Design Document
Shape Shifters

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Pitch Document

Game Title: Shape Shifters

Genre: Simulation

Platform: Online web application

Game Concept: Shape Shifters is a single player, mathematics educational game. Designed to help build mathematical skills around shapes, colors, and patterns. The game is formatted as a simulation that emulates real life events, following a narrative story in a fun and engaging way. The avatars and locations in the game are animated and realistic to appeal to a younger population. Learning opportunities are tied to the actions, rules, and the context of the game through mathematics problems. Players will navigate through "a day in the life" narrative story from a child's bedroom to the park, and the ice cream shop. The math problems are presented through activities the player must perform to progress the narrative and continue play. Players are given the opportunity to earn an Achievement Badge throughout gameplay when successfully completing challenge activities.

Target Audience: Ages 2-5

Implementation Context: Formal classrooms and/or Individual Online Learning

Learning Objectives: Learning objectives are aligned to the Texas Prekindergarden Guidelines for mathematics.

1. Players will recognize colors.
2. Players will recognize 2D shapes.
3. Players will identify color patterns.

4. Players will complete color patterns.

Hook: The game is realistic in that it presents a narrative story that is relatable and familiar to the audience, offering both extrinsic and intrinsic motivations. The goal of Shape Shifters is to help children improve their knowledge and comprehension in mathematics surrounding shapes, colors, and patterns.

Game Mechanics: Mechanics include avatar selection with game start followed by operational rules for how to play the game. Challenges are presented in three distinct locations with multiple activities for each location. Players can earn patches for each activity by solving mathematic problems. The goal is to accumulate all patches which results in earning the Shape Shifters Achievement Badge and winning the game.

Special Sauce: Player buy-in is presented at game start through avatar selection. A realistic avatar that resembles a player's physical appearance could influence personal connections with the character, increase interest, and promote relevance. Additionally, earning patches toward the Achievement Badge provides a positive reward and motivates the player to accomplish the learning objectives.

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Introduction

Game Overview

Welcome to Shape Shifters! In this game, players will learn about a variety of shapes, colors, and patterns to help build their mathematical skills. As players navigate through a simulation of “a day in the life” narrative story from a child’s bedroom to the park, and the ice cream shop, they are challenged with mathematic problems and given the opportunity to earn patches towards the Shape Shifters Achievement Badge. The goal is for players to successfully navigate a day in the life of a child peer and earn all badge patches. Once all patches are earned, they receive the Shape Shifters Achievement Badge.

Target Audience and Implementation Context

Shape Shifters is designed for an audience between the ages of 2 to 5. A typical game play session can vary from 15 minutes to 1 hour and depends on how long the player wants to participate in the game. Shape Shifters could be implemented in formal classrooms and individual online learning. Individual online learning would benefit teachers and students by preparing them for future required classroom standards and guidelines in mathematics.

Learning Objectives

Learning objectives are aligned to the Texas Prekindergarden Guidelines for mathematics and organized throughout the storyline.

1. Players will recognize colors.
2. Players will recognize 2D shapes.
3. Players will identify color patterns.

4. Players will complete color patterns.

Texas Prekindergarden Guidelines	
Mathematics Skill Domain	
Geometry and Spatial Sense Skills	V.C.1 Child recognizes common shapes.
Classification and Pattern Skills	V.E.1 Child sorts objects that are the same and different.
	V.E.3 Child recognizes and creates patterns.

Hook

The game hook is a simulation of a real-life experience in that it presents a narrative story that is relatable and familiar to the audience, offering both extrinsic and intrinsic motivations. The goal of Shape Shifters is to help children improve their knowledge and comprehension in mathematics surrounding shapes, colors, and patterns.

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Game Play and Mechanics

Game Play

Story Overview

Shape Shifters is designed using a linear and embedded narrative story that takes place in three predetermined locations to create a specific experience for players. The narrative is designed for consistency across all locations and impacts gameplay, in that a player must perform actions of solving mathematic problems to complete each challenge before progressing to the next scene.

Game Progression

The game offers progression through the presented challenges and the required skill necessary for each level of play. Each narrative location embodies its own theme for selecting the correct shape, color, or pattern by performing the appropriate mathematic problem-solving skills to earn patches towards the Achievement Badge. As players complete one level, the option is available to progress to the next level which requires greater skill and new mathematic problems. All players are subject to the same set of rules for equal and fair play and offered guidance through prompts and rules. There is a 50/50 balance of chance and skill in Shape Shifters. Players could be successful in each challenge by pure luck and chance, but the likelihood for consistent luck and chance over the course of the game is very low.

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Game Mechanics

Game Mechanics

Designed for a single player to perform mathematic problem-solving skills within consistent rules for accumulating patches to win the Shape Shifters Achievement Badge. The game starts with an introduction/welcome followed by avatar selection. Once an avatar is selected, players encounter an overview of operational rules necessary for how to play the game. Players are presented with various options to make obvious decisions in each narrative location. Selecting the correct shape, color, or pattern will result in the same outcome of an earned patch. Each decision the player makes drives game responses/outcomes. When players select shapes, colors, and patterns, they receive direct visual and audio feedback to reinforce the correct or incorrect choices for actively learning mathematic problem-solving skills.

Players: Designed for a single player.

Rules: Operational rules in the form of instructions on how to play the game.

(1) Click and hold objects to move.

(2) Earn patches towards the Shape Shifters Achievement Badge.

(3) Collect all 22 patches and earn the Shape Shifters Achievement Badge to win!

Goals: The game is made up of both a primary and secondary goal.

- Primary – Collect all patches to win the Shape Shifters Achievement Badge and win the game.
- Secondary – Complete each challenge to advance to the end of the game.

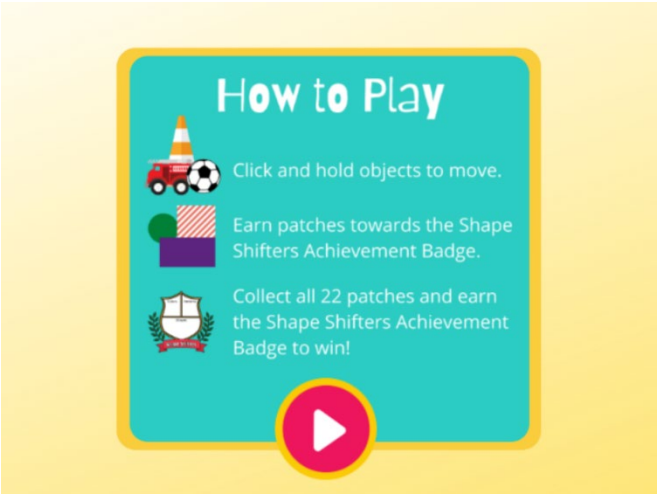
Challenges: Challenges are presented in three formats: colors, shapes, and patterns. Players are required to perform age-appropriate mathematical problem-solving skills to advance the game and have one attempt to correctly solve each challenge.

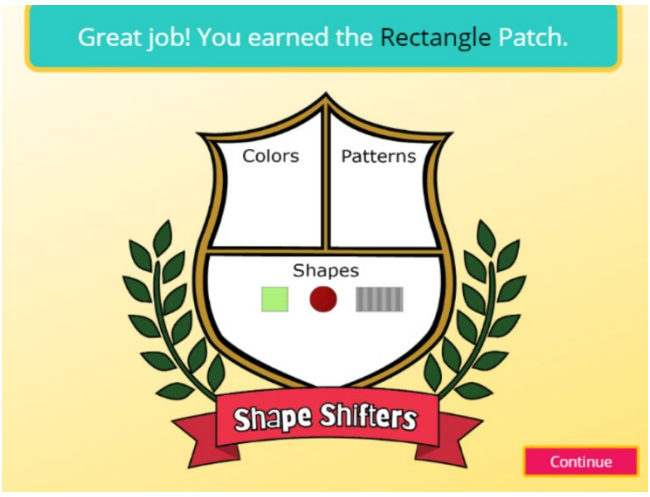
- Challenge 1 – Players must drag and drop the correct colored toy into the toybox.
- Challenge 2 – Players must select the correct shape.
- Challenge 3 – Players must complete each pattern correctly.

Patches: For each narrative location, the player can earn challenge-specific patches.

1. Bedroom – Player can earn nine patches (Red, Orange, Yellow, Green, Blue, Purple, Brown, Black, White).
2. Park – Player can earn eight patches (Square, Circle, Rectangle, Oval, Triangle, Pentagon, Rhombus, Hexagon).
3. Ice Cream Shop – Player can earn nine patches (Ice Cream Flavor Patterns).

Winning: Winning is accomplished by earning all patches to earn the Shape Shifters Achievement Badge.





Game Elements

Game elements encompass a variety of characters and objects that contribute to the overall player experience. The narrative story is presented using animated illustrations, and aesthetics including a combination of audio stimuli in the form of sound effects and narration, and visual elements in the form of 2D digital graphics throughout the game. Players are given the option to choose an avatar for game play that resemble a player's physical appearance including race and gender.

Characters: Players can choose from six different characters including three girls and three boys.

Girls:

1. Ciara – Black
2. Hafsa – Arab
3. Lacey – White

Boys:

1. Shawn – Black
2. Alex – Hispanic
3. Bryan - White

Objects: For the game to be played, players must interact with 2D objects.

Game Pieces:

a. Toys:

1. Game controller
2. Eightball

3. Train
4. Dice
5. Boat
6. Alligator
7. Rabbit
8. Puzzle Piece
9. Robot
10. Whistle
11. Car
12. Bear
13. Horse
14. Airplane
15. Camera
16. Dinosaur
17. Tennis ball
18. Solider
19. Chess piece
20. Basketball
21. Yoyo
22. Spinner
23. Alien
24. Castle
25. Firetruck

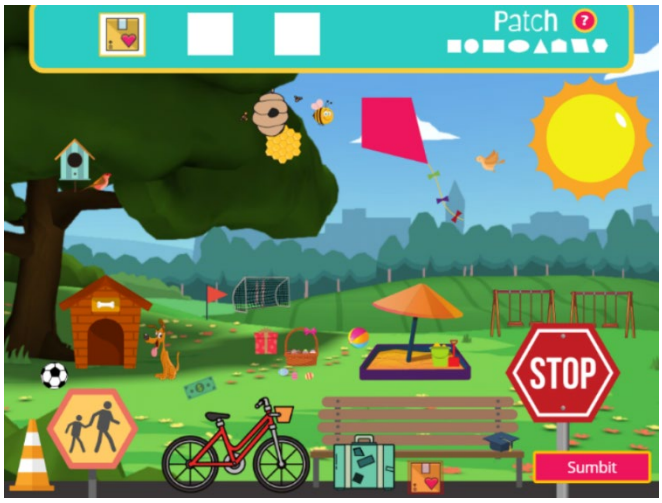
26. Teeth
27. Unicorn
28. Golf ball
29. Excavator
30. Rubber duck
31. Lego block

b. Shapes:

1. Squares – Box, Gift, Patch
2. Circle – Sun, Beach ball, Tire
3. Rectangle – Sign, Suitcase, Dollar bill
4. Hexagon – Stop sign, Crossing sign, Honeycomb
5. Triangle – Flag, Cone, Umbrella
6. Pentagon – Doghouse, Birdhouse, Soccer ball Patch
7. Rhombus – Kite, Graduation hat, Patch
8. Oval – Bee, Beehive, Easter Egg

Audio Aesthetics: Players encounter music, sound effects, and narration throughout the game. Music is in the form of a welcome theme song, sound effects are a response to clicking and dragging actions, and narration to address the literacy levels of the audience.

Technology: Technology requires that players have access to a computer or mobile device and internet for game play.



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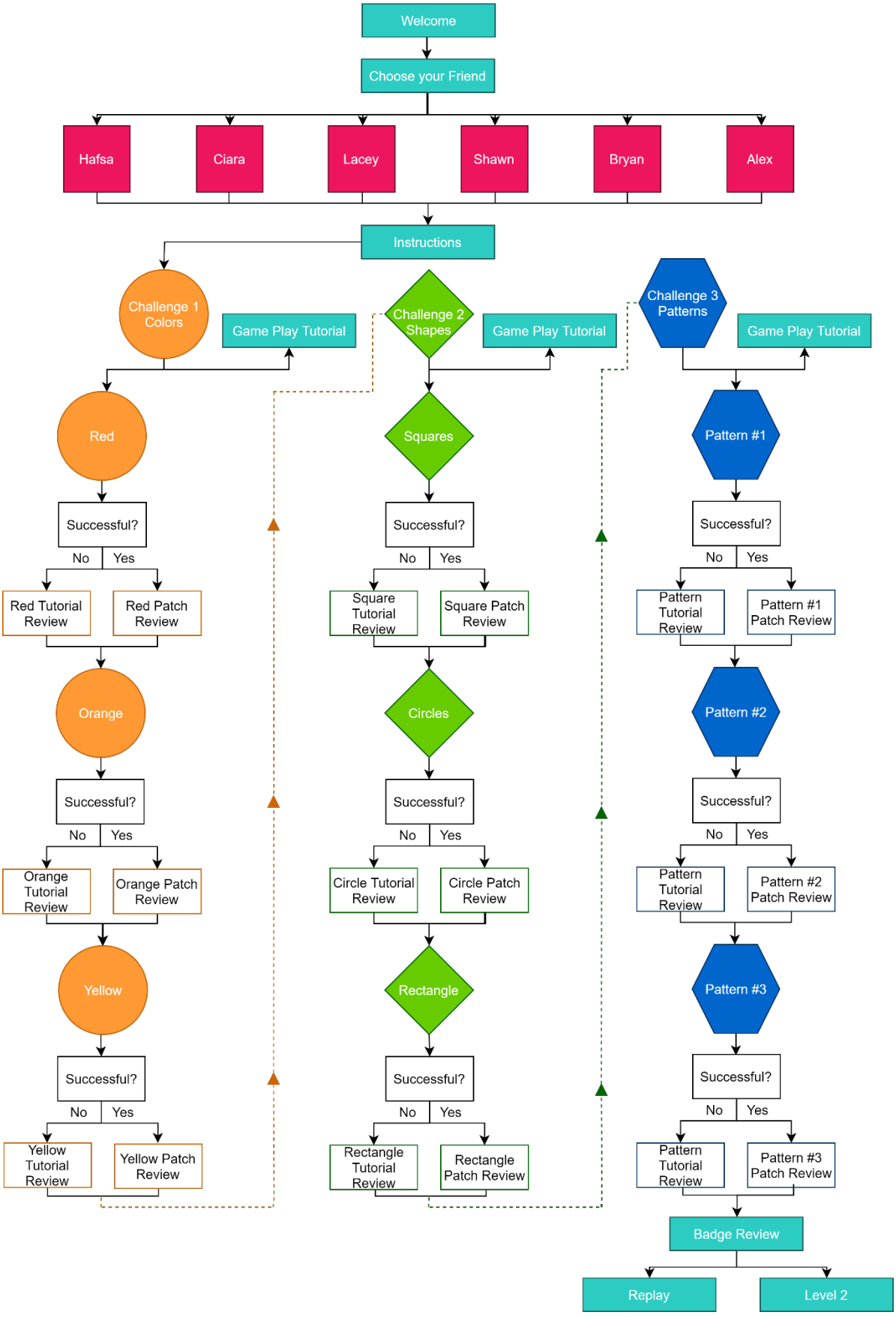
Artificial Intelligence

Flowchart



Interface

User Interface

The player communicates and interacts with the game through their actions and decisions. Clicking, touching, and dragging are the three actions taken by players to effectively communicate with the game. This communication results in feedback responses that are integral to a player's decisions. Game interface communication takes place through the type, presentation, and facilitation of information from game start to end. Type information consists of selecting an avatar, the option for replays, and the achievement of earning a patch and the Achievement Badge. Presentation information consist of visual text and objects with spatial arrangements, and auditory sound effects and narration included to reach players. Facilitation of learning consist of game play instructions, correct and incorrect choice, and hints for game play difficulty.

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Implementation Artifacts and Guidelines

Implementation and Guidelines

Shape Shifters (Shapes, Colors, & Patterns) 2+ Home School Guide

An Introduction to Shape Shifters (Shapes, Colors, & Patterns) 2+

Shape Shifters makes it possible for prekindergarten and elementary school age children to learn basic mathematic problem-solving skills in a fun and engaging way. This guide will describe the game, how to play, and how the game can be used as part of your home school curriculum.

We believe that learning experiences in early years are foundational in child development. Skill development is essential and necessary for common situations encountered daily, and children should actively engage in this development. Children are inherently curious and inquisitive with their world and environment and learn from interaction and experiment. Shape Shifters was blossomed and developed to deliver a strong foundation for success in children and future classrooms.

We want children to develop their unique system of gathering, determining, and generating information, making them functional and capable individuals of society.

Shape Shifters teaches geometry, classification, and sorting skills which lays a foundation for further mathematics learning. It encourages development and gives players confidence in mathematics.

This guide shows home school instructors how to use Shape Shifters to teach mathematics problem-solving skills to young children in an entertaining way.

Age recommendations:

Shape Shifters (Shapes, Colors, & Patterns) 2+ is recommended for age 2 and up to 5. It is designed to be an enjoyable, engaging, and motivational experience. Emphasis is placed on acquisition of skills and participation in meaningful and relevant experiences. We believe that positive and challenging math experiences provide foundational growth in children and influence the rest of their educational progress in mathematics. Shape Shifters can be used both to prepare children for future classrooms, and to improve attitudes towards learning mathematics.

How to use Shape Shifters (Shapes, Colors, & Patterns)

How you use Shape Shifters depends largely on the goals and mathematical skills of your child. It can be used to introduce your child to basic foundations of mathematics, to build on their current levels of mathematics, or in its own way of fun activity. If you feel your child is ready to start learning basic foundational mathematics, we recommend you use the following procedure to transfer what they have learned to pencil and paper equation solving:

Getting Started:

1. They understand what common shapes are.
2. They understand what common colors are.
3. They understand sorting objects that are the same and different.

Tip 1:

For number 1, introduce children to shapes using construction paper cut-outs. Start with simple shapes and grow into more difficult shapes (circle, square, triangle, pentagon, hexagon, octagon).

Example 1:

Use common objects to model shapes, such as paper plates, placemats, clocks, etc. Ask the children to name the shape of the objects. When this operation is well understood, draw these shapes on paper. Then ask children to trace suggested shapes.

Tip 2:

For number 2, introduce children to contrasting colors that are not similar to each other to avoid confusion. For example, when teaching colors side by side, do not place together blue and purple, instead use blue and yellow.

Example 1:

Use common objects to model color, such as food, furniture, animals etc. Ask the children to name the color of the objects. When this operation is well understood, draw these shapes on paper. Then ask children to fill-in objects with appropriate color.

Tip 3:

For number 3, find activities that children are familiar with in everyday life. For example, sorting laundry (whites/colors), putting away groceries (refrigerator, pantry, or cabinet) etc.

Example 1:

Use common objects to model sorting/patterns, such as buttons, beads, cubes, food, toys etc. Asks children to describe a pattern using manipulatives (a tower made of alternating yellow and red cubes can be presented with questions to prompt children to describe the repeating color pattern.) When this operation is well understood, draw these objects on paper. Then ask children to select the appropriate object to complete the alternating pattern.

From playing the game to solving equations on paper

1. Play a level and write down the rules learned in that level.
2. Take a challenge from the game and solve it on paper. When writing the problems on paper, make sure the proper distinction between color, shape, and manipulative is distinct for each challenge. For example, when solving for shapes, make sure shapes

are accurately drawn. This will make it easier for children to associate the correct solution using the appropriate skill.

3. Solve the problems using the specific strategies and rules from the game. Use a new space/page for each challenge specific problem.
4. Enjoy the game together as a family!

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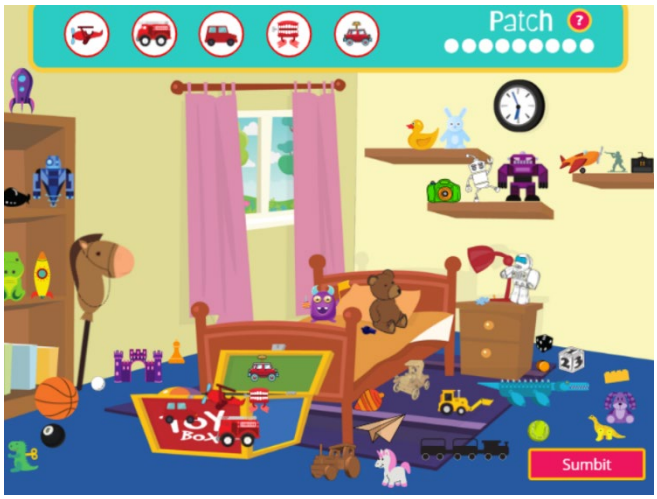
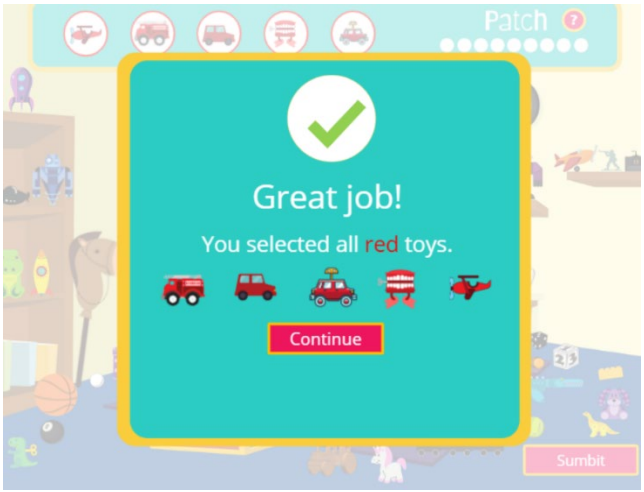
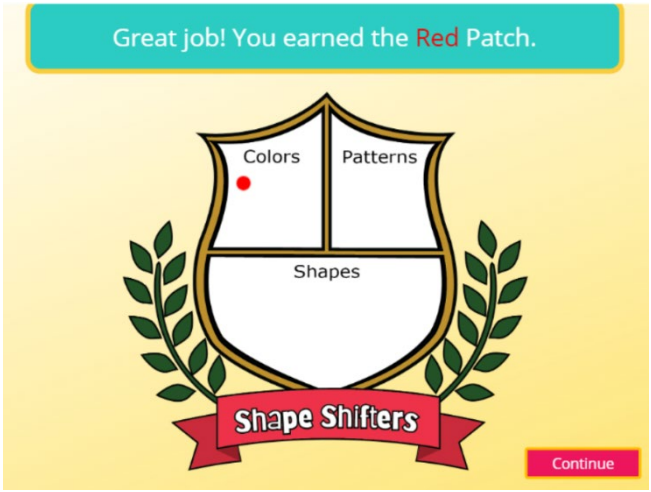
Game Minute

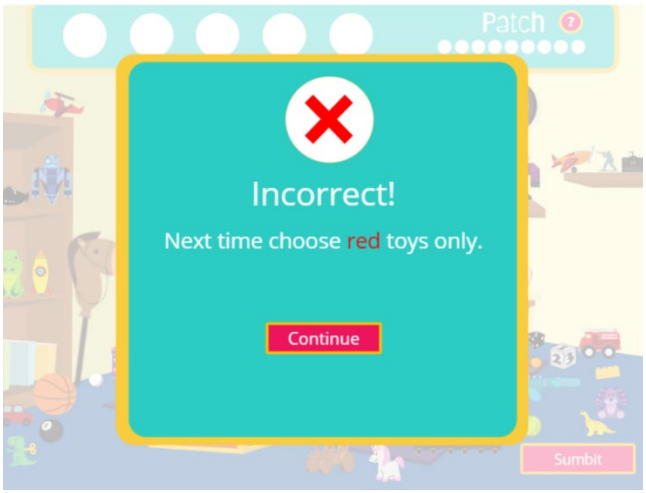
Game Minute

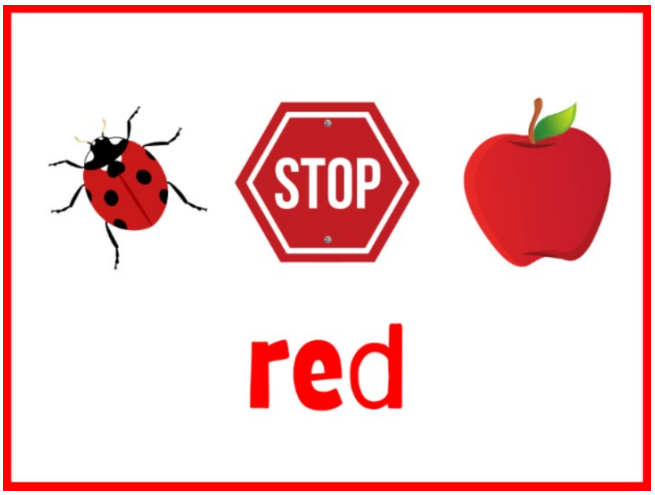
During Challenge #1 in the bedroom location, players encounter their chosen friend who gives a brief introduction. Followed by the option to watch a video tutorial of Challenge #1 rules or advance directly to game play. If players choose the tutorial, a video will show how to complete the activity. If players choose to advance directly to game play, they are instructed to complete the activity using the designated color, red. To complete the activity, players must drag and drop red toys into the toybox then click the submit button to lock in their response. If players answer correctly, they receive feedback stating “Great Job! You selected all red toys.” By clicking the continue button, players advance to the summary review of the earned patch. If players answer incorrectly, they receive feedback stating “Incorrect! Next time select red toys only.” By clicking the continue button, players advance to a tutorial of the color, red. In the red tutorial, players review the color and common red objects. After patch summary review and red tutorial, players advance to the next Challenge #1 activity.











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