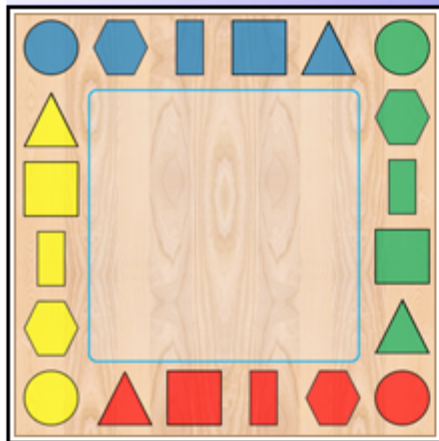




Tools for Active Teaching and Active Learning

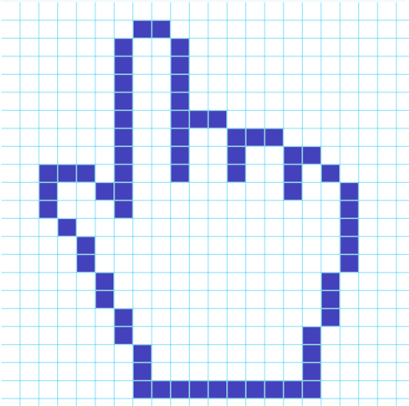
Hands-On Math



Attribute Blocks

- ★ Identify Shapes, Colors and Sizes
- ★ Sort and Classify by Properties
- ★ Create and Identify Sets and Patterns
- ★ Develop Logical Thinking Skills

Instructor's Guide



Ventura Educational Systems

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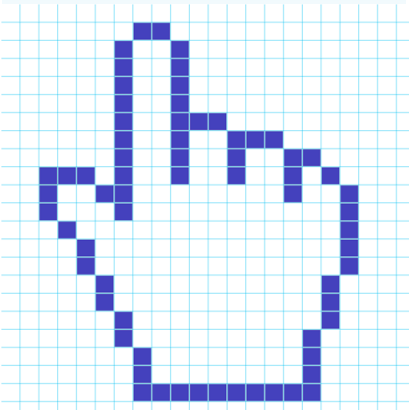
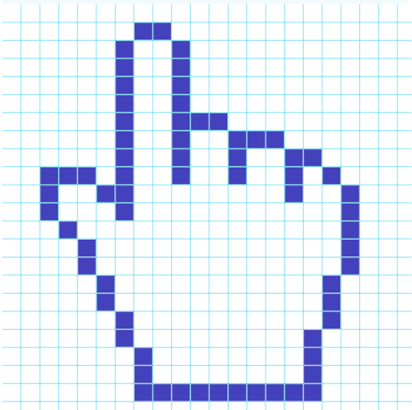


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Overview

Visualizing mathematical concepts is the key to understanding. Models help significantly in cognitive development.

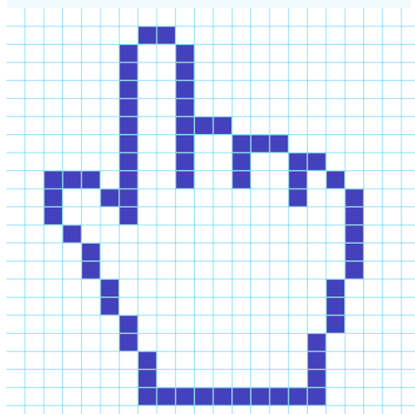
Attribute Blocks a great way to help student develop logical thinking skills and mathematical reasoning. In elementary math education it is critically important that students see the relevance of what they are learning. Math needs to make sense. The Hands-On Math Attribute Blocks helps students see the logical relationships that are a part of set theory, geometry, number theory and logical thinking concepts.

Research has shown that children learn best through active involvement in the learning process. Hands-On Math Attribute Blocks is designed to be a tool that teachers can use for active teaching and active learning. Math manipulative devices can be a rich source of teaching strategies for problem solving and can be very helpful in developing an intuitive understanding of mathematical concepts. The Hands-On Math series suggests ways in which concrete learning experiences can be extended to a representational level and still remain manipulative and interactive.

This guide consists of two sections. The first part is written for the teacher and explains the functions of the app and options available. It presents ideas for instructional strategies that can be implemented with each simulated manipulative device. The second section of the manual is a set of curriculum-based activities that are designed to help the teacher in using the Hands-On Math app. These activities have been developed for elementary and middle school age children and are arranged by order of grade level where the concepts are typically introduced. Teachers will want to decide what is the best sequence for using the materials with their particular group of students. Each lesson is aimed at specific mathematical objectives including recognizing similar attributes, identifying logical differences, patterns, and Venn diagrams. Each activity is meant to be a beginning. Teachers will want to encourage the children to explore extensions of each activity with different examples. Orally discussing each activity will help to foster higher level thinking.

Hands-On Math Attribute Blocks is a starting point. Learning should be fun and as students work with the app, it is my intention that they will begin discussing, sharing and creatively exploring mathematics.

-- Fred Ventura, Ph.D.



Introduction to Hands-On Math Attribute Blocks

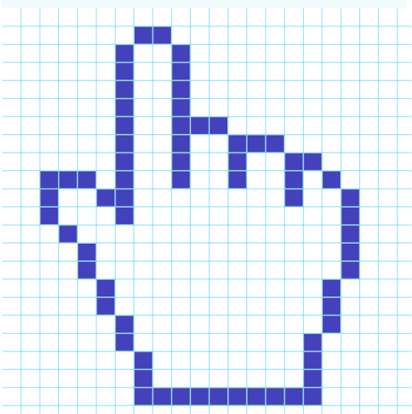
Piaget's theory of cognitive development is a comprehensive theory about the nature and development of human intelligence.

Approaches to the teaching of mathematics that rely heavily on one methodology are inherently weak and unlikely to produce optimal results. Educators have found that teaching strategies must adapt to accommodate new discoveries which expand our understanding of the learning process and new technologies which expand our delivery systems.

According to learning theory, children learn best when they are actively involved in the learning process. There are many ways to do this but one example is having children work in small groups in a laboratory/discovery situation. Small group instruction encourages variation in teaching methodology. Variation in the way in which material is presented serves the instructional process since one particular methodology may not be best for all children. Different children respond differently to a particular educational approach. The same methodology that is appropriate for one content area or developmental stage may not be appropriate in a different content area or with children who are at a different developmental stage.

For learning mathematics an active teaching and active learning situation is a very desirable educational environment. To create it the teacher must be aware of the behavioral characteristics of the students with regard to mathematics, must be knowledgeable in the particular skills which are being taught and must be able to draw upon diverse strategies in order to decide which is the most appropriate for fostering the development of the targeted mathematical concepts.

In general, educational psychologists believe that the ability of children to learn passes through developmental stages. Each stage is characterized by particular behaviors. In the early stages learning is tied to perceptual responses. As the child matures, abstract reasoning becomes possible and concrete models are useful for laying the conceptual groundwork for new ideas, but once a concept has been internalized the concrete models are no longer necessary. The work of Swiss psychologist, Jean Piaget, has contributed a great deal to support this theory, and to foster the development of educational strategies which are consistent with the theory.



Using an iPad in a Manipulative Approach to Math

We use the term “playground” to convey the open-ended, discovery approach to learning that this tool was designed to support.

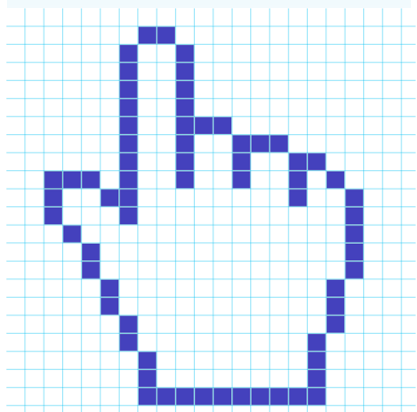
Hands-On Math Attribute Blocks combines and extends the use of concrete materials for teaching mathematics to the touch-based interactive environment of the Apple® iPad™. When used in conjunction with actual manipulative devices the app offers a unique set of strategies for active learning. While using the app students can draw upon concepts developed from concrete experiences that were gained using manipulative devices and will work with the same concepts in a more representational manner using the app. In this way the child’s concrete mathematical knowledge is used to help make a transition to a representational stage and serves as a foundation for the development of abstract mathematical thinking skills.

Once mathematical concepts have been internalized by the child in a concrete way, the stage is set for a deeper understanding of the more formal, abstract axioms of higher mathematics.

Hands-On Math Attribute Blocks simulates the use of a set of blocks with four colors, five shapes and two sizes. While using the blocks students are given feedback so that they can see logical relationships. Visualization is an effective way to help students understand mathematical reasoning and logic. A benefit derived from using the Attribute Blocks is that the blocks can be easily manipulated and therefore good problem solving strategies spontaneously evolve. The concepts studied in this curriculum are the foundations of mathematical development especially in the areas of Set Theory, Geometry, Number Theory and Logical Thinking. The app provides a variety of Playgrounds where logical relationships can be explored and discovered. Student interaction with the device is augmented by the artificially intelligent feedback provided by the software. The instructional approaches that result from creating an open-ended area for free exploration and discovery are exciting. On the various Playgrounds students manipulate a supply of virtual Attribute Blocks to solve problems using deductive reasoning.

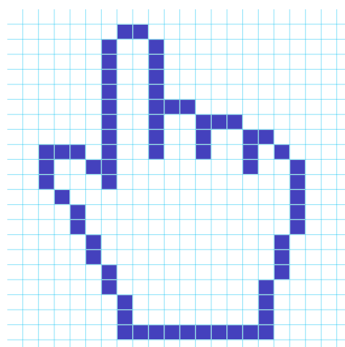
When using Attribute Blocks simple gestures are used to drag and drop blocks, placing them along trails or in regions where logical rules have been applied. The author and designer coined the term, “artificially intelligent math manipulative” to describe how using the Hands-On Math apps differs from the concrete manipulative devices traditionally used in classrooms. For example, this app provides intelligent mathematical feedback as the student manipulates the blocks. Immediately associating feedback with a behavior is an effective way to reinforce behavior and facilitate learning.

The Hands-On Math Attribute Blocks Playground can also be effectively used with lessons that present mathematical concepts in a structured way. Initially teachers may want to provide ample free exploration time and then after the students have become familiar with the product, direct students into more structured investigations, for example, observing the logical relationships between blocks that lie along a path. Students will make discoveries and when they do teachers should encourage them to share their discoveries with others in their group.



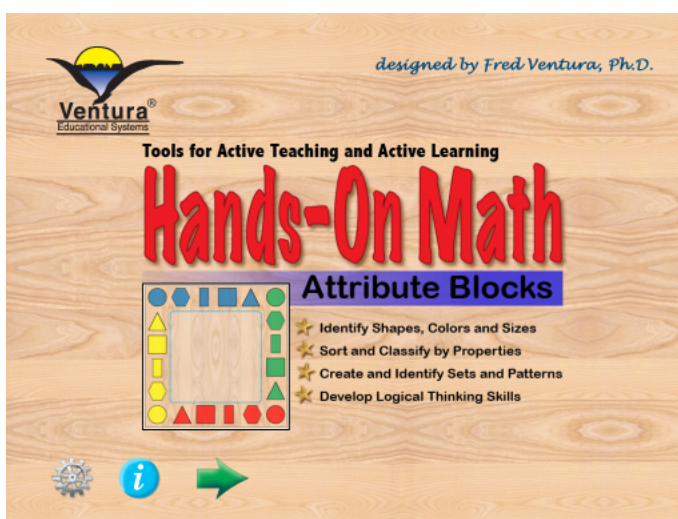
Getting Started

Hands-On Math Attribute Blocks helps student develop an understanding of set theory, geometry, number theory and logical thinking. The program is designed in such a way that the physical operation of the app does not interfere with the learning activity. Icons are used to provide the user with complete control over the interaction with the software features.



Attribute Blocks are essentially a set of objects that vary according to 1, 2 or 3 properties. In this application the properties are size, color and shape. It is an effective way to help students visualize mathematical relationships. Mathematical thinking skills are engaged as students manipulate the blocks.

Tap the Hands-On Math Attribute Blocks icon to launch the app.



The opening view presents the title page with three options:



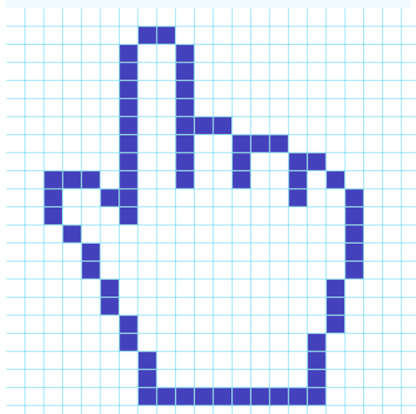
Settings - Tap this icon to control the sound, speech and view options of the app.



Info - Tap this icon to access the User's Guide where an overview of the app is presented.



Begin - Tap the green arrow to start using the Hands-On Math Attribute Blocks Playground.

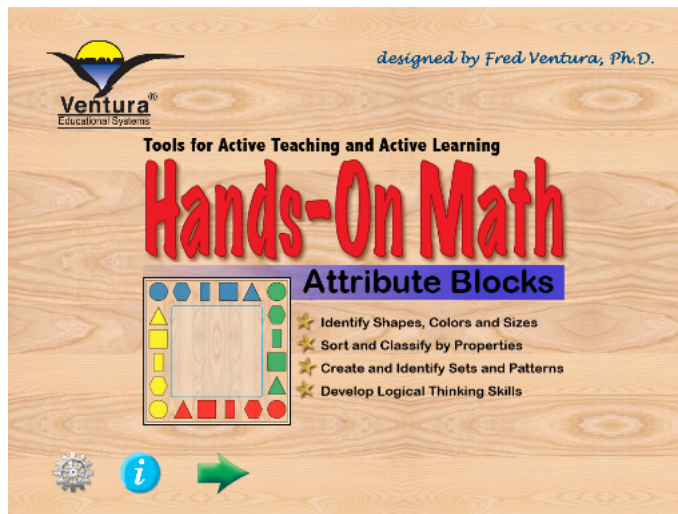


Settings

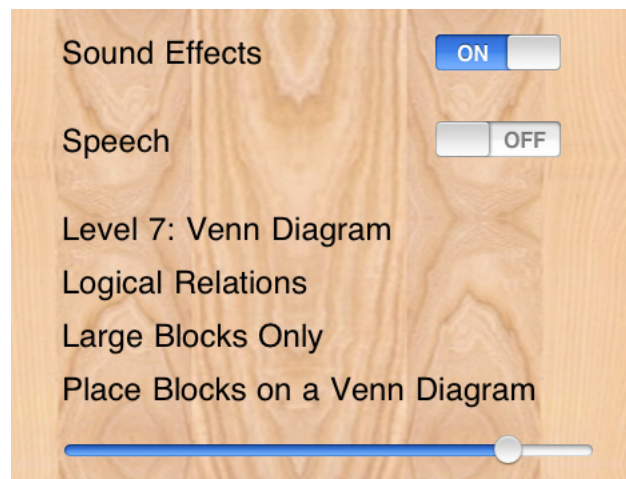


Use Speech effects with very young children to reinforce the names of the numbers.

The Settings option provides control of some of the basic features of the app. Options include control for sound effects and speech.

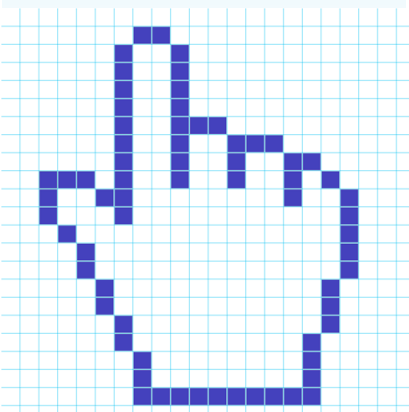


Mild sound effects are used through out the app and add a level of interest for students. When using the app with very young students teachers may wish to have the Speech option on. When Speech is 'on' the size, color and shape of each block is spoken as it is played.

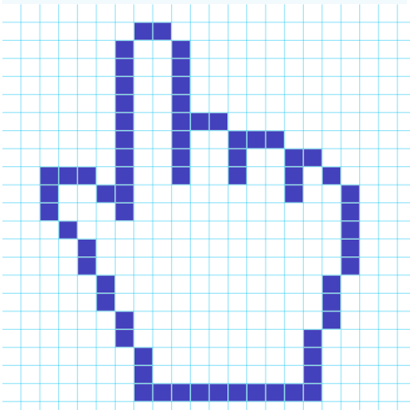
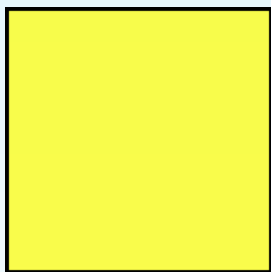
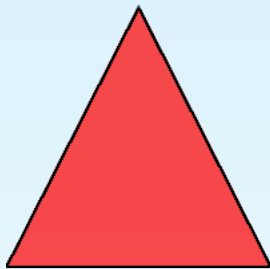
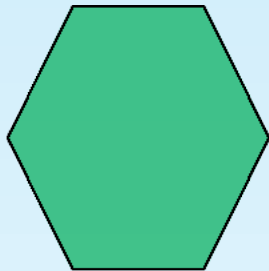


Use the on/off switch to activate or deactivate the sound effects and speech.

The app offers 8 levels sets and subsets, geometric properties, sequences, patterns and Venn diagrams.



Levels 1-8



Level 1: **Shapes and Colors**

Getting Familiar with Attribute Blocks

Large and Small Blocks

Explore and Discover

Level 2: **Classifying Shapes**

Recognizing Similar Attributes

Large Blocks Only - One Attribute

Find the Shapes that Fit a Rule

Level 3: **Classifying Shapes**

Recognizing Similar Attributes

All Blocks - Two Attributes

Find the Shapes that Fit a Rule

Level 4: **Logical Patterns**

Recognizing Differences

All Blocks Along the Trail

Place Blocks Along the Trail

Level 5: **2 × 2 Grid**

Recognizing Differences

Large Blocks Only

Place Blocks on a Grid

Level 6: **3 × 3 Grid**

Recognizing Differences

Large Blocks Only

Place Blocks on a Grid

Level 7: **Venn Diagram**

Logical Relations

Large Blocks Only

Place Blocks on a Venn Diagram

Level 8: **Venn Diagram**

Logical Relations

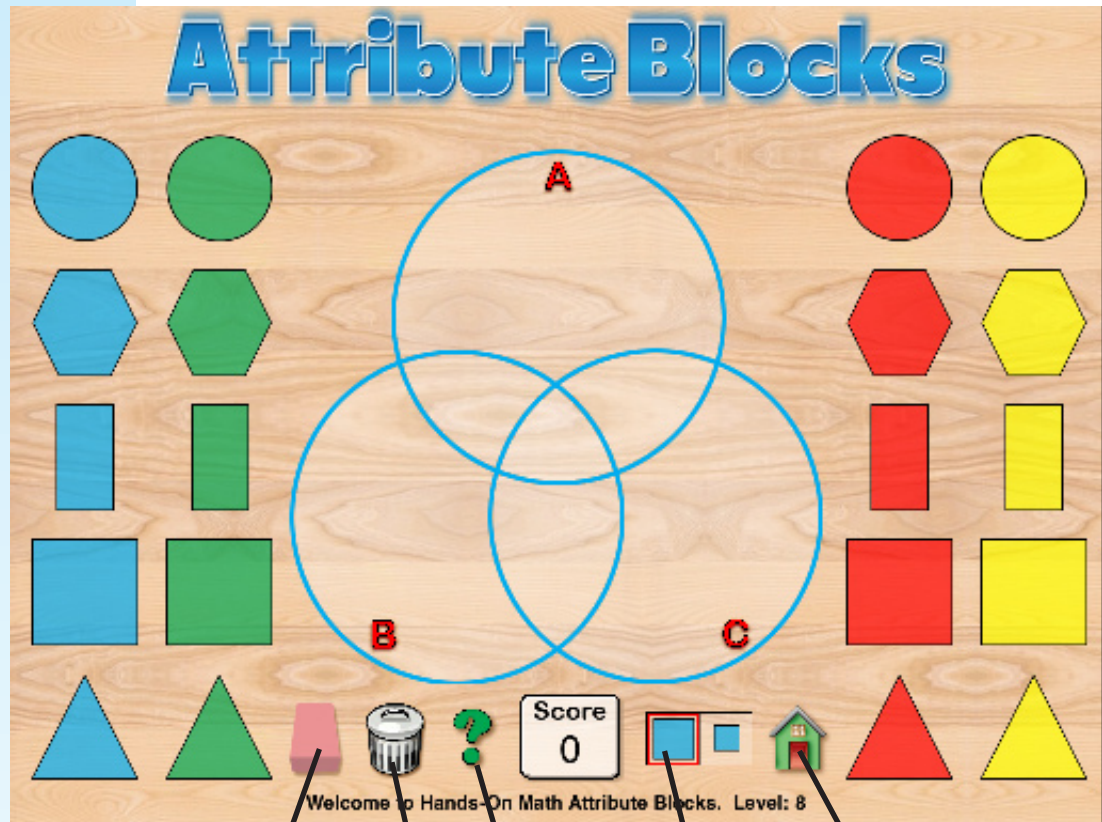
All Blocks - Three Attributes

Place Blocks on a Venn Diagram

Use the slider on the Settings screen to select an appropriate level.

Attribute Blocks Controls and Buttons

The Hands-On Math Attribute Blocks has several different configurations for exploring set theory, geometry, and logical reasoning. Tapping icons activates a variety of features.



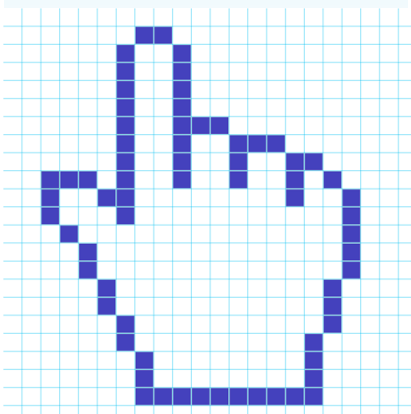
Tap the eraser to remove all the Attribute Blocks.

Tap the trash can to remove all the Attribute Blocks and reset the score.

Tap the Question Mark to set up a challenge or assign mystery rules .

Access large or small blocks by tapping this icon.

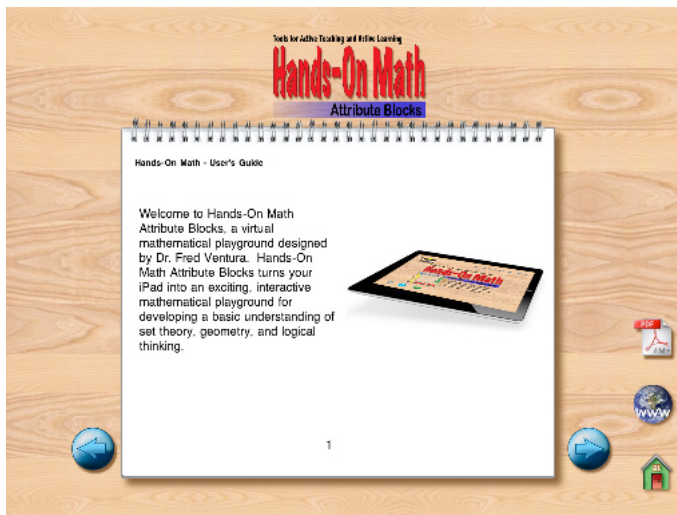
Tap Home to leave the Attribute Blocks Playground and return to the top level.



In App User's Guide



Tapping the Info icon brings up the Hands-On Math User's Guide. The guide provides a quick overview to the features of the app. It serves as a quick reference to the use of the product.



Users can navigate by tapping either the right or left arrows. Swiping right or left can also be used to move to the next page or previous page.

Exit the user's guide by tapping the home icon.

Swipe right or left to change pages or use the buttons.



Next Page - Tap this icon to move to the next page.



Previous Page - Tap this icon to move to the next page.



Instructor's Guide - Tap to automatically begin downloading the PDF of the Instructor's Guide from www.venturaes.com. We recommend you install the Instructor's Guide in iBooks for convenient reference.



Tap the World Wide Web icon to launch your iPad browser and view the Ventura Educational Systems website.

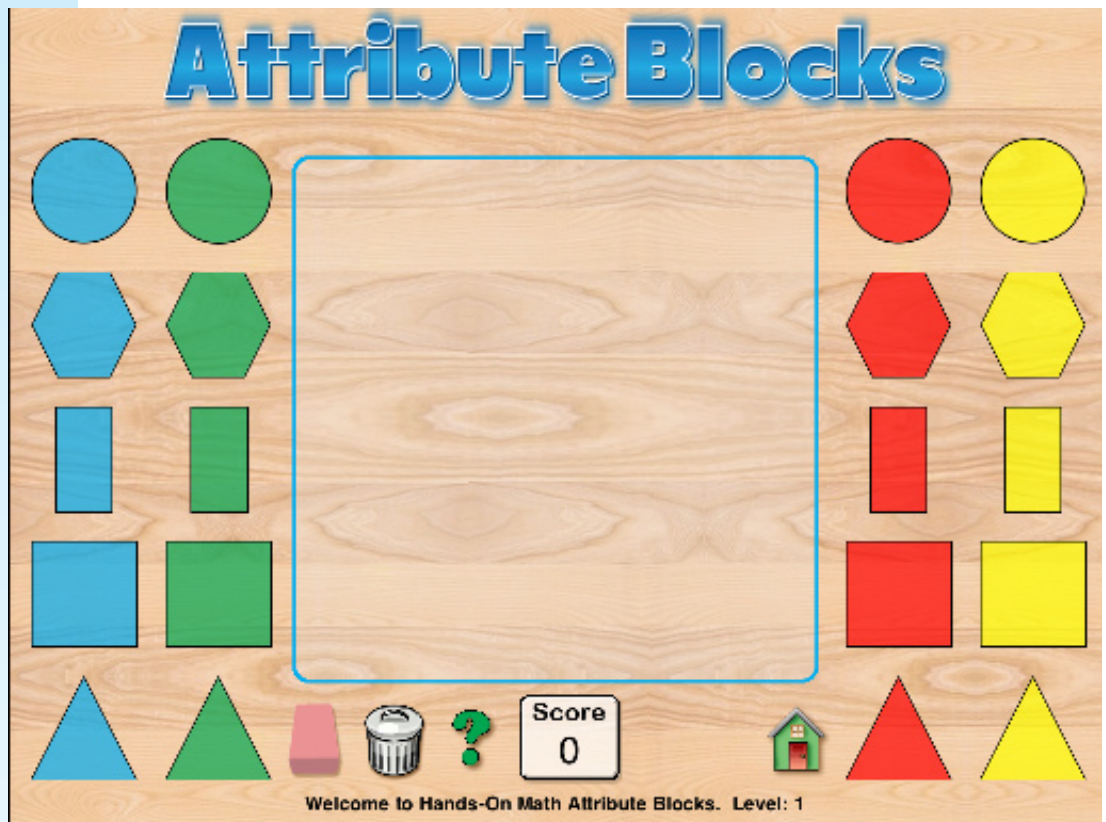


Home - Tap this icon to exit from the User's Guide.

Attribute Blocks Playgrounds



Choose the Level 1 Attribute Blocks Playground and let the fun begin. Tap the green arrow to get started. You will notice that in addition to the Attribute Blocks there is Playground area in the center of the screen. In Playground mode students can freely explore set theory, geometry, number theory or logical thinking by adding, moving and removing bars from the Playground.

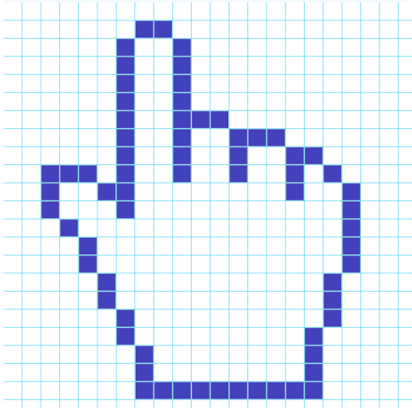


Gesture for Placing an Attribute Block on the Playground: Tap the red circle and while holding your finger down drag the circle to anywhere inside the Playground. Release your finger and the block stays where it has been placed.

To remove a Block from the Playground drag and drop it anywhere outside the perimeter of the Playground.

Notice that in this mode any Block can be added or removed from the Playground. Later we will tap the question mark icon to establish a rule for the Playground. When a rule is in place only the Blocks that fit the rule will be accepted on the Playground.

Playground mode is the default mode for the Attribute Block levels. When the question mark icon is tapped the Attribute Blocks app shifts into Question mode and waits for the student to solve a randomly generated challenge by placing Blocks and paying attention to feedback.



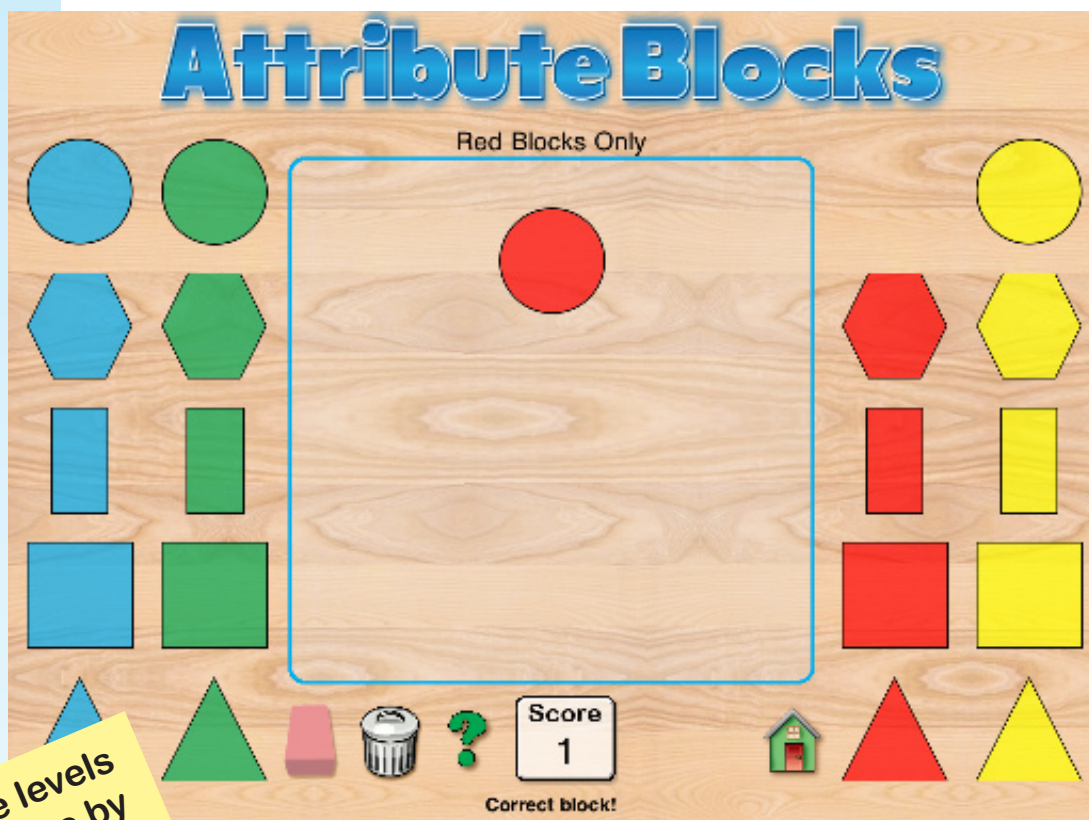
Generating Problems at a Specific Level

Tap the green question mark icon to randomly assign a rule to the Playground. Here for example a Level 1 problem is shown and the rule is to place only Red Blocks on the Playground. One red circle has been placed on the Playground and the score reflects that one piece has been successfully placed. The student's task is to find **all** the pieces that fit the rule.

Answering correctly increases the score which is show at the bottom of the screen.

Every time the correct block is placed the score increases by 1 point.

Change levels at any time by navigating to the Settings screen.



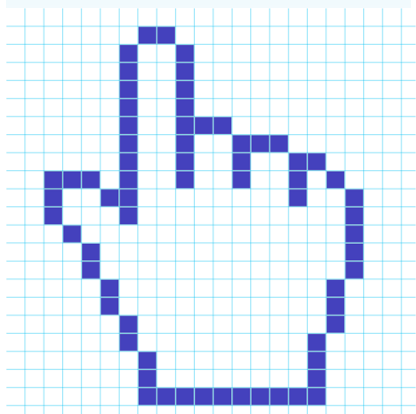
Drag and drop all the blocks that fit the rule to complete the challenge. After a challenge has been solved the Attribute Blocks app automatically returns to the Playground mode. Tap the green question mark to generate another challenge and continue until a desired score is achieved.



Tap the eraser icon to remove the last bar placed on the Attribute Blocks Playground.



Tap the trash can icon to clear all the bars from the Attribute Blocks Playground.



Instructional Goals

Generally the purpose of using Attribute Blocks as a math manipulative is provide students with activities that involve recognizing attributes, visualizing patterns of attributes apply logical thinking to problem solving situations. The Attribute Blocks used in this app have three attributes: Color (Blue, Green, Red, and Yellow), Shape (Circle, Hexagon, Rectangle, Square and Triangle), and Size (Large and Small). For the purposes of the logic exercises, square and rectangles are considered different shapes. However it would be helpful for students to realize that in geometry squares are consider rectangles.

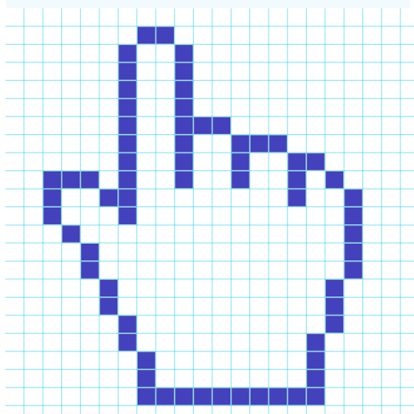
Several of the activities involve building at train of Attribute Blocks that fit a rule. A train might be constructed with a pattern using color, for example green, green, blue, or using shape, as in, triangle, square, square, or using size, as in, large, small, large, small. Students are challenged to build a train using blocks that continue the pattern, until all spaces in the train are filled.

Problems involving Venn diagrams are often found on assessment tests. Levels 7 and 8 use Venn diagrams to present logical thinking problems. The logical reasoning used so solve the Venn diagram challenges that are presented at Levels 7 and 8 is useful in many curriculum areas, not just mathematics. This type of reasoning skill has relevance to social science and science in addition to mathematics.

As students use this app they should begin to expand their mathematical vocabulary. Encourage students to give verbal descriptions of the patterns the see while using the app. Some of the activities require the students to work in small groups and this is an opportunity to use mathematical language in sharing and refining ideas. In large group instructional situation with your iPad connected to a projection device teachers can demonstrate a variety of mathematical concepts using the app, for example, properties of geometric figures, sequences, patterns, and Venn diagrams.

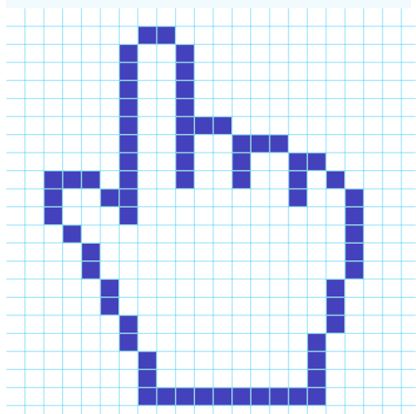
Teachers will want to guide the learning experience with questions that help students focus on critical attributes. “Do the shapes create a pattern?” “What color comes next in this pattern?” “Does this block belong in this space?” “Can you name a piece that could be placed in the next spot along the trail?” When an incorrect block is played it automatical bounces back to its default location. When this happens teachers might want to help students see why that particular piece doesn’t work.

Hand-On Math Attribute Blocks is designed to be used at a variety of grade levels. It is appropriate for individual, small group or classroom learning situations.



Activities

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What's My Rule?



Settings

Tap the Settings icon from the top level and use the slider to choose Level 1: Shapes and Colors.



Sound Effects

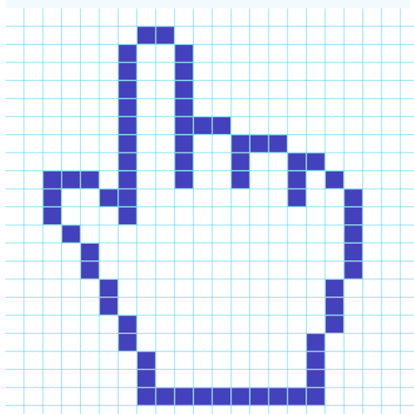


Speech

Tap the eraser to remove the last tile placed or pick up any unlocked tile and drop it off the Tangle Table to remove it.

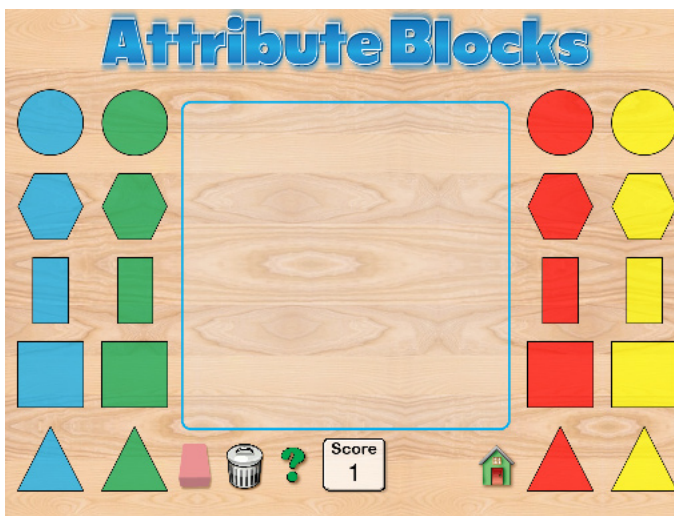


Eraser



Let's begin exploring Attribute Blocks with the setting on Level 1 Shapes and Colors. After choosing Level 1 in Settings, tap the green arrow from the top level to start the Attribute Blocks Playground.

This is a two player game so pair each student with a partner and one iPad. Determine Player A and Player B.



Player A thinks of a rule for the Playground. The rule might be red blocks only, or hexagons only. Player B's task is to figure out Player A's rule, but no talking is allowed. Player A gives Player B feedback by show a 'Thumb's Up' or 'Thumb's Down' for each block. Blocks that get a 'Thumb's Up' can stay on the Playground. Blocks that get a 'Thumb's Down' should be removed.

Play continues until Player B can correctly guess Player A's rule.

Continue by switch roles. Let Player B challenge Player A.

Encourage students to try rules that involve subsets, negations, unions and intersections. Here are some suggestions:

1. Not blue.
2. Green and square.
3. Not rectangle and not hexagon.
4. Not blue and not rectangle.
5. Red or yellow.

Level 1: Learning about Attributes

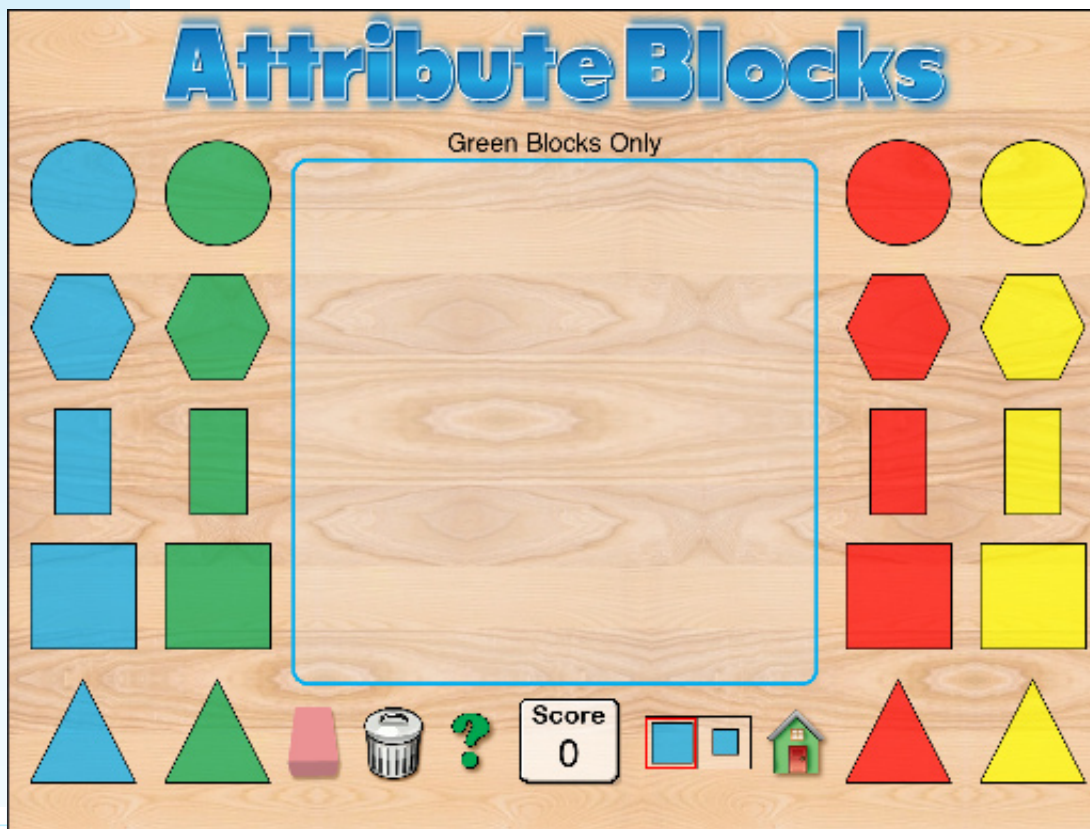
Level 1 introduces students to the idea of a set as a group of well defined objects. Using Attribute Blocks we can define a set as red blocks, blue blocks, squares, circles, or even by combining two or more attributes, for example, blue rectangles.

Introductory Activities

Place a square Attribute Block on the playground.

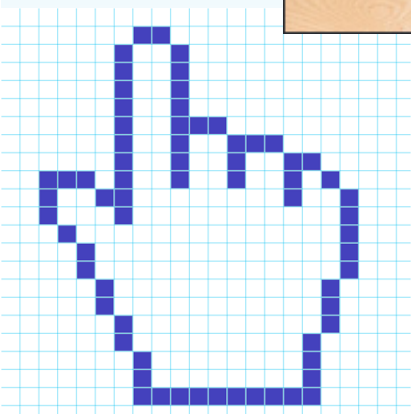
- How many sides does it have?
- Are all the sides the same length?
- What color is it?
- Can you find another shape that is the same shape?
- Can you find another shape that is the same color?

Repeat this exercise with a hexagon, rectangle, circle and triangle.



When the question mark icon is tapped, the app shifts into problem solving mode. For example, above a set has been defined as Green Blocks Only. The task is to find all the green blocks at place them on the Playground. Blocks are evaluated as they are placed on the Playground. One point is earned for each correct placement.

Tapping the eraser or trash can icons to exit problem solving mode.



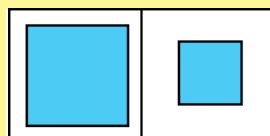
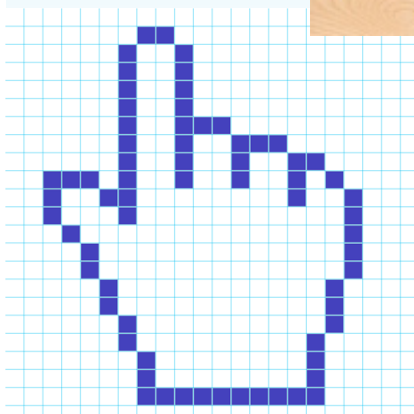
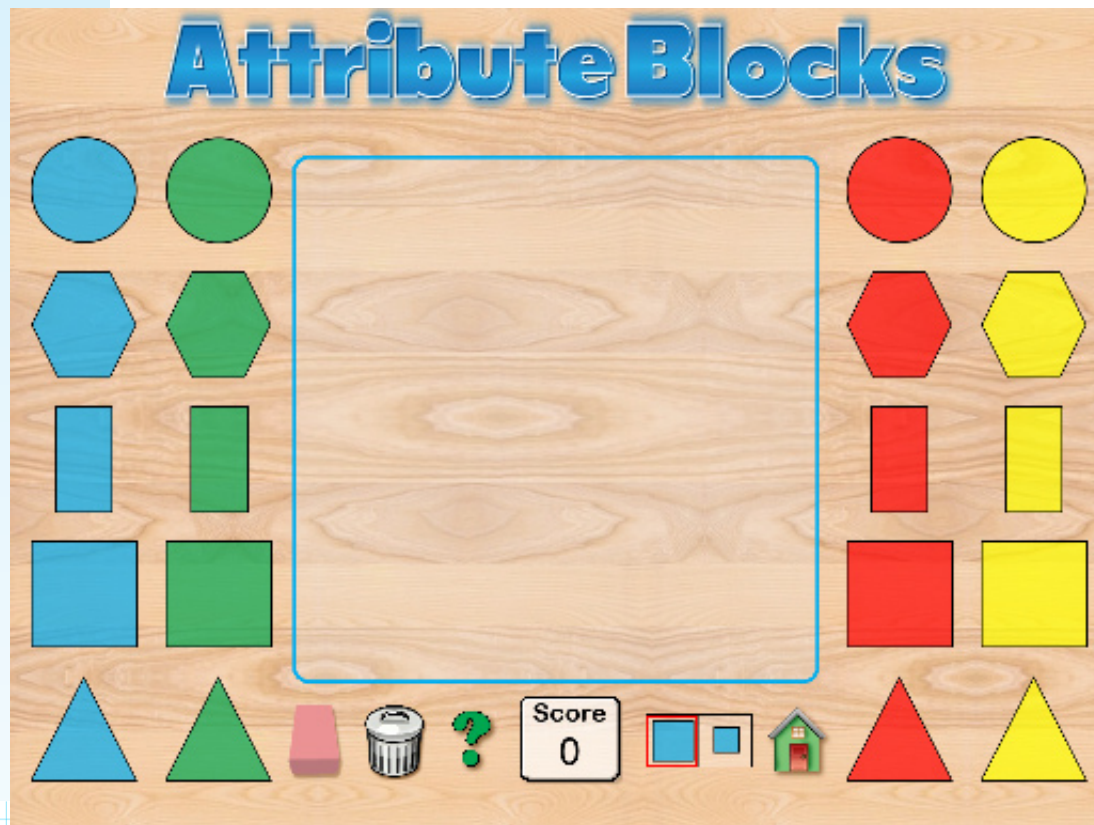
Level 1: Sorting and Classifying Shapes

Organize your students in pairs or small groups with one iPad per group. Allow each of the students in the group to practice moving Attribute Blocks into and out of the Level 1 Attribute Blocks Playground.

If your iPad display can be projected in your classroom, use the Notes app to show the following words or write these words on the board.

large, small
blue, green, red, yellow
circle, hexagon, rectangle, square, triangle

Ask a student in the class to read the first word and ask one of the students in the group to move a block with the attribute that was read aloud onto the Playground. Other students in the group should agree that a correct piece was placed.



Teacher Note: It may be helpful to point out to students the icon used to switch the size of the blocks displayed on the table top. This icon is available when the level setting calls for the use of both large and small blocks.

Level 1: Small Group Activity

And / Or
Logic

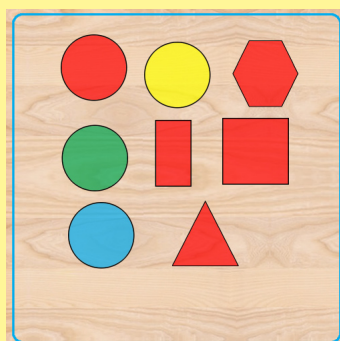
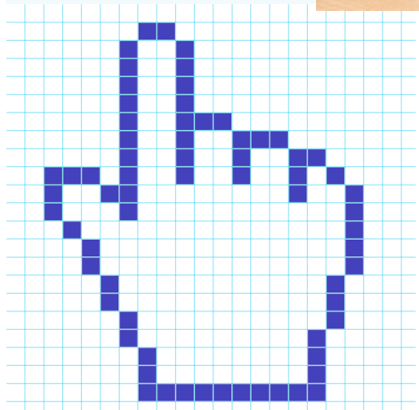
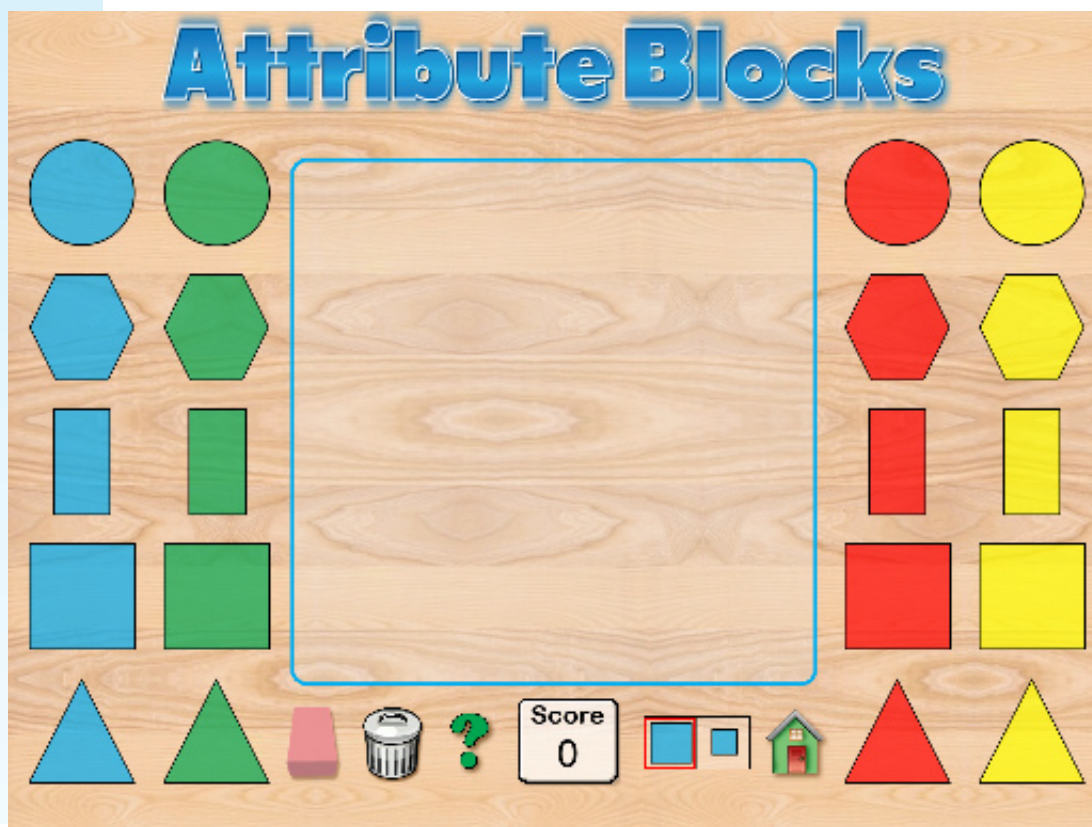
Organize your students in pairs or small groups with one iPad per group. Allow each of the students in the group to practice moving Attribute Blocks into and out of the Level 1 Attribute Blocks Playground.

If your iPad display can be projected in your classroom, use the Notes app to show the following words or write these words on the board.

large and blue
green and rectangle
yellow or circle

green and hexagon
blue or circle
square or triangle

Ask a student in the class to read each phrase and ask one of the students in the group to move a block that has attributes that were read aloud onto the Playground. Other students in the group should agree that a correct piece was placed.



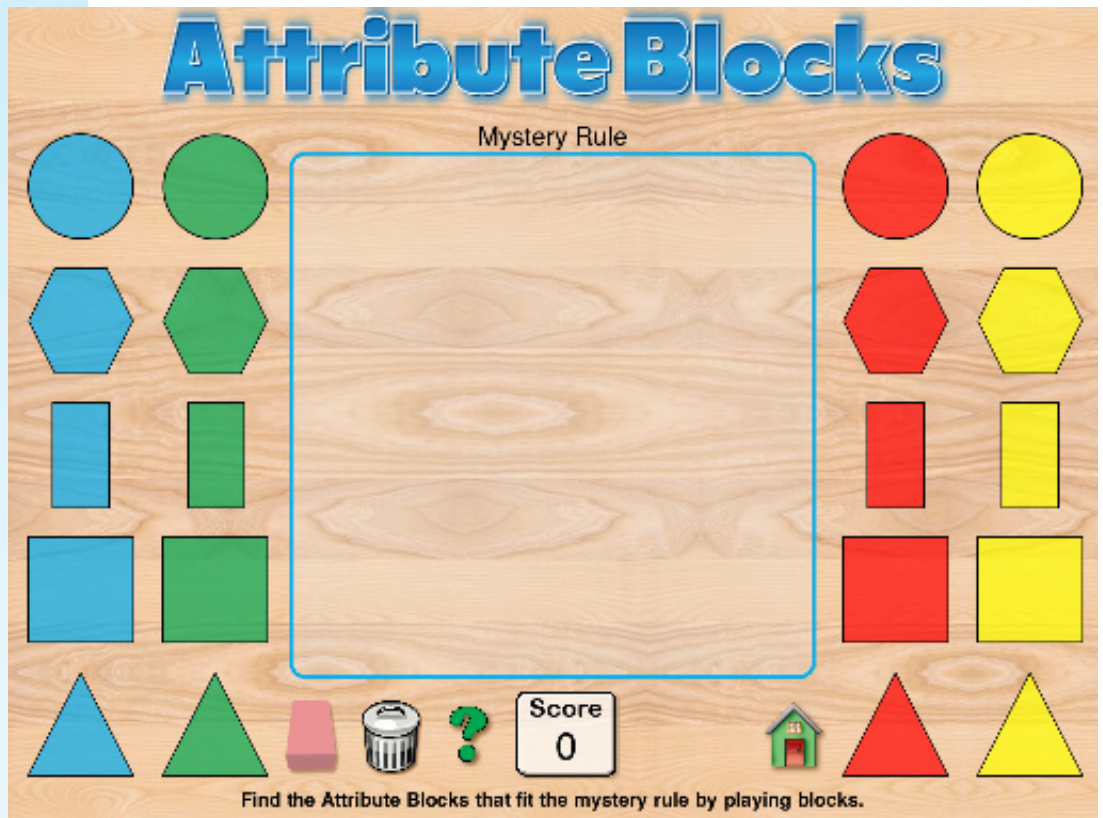
Teacher Note: An alternate strategy is to have one student in the group to place blocks onto the Playground that fit a rule and then ask other students to guess the rule.

For example, here the rule is 'circle or red'.

Level 2: Recognizing Similar Attributes

Level 2 involves recognizing similar attributes. For this level we use only the 20 large blocks. Tap the question mark icon and notice that the words ‘Mystery Rule’ appear at the top of the screen above the Playground area.

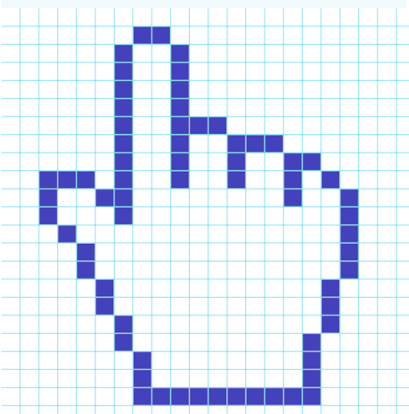
The task is to place Attribute Blocks on the Playground in order to determine the Mystery Rule. As pieces are played they are either accepted or rejected. If a block is rejected feedback is given, for example, “That block is an incorrect shape.” Use the feedback to logically determine the mystery rule.



As a follow-up activity ask students to complete the following table.

Block Shape	Number of Sides
Triangle	
Square	
Rectangle	
Hexagon	
Circle*	

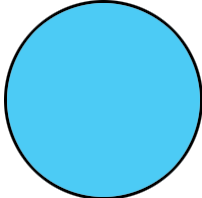
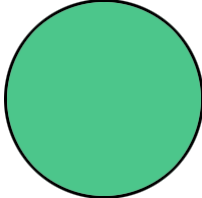
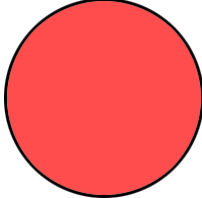
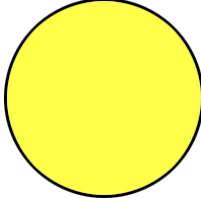
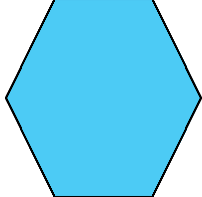
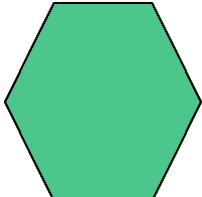
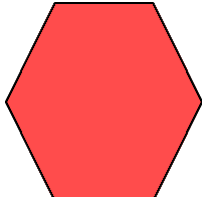
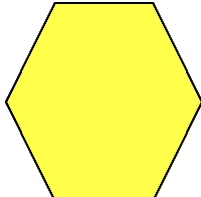
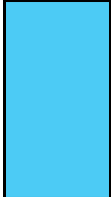


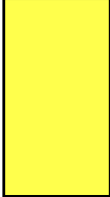
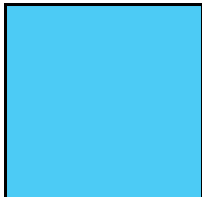
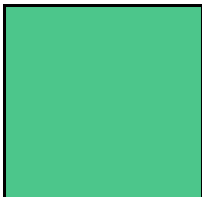
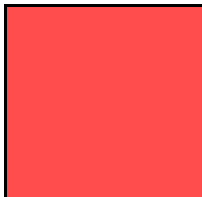
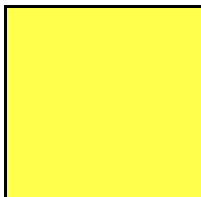
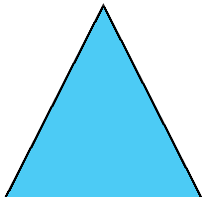
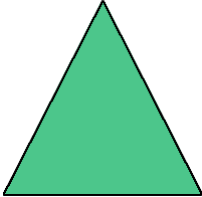
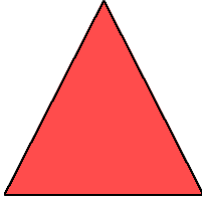
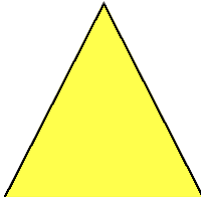
** If a side is defined as a straight line segment forming the edge of a polygon, then the number of sides of a circle is 0 since it is not a polygon. This is a complex idea since increasing the number of sides of a regular polygon approximates a circle, but by definition a circle is the locus of all points equidistant from a central point.*

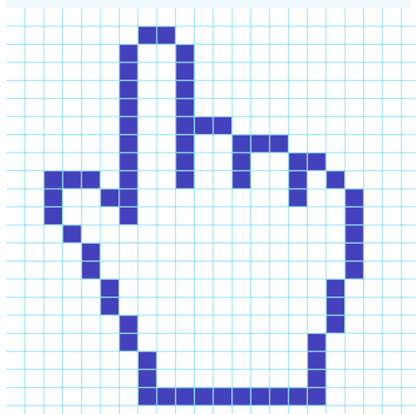


Level 3: Logical Rules

At Level 3 students use deductive reasoning to solve the mystery rule. It is important for students to pay attention to the feedback given after a block is played to figure out the mystery rule.

Project this chart onto the classroom's whiteboard and use a marker to X-out the blocks that are eliminated with each feedback message to demonstrate the process of elimination used to determine the mystery rule.



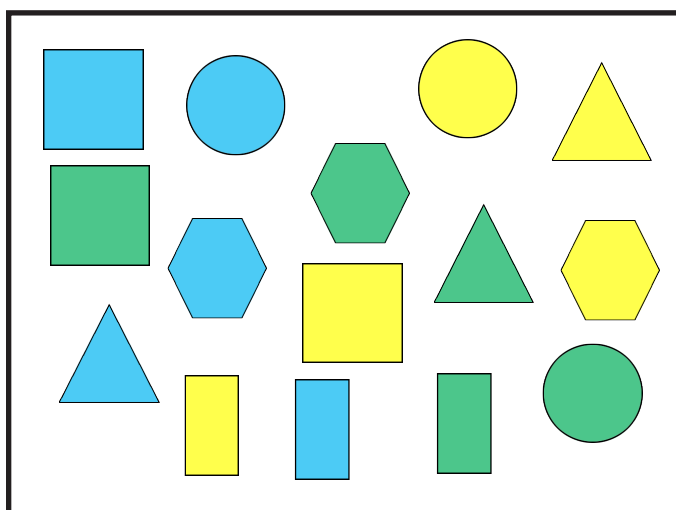
Level 3: Mathematical Reasoning

When the question mark icon is clicked at the Level 3 a mystery rule is generated. The rule might apply to a single attribute, for example, color, shape or size. The rule might apply to two attributes, for example, blue squares. Or the rule might apply to three attributes, size, color and shape.

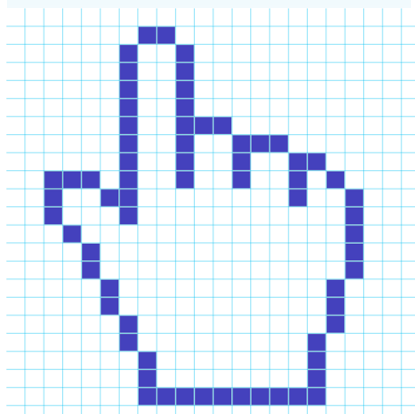
Give students ample time to play with Level 3. Challenge them to try to reach a score of 100. After they have had sufficient experience with this activity encourage them to use mathematical reasoning to complete this table.

Attribute Rule	Number of Blocks
Hexagons	8
Red	
Yellow Square	
Small	
Blue and Rectangle	
Blue	
Triangle	
Small and Triangle	
Not Blue and Large	
Green and Small	
Not Yellow and Triangle	
Blue and Square	

Write a rule to describe this set of blocks.



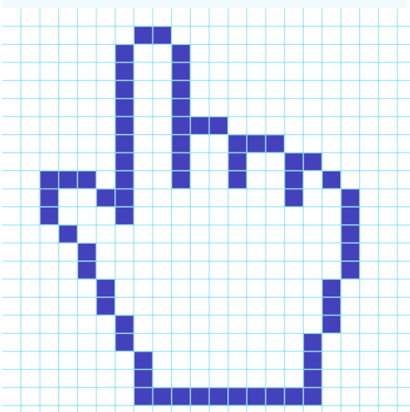
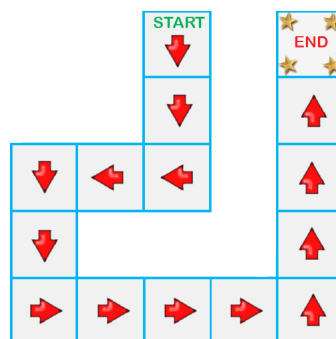
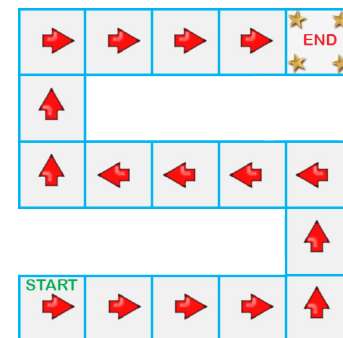
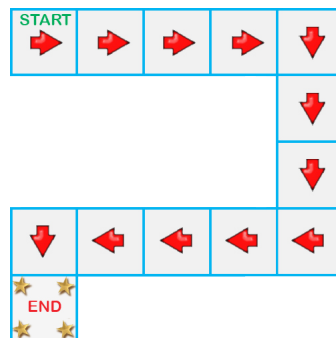
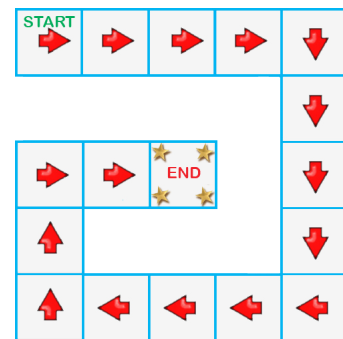
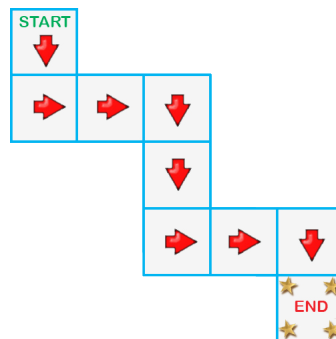
Rule: _____



Level 4: Attribute Block Trains

Attribute Blocks Trains is an activity designed to help student recognize attributes and patterns of attributes by placing pieces along a trail. The blocks placed along the trail must follow the rule for number of differences. For example, a large, blue square and a large, red square differ in only one way (shape). A large, blue hexagon and a large red circle differ in two ways (shape and color).

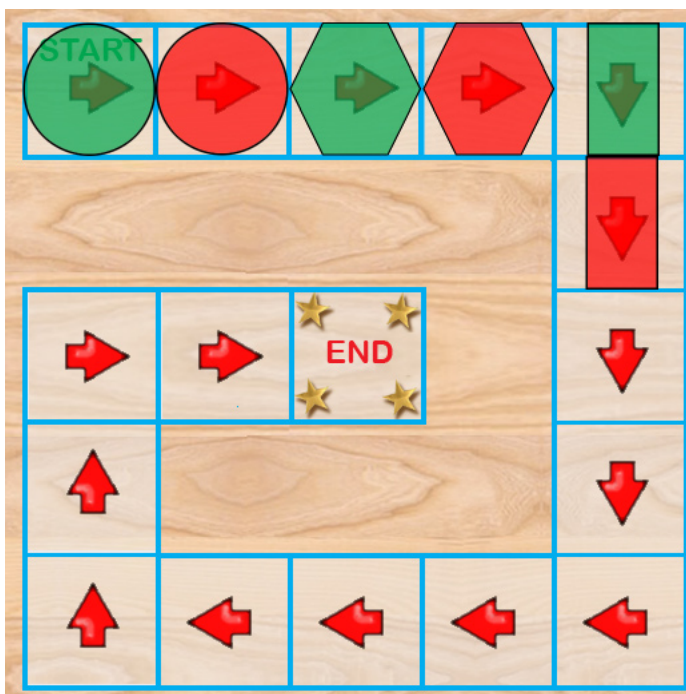
When the Level 4 setting is used one of five Attribute Block trails are selected. The object is to place blocks along the trail to make a train with the given number of differences.



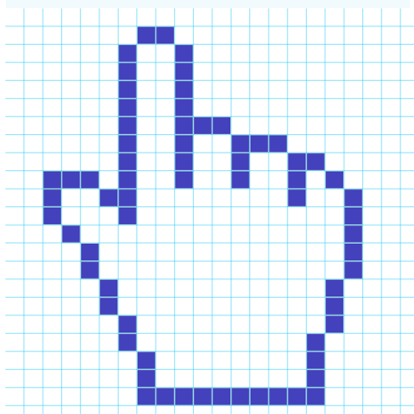
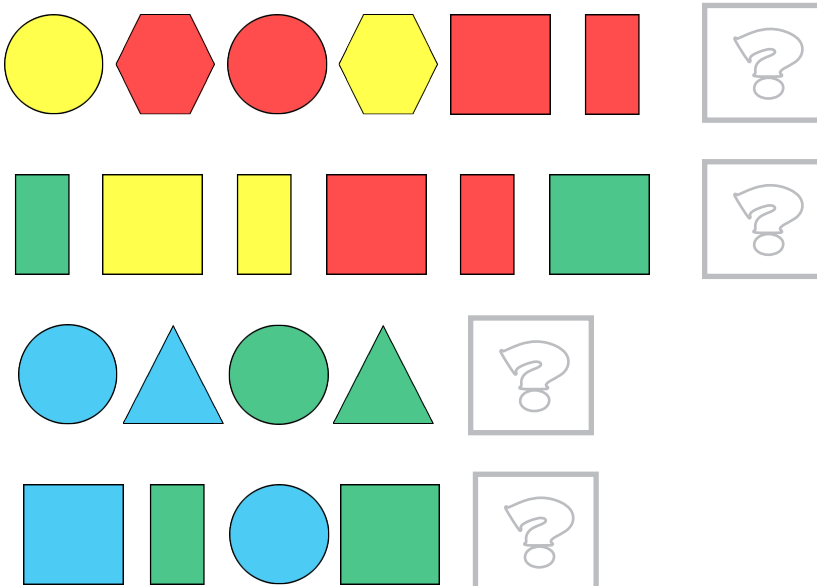
Level 4: Attribute Block Trains

Choose Level 4 from the Settings screen and then navigate to the Playground. Tap the eraser icon to clear the difference rule so that any pattern of blocks can be placed on the Playground.

Make a pattern using Attribute Blocks. Here is an example of a pattern using color: green, red, green, red, green, red. What color should the next block be?

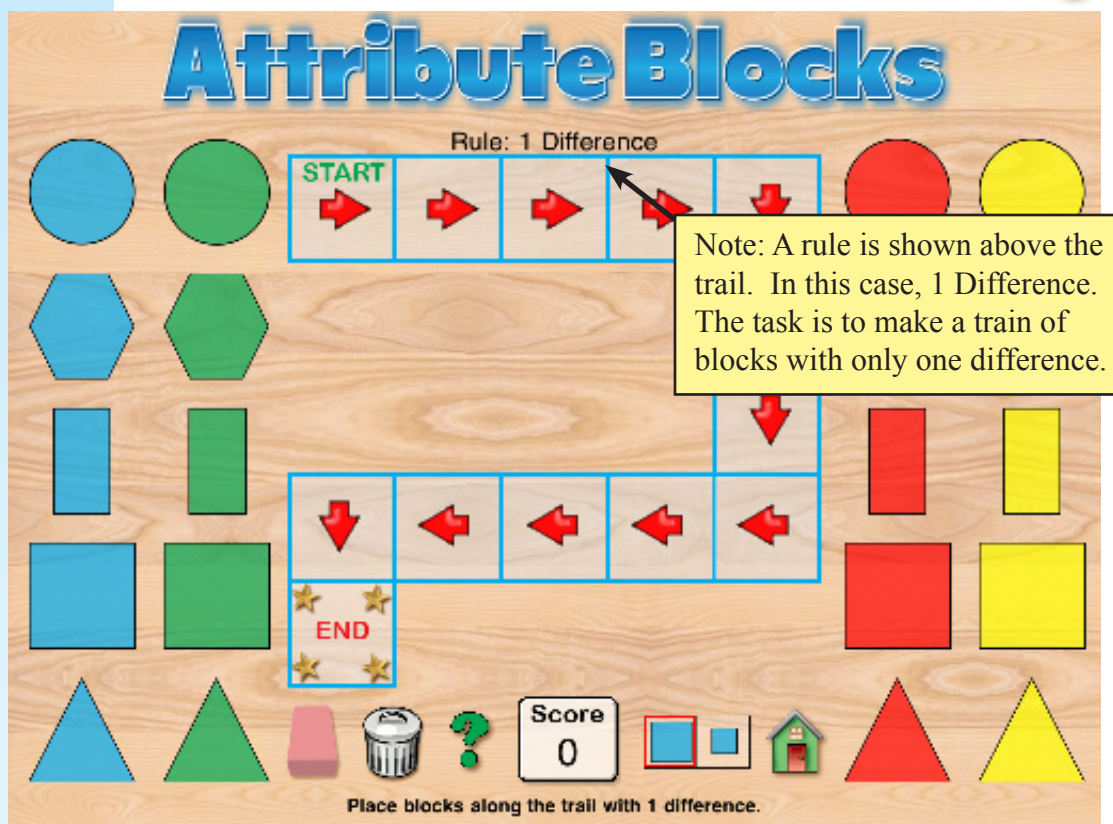


Organize your students in pairs or small groups with one iPad for each group. Ask one student in the group to make a pattern using at least 4 blocks. The challenge for other students in the group is to find the next block in the sequence. Here are some examples.



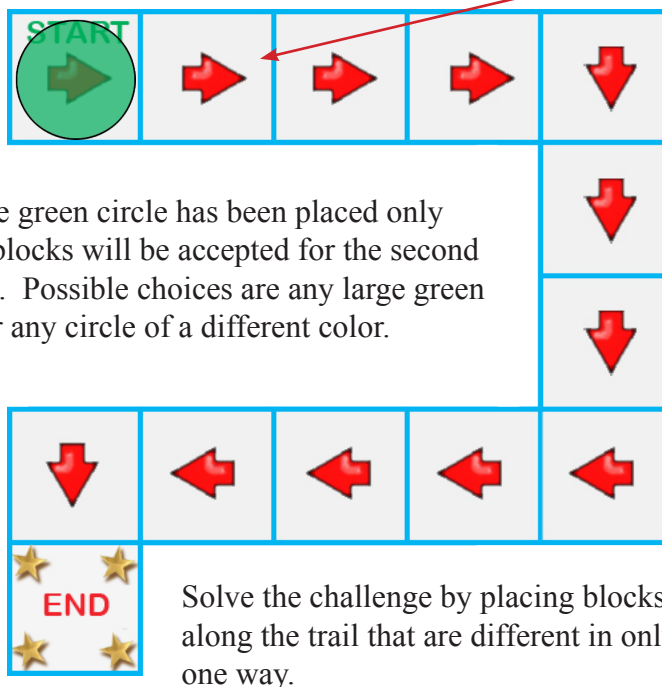
Level 4: Attribute Block Difference Trains

Choose Level 4 from the Settings screen and then navigate to the Playground. Tap the question mark icon to set up challenge.



Trails for the Attribute Block trains are randomly selected so your screen might look different.

Begin to solve the difference challenge by placing a block at the start position of the trail. Any block can be the starting block. For example a green circle can be played as the first block.



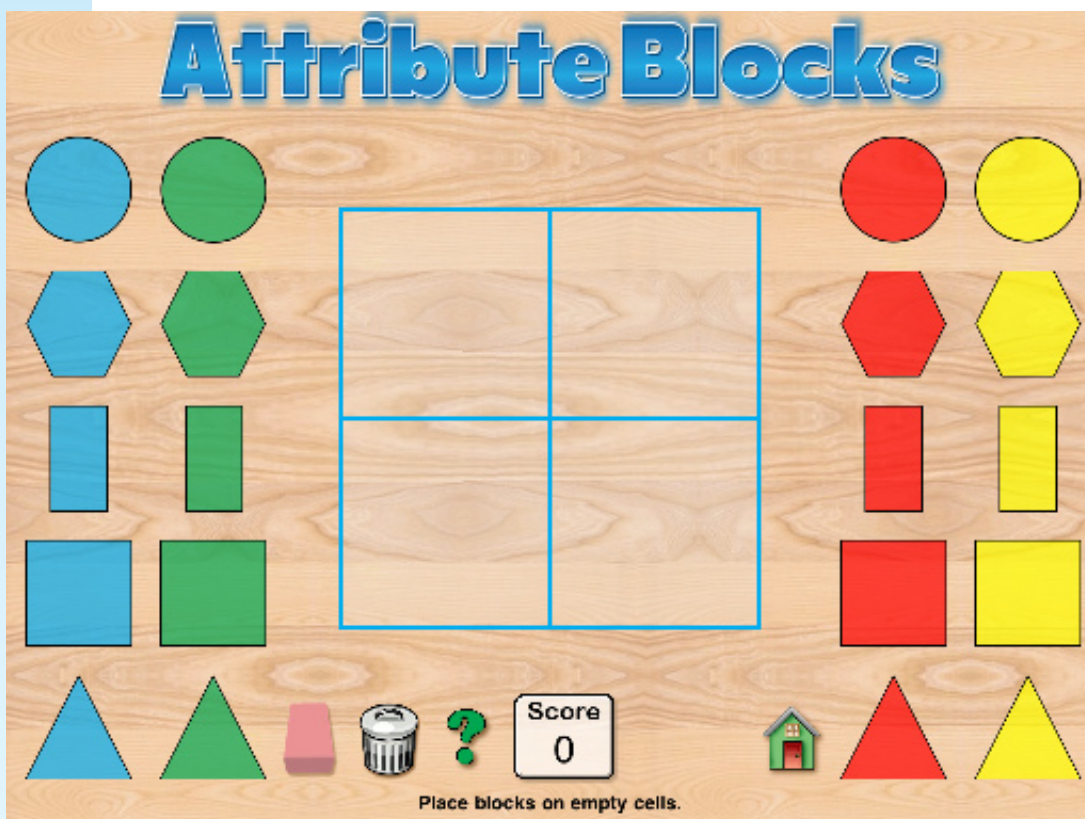
Once the green circle has been placed only certain blocks will be accepted for the second position. Possible choices are any large green shape or any circle of a different color.

Solve the challenge by placing blocks along the trail that are different in only one way.

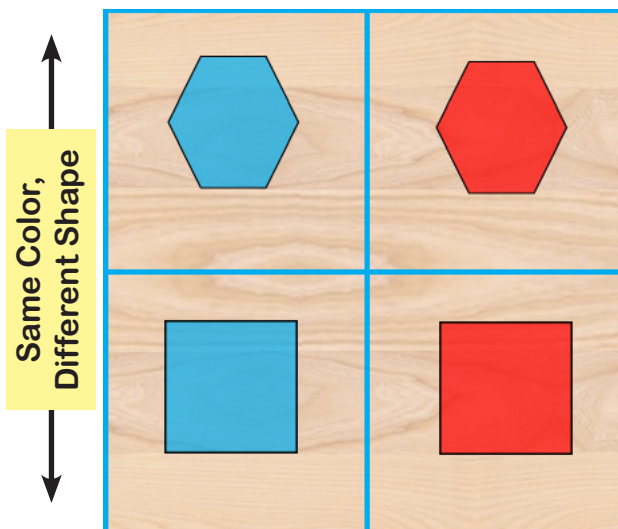


Level 5: 2 × 2 Grid

At Level 5 the Playground is a grid with two columns and two rows. Tap the eraser so that any Attribute Block can be placed in any cell of the grid. Use this mode for demonstration purposes.



← Same Shape,
Different Color →

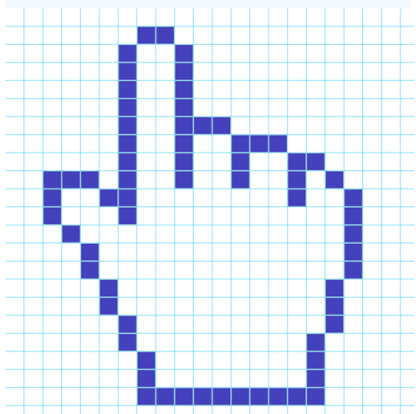


Place two hexagons and two squares as shown here.

Use this example to explain to students how each Attribute Block is different from its neighbor in just one way.

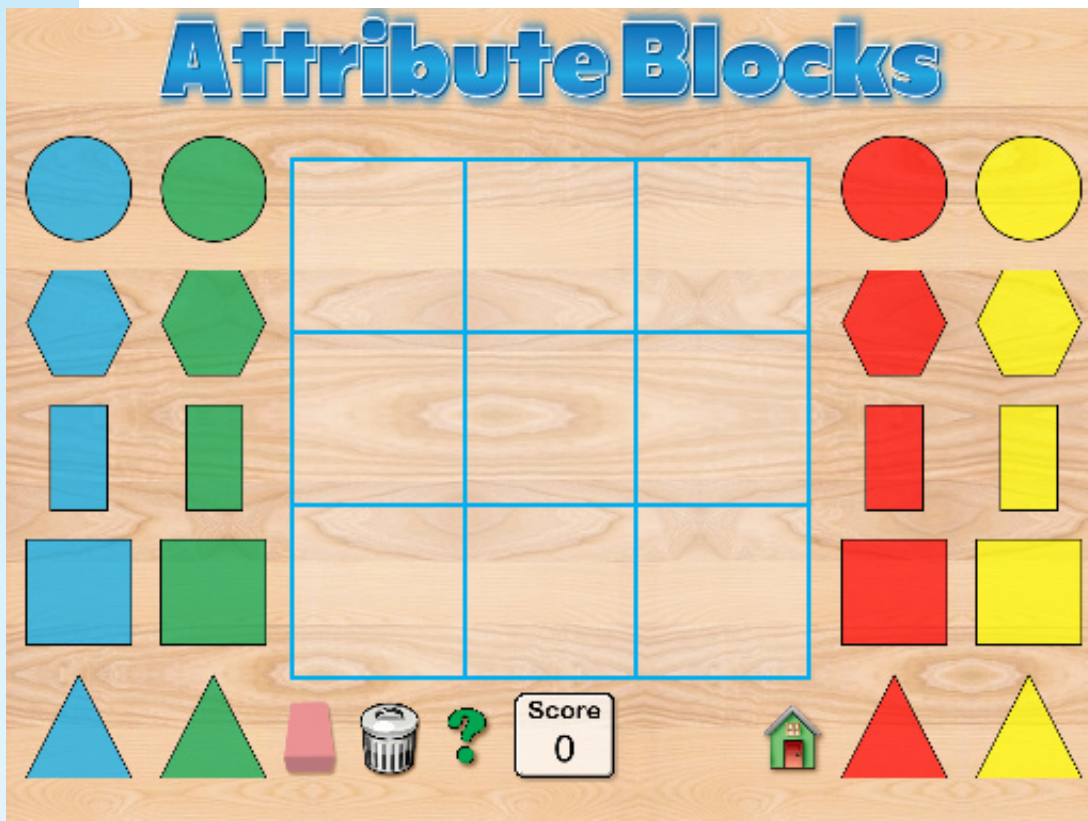


Tap the question mark icon and the iPad will automatically generate a rule for the grid to set up a challenge. Place blocks on the grid using logical reasoning to solve the challenge.



Level 6: 3 × 3 Grid

At Level 6 the Playground is a grid with three columns and three rows. Tap the eraser so that any Attribute Block can be placed in any cell of the grid. Use this mode for demonstration purposes.

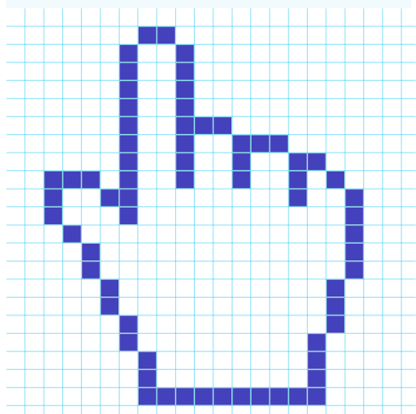
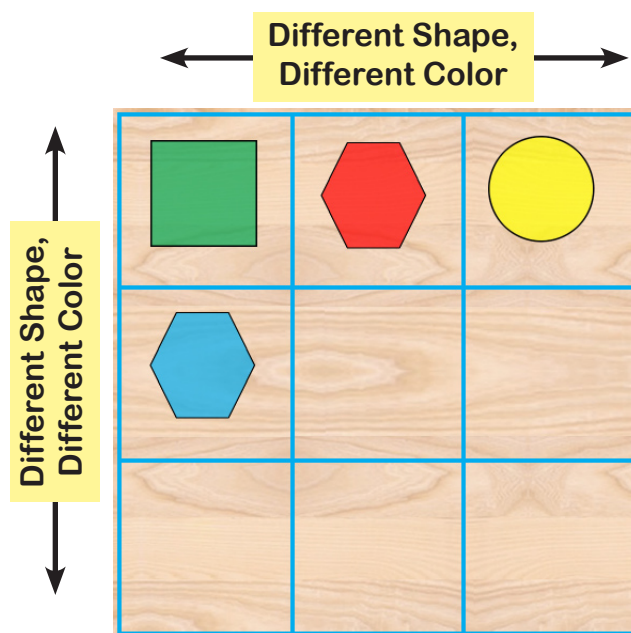


Place a green square, red hexagon, yellow circle and blue hexagon on the grid as shown.

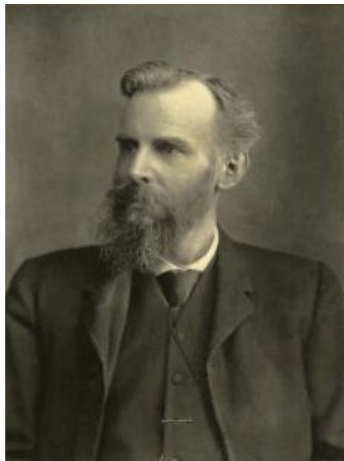
Use this example to explain to students how each Attribute Block is different from its neighbor in two ways.



Tap the question mark icon and the iPad will automatically generate a rule for the grid to set up a challenge. Place blocks on the grid using logical reasoning to solve the challenge.



Level 7: Logical Relationships with Venn Diagrams

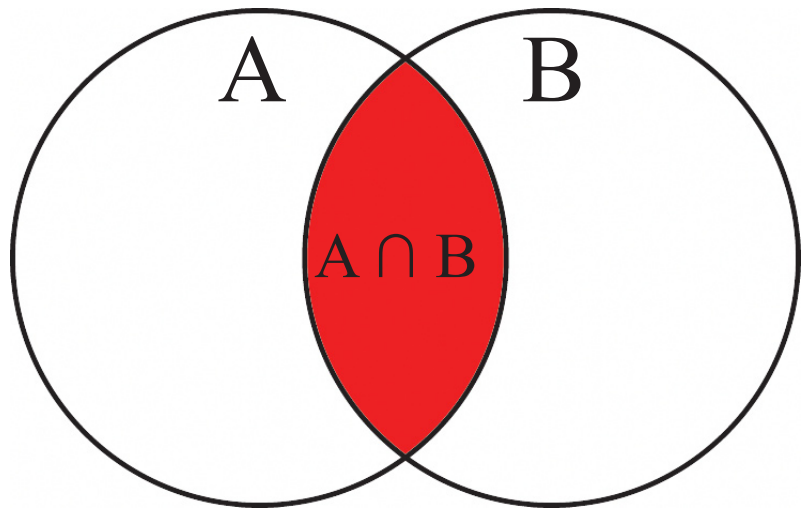


John Venn (1834 – 1923)

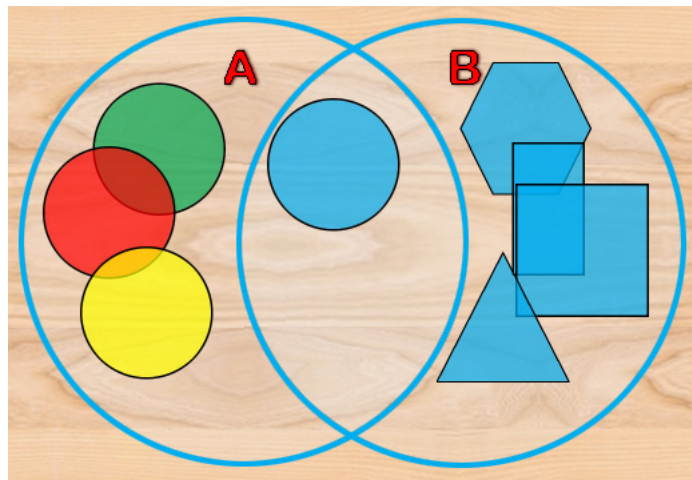
Venn diagrams were introduced in 1880 by John Venn, a British philosopher and logician. Venn diagrams are useful in many fields of study including set theory, probability, logic, statistics, computer science, social science and biology.

At Level 7 the Playground is a Venn diagram with two intersecting circles. Venn diagrams are also referred to as set diagrams. This type of diagram is often used to show logical relationships with a set of objects.

The regions in a Venn diagram define logical relationships. In this diagram circle A and circle B intersect. The region formed by the intersection is used to represent the logical relationship between objects in set A and objects in set B.



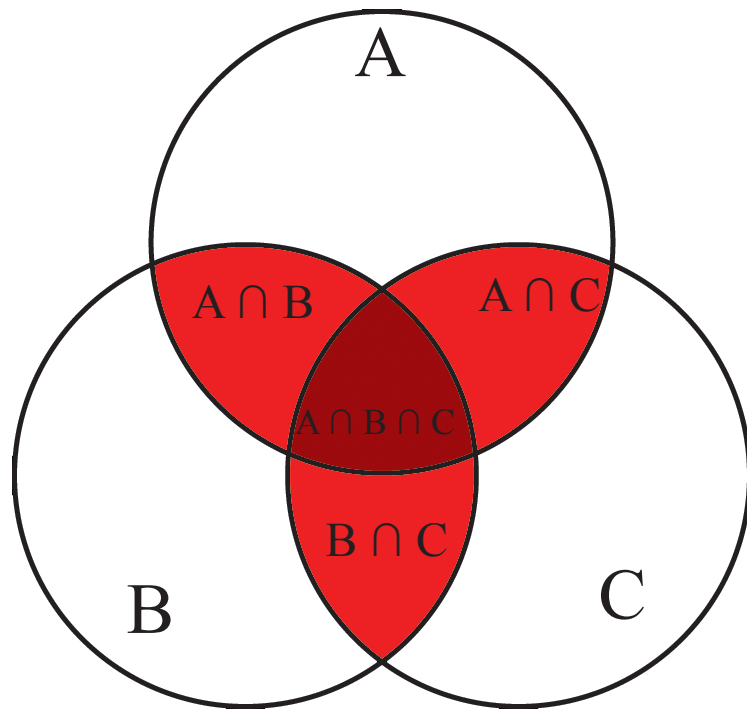
For example if the rule for set A is 'circle' and the rule for set B is 'blue', any Attribute Block that is a circle belongs in circle A and any Attribute Block that is blue belongs in circle B. Blue circles belong in the intersection. Demonstrate this on the Attribute Blocks Playground by placing blocks as shown below.



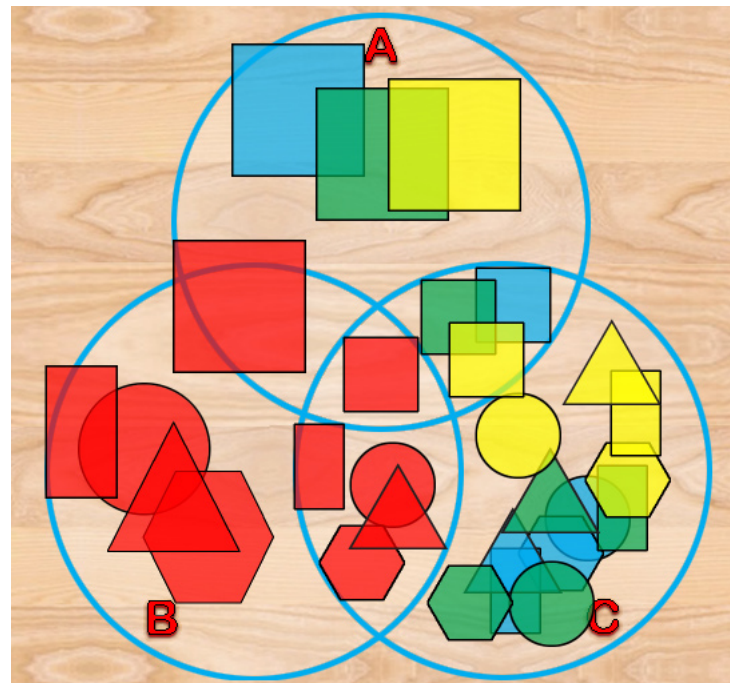
Tap the question mark icon and the iPad will automatically generate a rule for circle A and circle B to set up a Venn diagram challenge. Place blocks in the regions of the diagram using logical reasoning to solve the challenge.

Level 8: Logical Relationships with Venn Diagrams

At Level 8 the Playground is a Venn diagram with three intersecting circles. In this diagram circle A, circle B and circle C intersect to create 7 distinct regions. The regions formed by the intersections are used to represent the logical relationships between objects in set A, set B and set C.



For example if the rule for set A is 'square' and the rule for set B is 'red' and the rule for set C is 'small', any Attribute Block that is a square belongs in circle A but red squares belong in the intersection of A and B. Small red squares belong in the center region. Demonstrate this on the Attribute Blocks Playground by placing blocks as shown here.



Tap the question mark icon and the iPad will automatically generate a rules for circles A, B and C to set up a Venn diagram challenge. Place blocks in the regions of the diagram using logical reasoning to solve the challenge.

Hands-On Math Attribute Blocks

Ventura Educational Systems

