Cubes, Flips, Tangrams</i>

Connections:

a) Recognize and use connections among mathematical ideas	<i>Cubes, Flips, Tangrams, Spatial Delivery, Waterworld</i>
b) Understand how mathematical ideas interconnect and build on one another to produce a coherent whole	<i>Cubes, Flips, Tangrams, Spatial Delivery, Waterworld</i>
c) Recognize and apply mathematics in contexts outside of mathematics	<i>Cubes, Flips, Tangrams, Spatial Delivery, Waterworld</i>

Representation:

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<p>a) Create and use representations to organize, record, and communicate mathematical ideas</p>	<p><i>Cubes, Flips, Tangrams, Spatial Delivery, Waterworld</i></p>
<p>b) Select, apply, and translate among mathematical representations to solve problems</p>	<p><i>Cubes, Flips, Tangrams, Spatial Delivery, Waterworld</i></p>
<p>c) Use representations to model and interpret physical, social, and mathematical phenomena</p>	<p><i>Cubes, Flips, Tangrams</i></p>