



Re-Plays

Repeatable Playful Explorations for Joyful, Creative Math

Re-Plays (short for Repeatable Playful Explorations) are open-ended activities in Tile Farm Academy designed for after-school classes, STEAM labs, homeschools, or any learning space that values a balance of math, fun, and creative expression.

Why Teachers Love Re-Plays

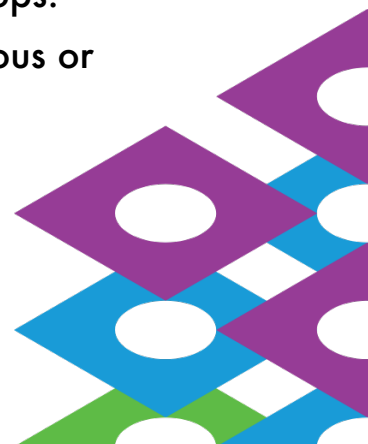
Each Re-Play invites students to build, explore, and experiment in their own way. The same activity leads to new discoveries every time—making it feel endlessly fresh. Re-Plays are **ageless, low-prep, and naturally differentiated**, so they work beautifully across a wide range of grade levels and abilities. Just launch the prompt and let students take it from there.

Why Students Love Re-Plays

Re-Plays let learners operate at their own level, making them ideal for mixed-grade groups or classes with a wide range of abilities. Students experience **productive struggle in a setting that feels like play**, which supports a growth mindset and fuels genuine curiosity. **Math, art, and personal expression blend naturally**, giving even reluctant students a creative foothold. The result is a room buzzing with **collaboration, discovery, and “look what I made!” moments** that kids love to share.

When to Use Re-Plays

These activities fit almost anywhere: after-school programs, STEAM labs, summer camps, homeschool co-ops, family math nights, classroom enrichment periods, or even professional development workshops. Wherever you have a device, a little time, and a group of curious or creative learners, a Re-Play will thrive.



Sample 60-Minute Re-Play Session

A simple, balanced session structure might look like this:

- **10 minutes - Daily Digits Warm-Up**

Students build number sense and fluency with quick, engaging puzzles, while the teacher preps the Re-Play. Daily Digits meets students where they need to be met and adapts to their learning profiles, making it easy for students of all ages to enjoy level-appropriate warm-up content.

- **20 - 50 minutes –Re-Play Activity**

Choose one of the six Re-Plays in this guide. Each offers a mix of mathematical thinking, creative building in Tile Farm Studio, and opportunities for collaboration and discussion.

- **0 - 30 minutes –Free Exploration**

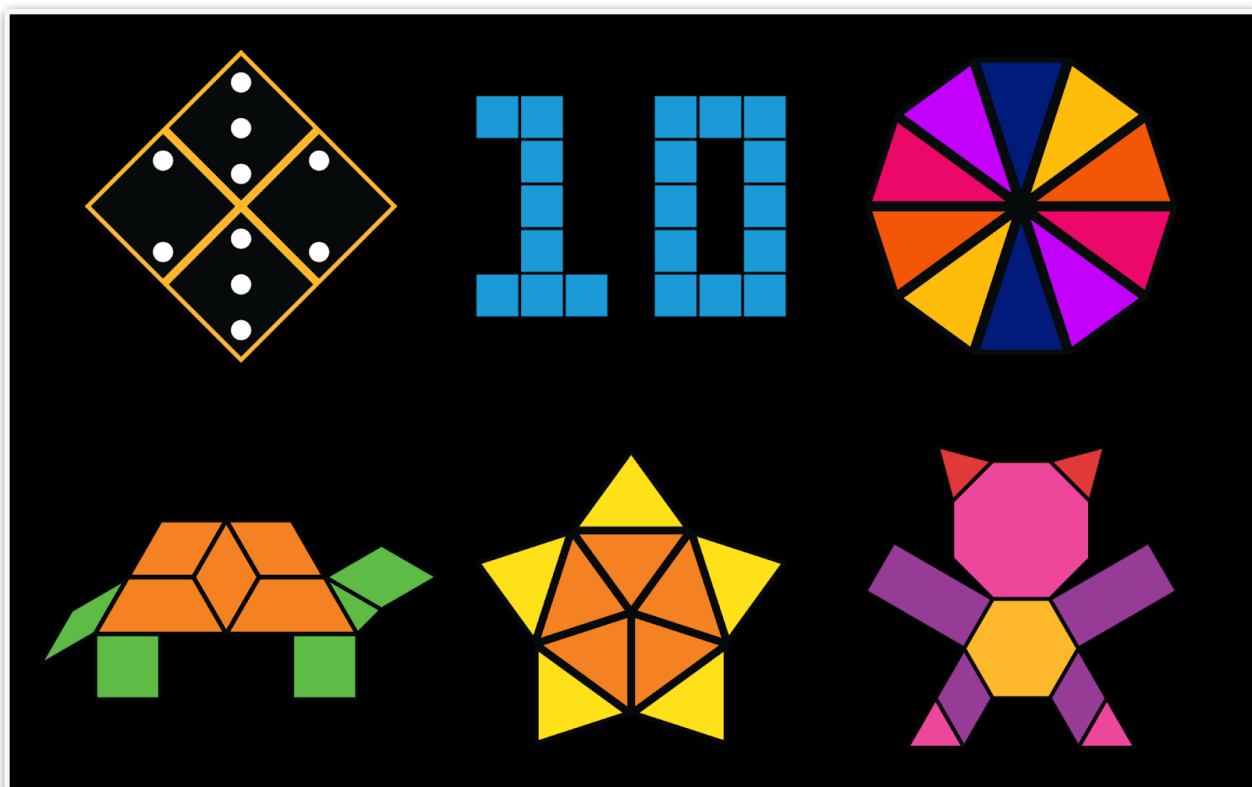
Students can continue building in Tile Farm Studio, play games and puzzles in Tile Farm Playground, or explore and edit patterns from their Harvest collections.



Re-Play #1 - Number Portraits

Overview

Students pick one class-wide number or expression, then each learner creates a unique representation of it in Tile Farm Studio. These portraits highlight the many ways a single number can be seen and understood—building number sense, encouraging creativity, and sparking rich mathematical discussion.



Six unique representations of the number 10 made in Tile Farm Studio.

Why This Works:

- **Personal Expression & Creativity** - Because every build is self-designed, students represent math in ways that feel meaningful to them. This freedom sparks joy, passion, and a deep sense of ownership - kids get immersed and take real pride in what they create.

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- **Ageless & Differentiated** - One shared prompt scales effortlessly from counting to multiplication to order of operations and beyond.
- **Joyful Productive Struggle** - Open-ended building invites experimentation and iteration; mistakes become springboards rather than roadblocks.
- **Deep Number Sense & Communicative Math** - Comparing and explaining many different representations sharpens understanding of equivalence and composition while pushing students to use precise mathematical language.

Sample Lesson: Number Portraits

- **10 minutes - Daily Digits Warm-Up**

When students arrive, have them complete their Daily Digits to build number sense, spark mathematical thinking, and warm up for the day's activity. Completing Daily Digits also unlocks access to Tile Farm Studio, which they'll use for their Rep-Tile build.

- **5 minutes - Introduce the Re-Play**

Tell students they'll be building creative representations of a number in Tile Farm Studio. Show a few sample builds (e.g., different ways to show 10) and set the stage for creative thinking and multiple interpretations.

- Ask: What do you notice? How do you see 10 in this?
What makes these representations similar or different?

- **2 minutes - Choose a Prompt**

Select one number or expression for the whole class and write it on the board. You can choose it yourself or let students decide within a range. Example ranges:

- Early elementary: Pick a number between 10 and 20
- Upper elementary: Choose a multiplication fact
- Middle school: Choose an expression like $2 \times (3 + 5)$

Write the chosen prompt on the board.

- **15 - 30 minutes - Build**

Students create their own unique representation of the number or expression in Tile Farm Studio. Some may go deep with one design; others may try a few variations.

- **5 - 15 minutes - Share**

Invite students to share and discuss their builds in small groups, as a class, or gallery-style. Encourage them to explain how their design shows the chosen number and to reflect on each other's work using math language. Alternatively you can have students write about their build.

- **0 - 30 minutes - Free Exploration**

If time allows, students can continue building in Tile Farm Studio or explore games and puzzles in Tile Farm Playground.

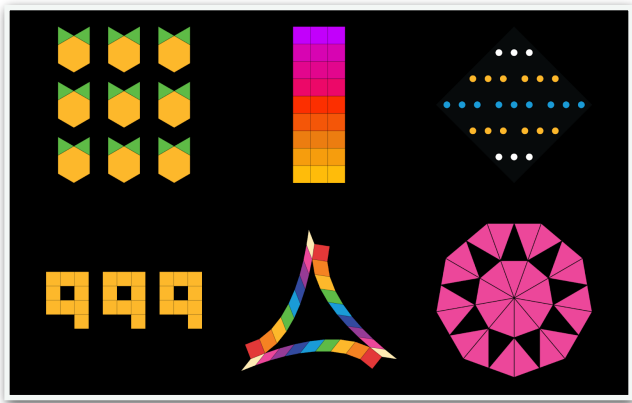
Optional Extensions & Variations:

- **Which One Doesn't Belong?**

Students build four representations—three that show the target number (e.g., 10) and one “near miss” that does not (e.g., 9 or 11). Classmates identify the odd one out and explain why.

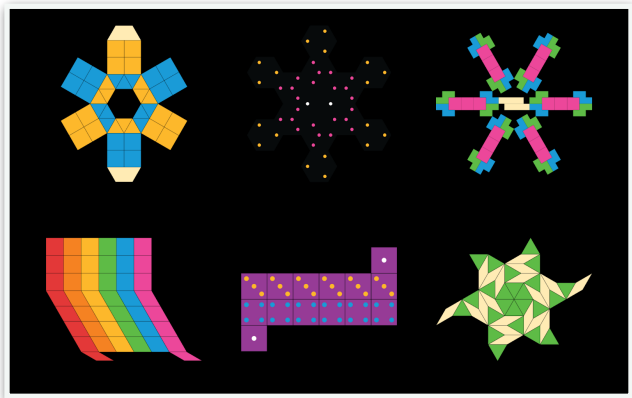
- **Sort It Out**

Give the class a range instead of a single number (e.g., 20–50). Each student secretly chooses a number in that range and builds a representation. When everyone is done, the group must arrange their devices in order from least to greatest—without saying their numbers aloud. Students justify each placement before revealing the actual values.



Example 2:

Six different representations of the multiplication fact 9×3 made in Tile Farm Studio.



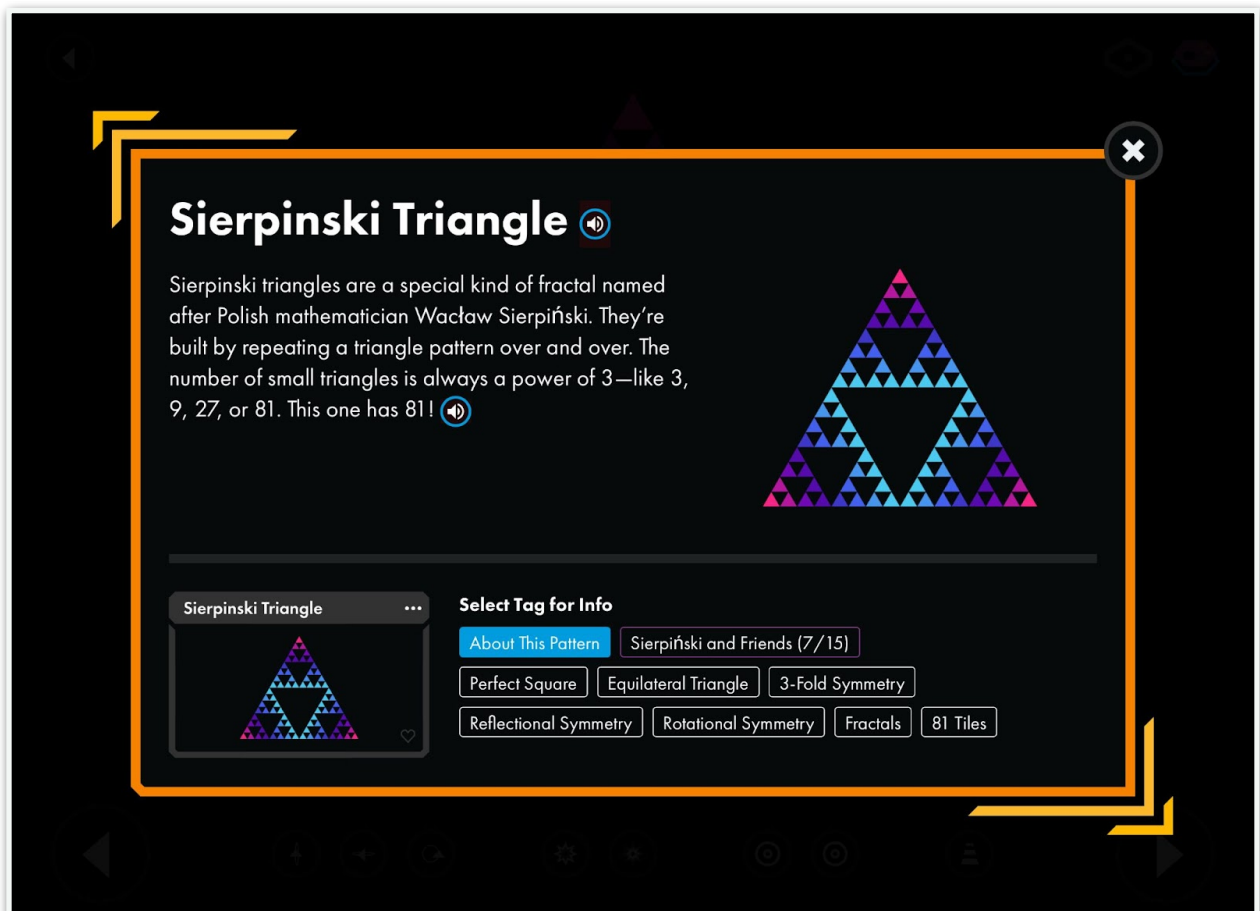
Example 3:

Six different representations of the expression $(3+4) \times 6 + 2$ made in Tile Farm Studio.

Re-Play #2 - Harvest Show & Tell

Overview

After completing Daily Digits, students collect a new pattern in Tile Farm Harvest—a vast collection of artistic and mathematical designs created by professional mathematicians and artists. Each pattern includes descriptive tags that highlight mathematical features and real-world connections. Students explore these tags to learn more about their pattern, then open it in Tile Farm Studio to make it their own. Finally, they share their remix with the class.



Harvest pattern info modal where students can learn about their pattern by clicking various descriptive tags..

Why This Works:

- **Inquiry & Research** - The descriptive tags spark curiosity and guide students to ask questions, notice patterns, and learn more about the math, science, or cultural context behind each design.
- **Interconnected Thinking** - Harvest patterns reveal the deep connections between math, art, and culture.
- **Learning from Experts, Then Making It Your Own** - Students start with a professional design and learn how it was made—then remix it in Tile Farm Studio. This blend of guided learning and creative ownership builds confidence and insight.
- **Mathematical Communication** - Sharing builds essential skills: explaining ideas clearly, listening actively, and noticing how others approach the same challenge. It fosters a respectful, curious classroom culture rooted in shared discovery.

Sample Lesson: Harvest Show & Tell

- **10 minutes - Daily Digits Warm-Up**
Students complete Daily Digits to build fluency then collect a new Harvest pattern, which they'll explore in the main activity.
- **5 minutes - Research Your Pattern**
Students review their new Harvest pattern and read its tags. Encourage them to identify at least one interesting detail, question, or math connection they notice.
- **5 minutes - Small Group Show & Tell**
In pairs or small groups, students take turns showing their pattern and describing what they learned or noticed. Peers can ask questions or add observations.

- **15 - 25 minutes - Remix in Tile Farm Studio**

Students open their pattern in Studio and make it their own—by recoloring, extending, or transforming the design while keeping a connection to the original.

- **5 - 15 minutes - Share Remixed Builds**

Choose a sharing format (whole class, small group, or gallery-style). Students explain their design choices and reflect on what they discovered.

- **0 - 30 minutes - Small Group Show & Tell**

If time allows, students can continue refining their remix or explore puzzles and games in Tile Farm Playground.

Optional Extensions & Variations:

- **Tag Hunt**

After researching their pattern, have students try to find another classmate whose Harvest pattern shares at least one tag. Once they find a match, they compare how that tag shows up in each design and talk about what it means.

- **Tag Spin-Off**

Students choose one tag from their pattern and create a brand-new design in Tile Farm Studio that fits the same tag. This could be a math tag (like “reflectional symmetry” or “power of 3”) or a thematic tag (like “mammal” or “Ohio”). Then they share their new design and explain how it connects to the tag.

- **Remix & Trade**

After students remix their original pattern, they swap designs with a partner and remix the remix. Once both versions are complete, partners compare their work with the original pattern and reflect on

what was kept, changed, or unexpectedly transformed. It's a bit like a visual game of telephone—students often end up surprised by how much the design has evolved.

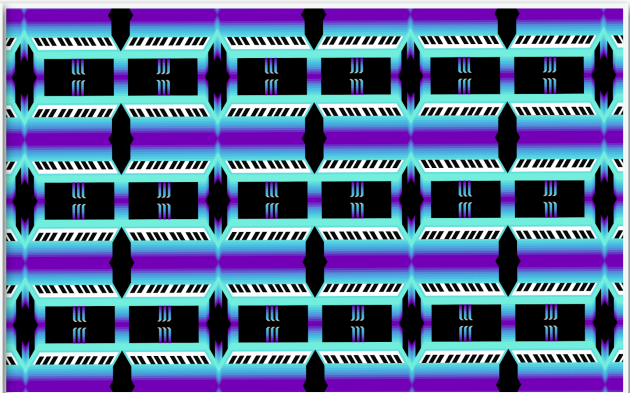
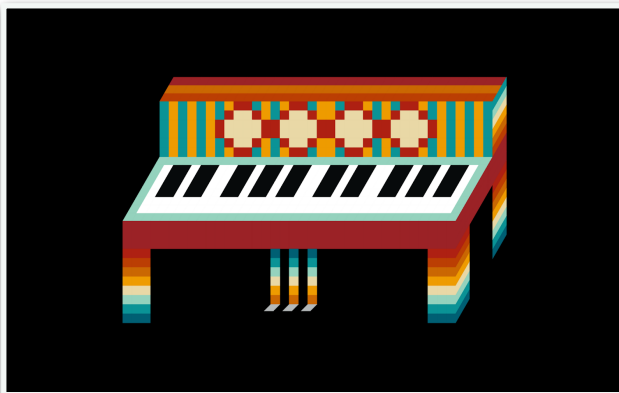
- **Color Copies**

Students take their pattern and recolor it in three completely different ways. Afterward, they can share their three versions and talk about how color choices affected the feel or interpretation of the design.



Example 2:

Piano design made out of 888 rhombi students can collect in the "Sonic Shapes" harvest set.

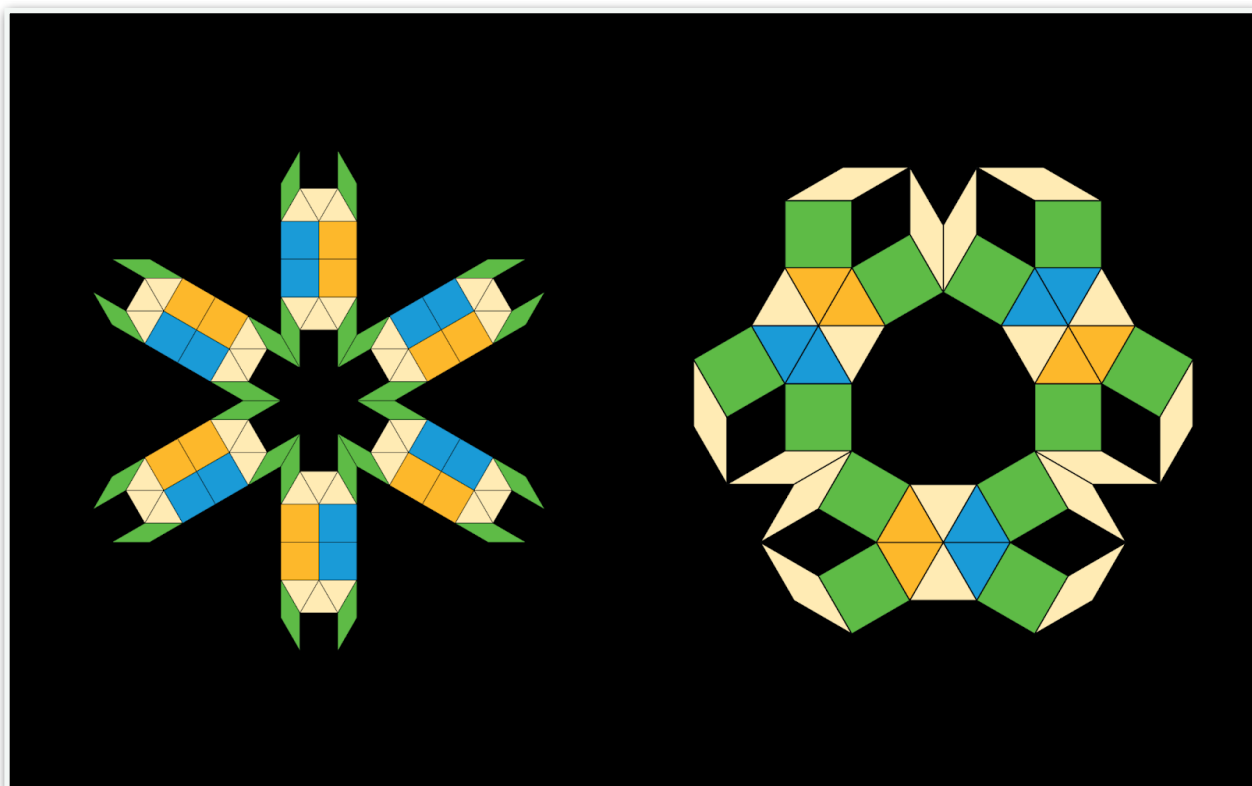


Example 3: Two possible remixes of the piano design shown above, the first recolored to have a Southwest feel, the second with the original design turned into a symmetric tessellation.

Re-Play #3 - Call & Create

Overview

In Call & Create, students take turns being the caller, giving simple instructions like “add 3 trapezoids,” “color 4 tiles blue,” or “delete 2 tiles.” After each instruction, everyone builds in Tile Farm Studio using the same step, but they interpret it in their own way—resulting in a wide variety of creative designs. This turn-based format invites students to think flexibly about shapes, structure, and operations, while encouraging playful exploration and surprising outcomes.



Two different designs students made in a “Call & Create” activity that were made using the same steps applied in different ways. The final results offer lots of room for rich comparisons and discussions.

Why This Works:

- **Student Voice & Engagement** - Taking turns as the caller gives students a chance to lead, make decisions, and shape the activity. Everyone gets to be both the designer and the decider.
- **Same Steps, Different Creations** - Each student uses the same instructions, but their patterns diverge—resulting in surprising creations that highlight individual thinking.
- **Flexible Thinking & Spatial Reasoning** - Because students don't know what instruction is coming next, they must adapt and revise on the fly. This encourages flexible thinking and strengthens spatial awareness.
- **Informal Math Talk** - The format naturally invites questions like "How many tiles do we have now?" or "Did anyone build something symmetrical?"—sparking number sense, structure, and mathematical communication.

Sample Lesson: Harvest Show & Tell

- **10 minutes - Daily Digits Warm-Up**

Have students complete their Daily Digits to warm up their number sense and unlock access to Tile Farm Studio, where they'll do their building.

- **5 minutes - Explain the Format**

Let students know they'll be taking turns giving instructions—and everyone will follow the same instructions one at a time, building as they go. Demonstrate one or two rounds if helpful. Keep it simple to start (just shape adds), then layer on color, transformations, or other rules over time.

- **15 - 30 minutes - Call & Create Rounds**

Start the round robin. Each student gives one instruction—either to the whole class or within a small group. Everyone follows that instruction and updates their build. Keep track of the steps taken so far, and pause occasionally to check: “How many tiles do we have now?” or “Who used that step in a way no one else did?”

- **5 - 15 minutes - Compare & Share**

After 5–10 rounds, have students show and describe their builds. This can be done in gallery view, small groups, or the whole class. Encourage reflection on how the same instructions led to such different results.

- **0 - 30 minutes - Free Exploration**

Let students continue building freely in Studio or explore other activities in Tile Farm Playground.

Optional Extensions & Variations:

- **Dice Build**

Assign each tile shape a number (1 = triangle, 2 = square, etc.) and roll dice to determine the shape and quantity for each round. For older students, add a second die to introduce multipliers or transformations.

- **Mid-Build Check-In**

After a few rounds, pause to ask: “What’s the total tile count?” or “Whose pattern has symmetry?” Build in some quick number talks or estimation checks.

- **Remix the Recipe**

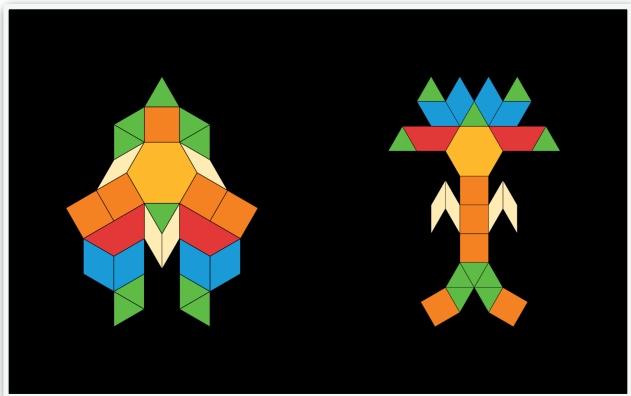
After one full round of Call & Create, students restart with the same list of steps but try to interpret them in a different way to create a totally new build.

- **Creative Constraints**

Set boundaries like “only use fraction triangles,” “use only two tile types,” or “preserve symmetry.” Great for encouraging structure and intentional design.

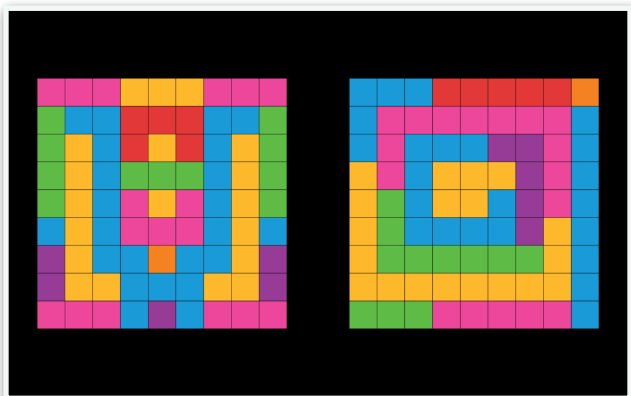
- **Close Call**

After completing a round of Call & Create, have students walk around the room or share in small groups to find the classmate whose creation is most similar to their own. They compare designs and explain why they think they’re a “close call”—what decisions were the same, and what turned out differently. This variation encourages detailed observation, mathematical vocabulary, and playful peer-to-peer connection.



Example 2:

Two examples from a simple “Call & Create” round where students just used Classic Tiles.



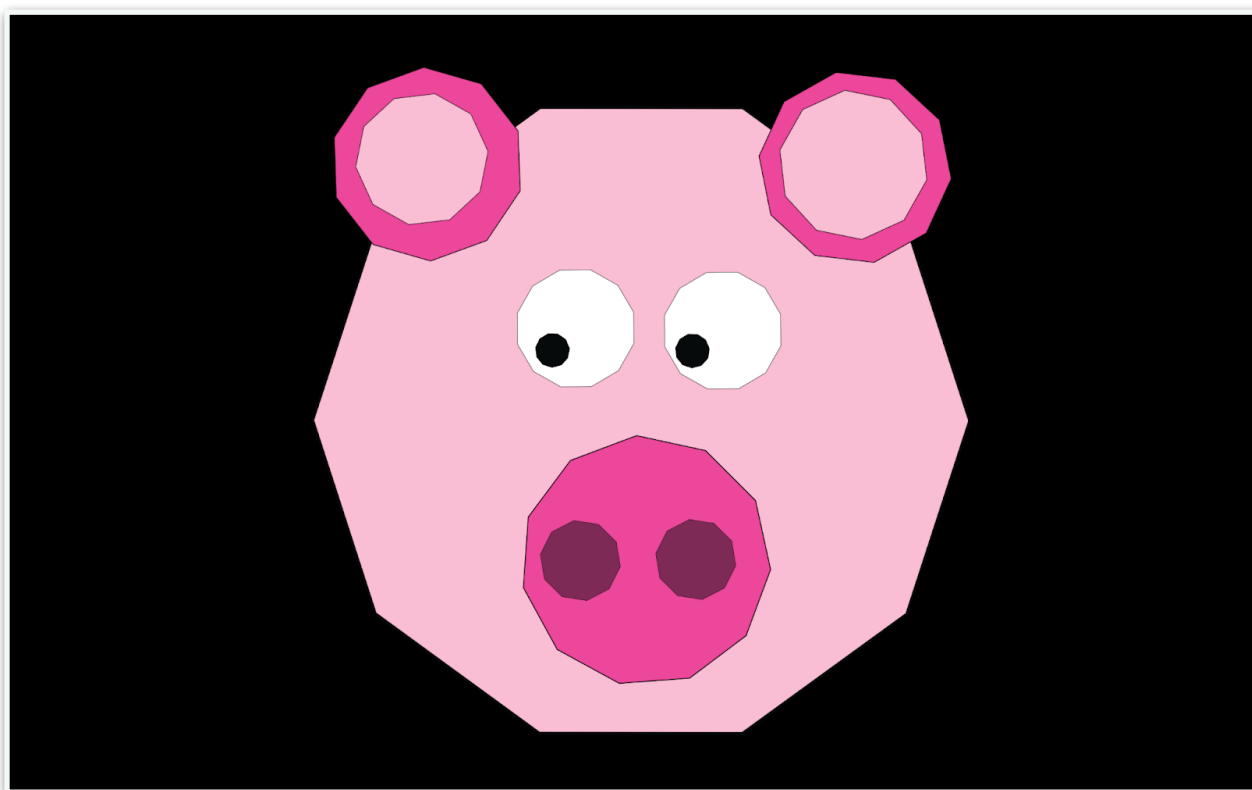
Example 3:

Two examples of student work from a “Call & Create” round where students first built a 9x9 square, then did 14 rounds of “calling” colors and numbers of squares.

Re-Play #4 - Creative Connections

Overview

In Creative Connections, the class picks a category—like “dinosaurs,” “sea creatures,” “the letter C,” or even “your favorite snack”—and each student builds their own creative interpretation in Tile Farm Studio. This activity invites imagination, personal expression, and mathematical play, while encouraging students to connect math to the world around them.



A pig built by a student in Albuquerque, NM for an “animals” prompt..

Why This Works:

- **Creative Constraint** - A shared theme gives structure, but the open-ended format allows for wildly different interpretations.

- **Storytelling & Connections** - Students turn math into meaning by using shapes and structure to represent real-world ideas.
- **Joyful Math Play** - Even without a formal prompt, students explore shape, symmetry, quantity, and structure in their designs while having fun expressing themselves.
- **Joyful Productive Struggle** - Open-ended building invites experimentation and iteration; mistakes become springboards rather than roadblocks.
- **Math Talk & Reflection** - Sharing invites students to explain their thinking, make comparisons, and talk about math in creative contexts.

Sample Lesson: Harvest Show & Tell

- **10 minutes - Daily Digits Warm-Up**

Have students complete their Daily Digits to warm up their number sense and unlock access to Tile Farm Studio, where they'll do their building.

- **2 minutes - Choose a Category**

As a class or in small groups, decide on a theme. It could be:

- A specific object (e.g., "a bird," "the letter A")
- A group (e.g., "three sea creatures")
- A prompt with variation (e.g., "your favorite animal")

- **15 - 30 minutes - Build**

Students build their creation in Tile Farm Studio. Encourage them to focus on recognizable form, creative details, and personal meaning.

- **5 - 15 minutes - Compare & Share**

Students present their designs, explain their choices, and tell the story behind their build. Sharing can be gallery-style, group-by-group, or whole class.

- **0 - 30 minutes - Free Exploration**

If time permits, students can continue designing, try a new category, or explore games and puzzles in Tile Farm Playground.

Optional Extensions & Variations:

- **Team Relay Build**

Form teams of four, each with its own set of four devices. Every student starts a design on their own screen. After two minutes, they pass their device clockwise and add to the new design in front of them. Continue for four passes so each student has worked on every build. When time is up, the team reviews all four designs, chooses the one they think best meets the category, and shares it with the class—explaining how each relay step shaped the final result.

- **Sort It Out**

After building, have students sort all designs from least to greatest based on the number of tiles used. This encourages students to notice structure, compare design choices, and discuss the value of simplicity versus complexity.

- **3-Part Build**

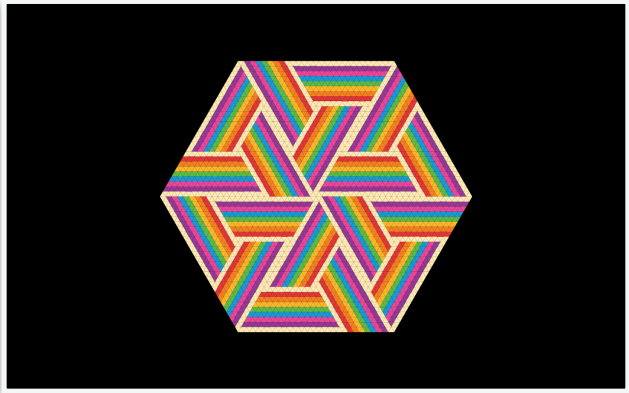
Pick a three-part category like “a dog, a cat, and their house” or “beginning, middle, and end.” Students complete each part one at a time, then share how the pieces connect.

- **Creative Constraints**

Give students a strict constraint, such as “use only triangles,” “exactly 17 tiles,” or “no repeating colors.” The tight boundary pushes creative problem-solving and highlights how design choices change when resources are limited.

- **Silent Vote (Optional)**

If your group enjoys it, allow a friendly, anonymous vote: “Which design surprised you most?” or “Which one made you smile?” Emphasize celebration, not competition.



Example 2:

Artwork made by a student for the prompt “build a big hexagon”.



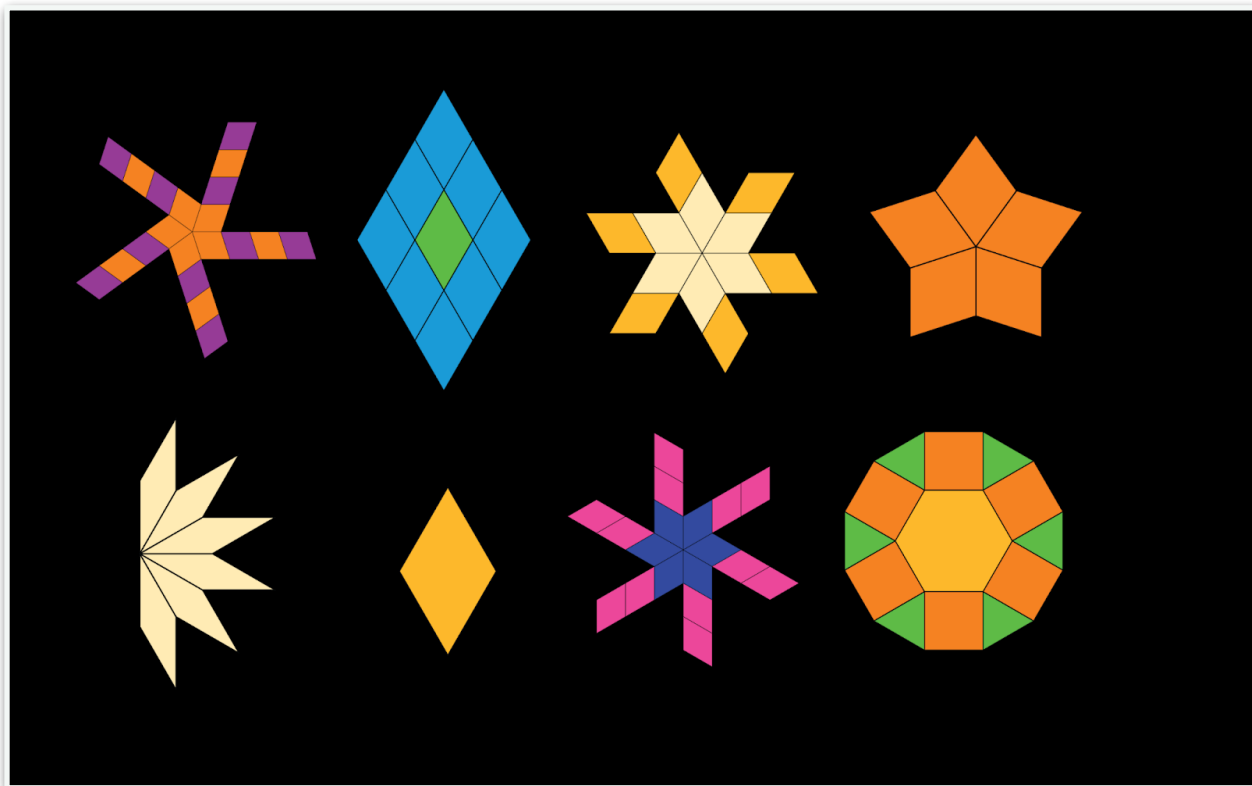
Example 3:

Artwork made by a student for the prompt “build a letter”.

Re-Play #5 - CryptoTiles

Overview

In CryptoTiles, students use Tile Farm Studio to create secret messages, where each cluster of tiles stands for a letter—A = 1 tile, B = 2, all the way to Z = 26. For example, “CAT” becomes three builds with 3, 1, and 20 tiles. Once students finish their coded creations, they trade with classmates and try to decipher each other’s messages.



A CryptoTiles canvas that spells “Tile Farm” using a cipher where the number of tiles = the position of letters in the alphabet.

Why This Works:

- **Literacy Meets Math** - Students connect letters and numbers in meaningful ways, reinforcing alphabetic order while using addition, subtraction, and strategic counting.

- **Hypothesis-Driven Thinking** - Cracking codes pushes students to make guesses, test ideas, and revise—just like real problem solving.
- **Executive Function in Action** - Planning a message, tracking counts, and checking guesses all flex working memory, attention, and persistence.
- **Creative & Infinite** - Messages can be short or long, simple or elaborate, and students can invent their own cipher rules—making this a playground for math, logic, and expression.
- **Real-World Connections** - This activity introduces basic ideas from cryptography and information theory—kids are building math-based communication systems.

Sample Lesson: Harvest Show & Tell

- **10 minutes - Daily Digits Warm-Up**
Students complete Daily Digits to activate number sense and unlock access to Studio.
- **5 minutes - Introduce the Cipher**
Print or Project a few of the examples shown below for students to get the hang of this activity. Explain the basic cipher (A = 1, B = 2... Z = 26), and show how each word becomes a sequence of tile clusters.
- **10 - 20 minutes - Build a Message**
Students plan and build a coded word or phrase in Tile Farm Studio. Optional: give them a category (like “animals” or “states”) to focus on.
- **10 - 15 minutes - Decode Each Other’s Work**
Students swap designs and try to crack each other’s codes. They record guesses to check later.

- **5 - 10 minutes - Share & Discuss**

Bring students together to reveal answers and talk about strategies.

- **0 - 30 minutes - Free Exploration**

If time permits, students can extend their message, invent new cipher rules, or explore in Tile Farm Studio or Tile Farm Playground.

Optional Extensions & Variations:

- **Themed Messages**

Try choosing a theme for your messages (i.e. dinosaurs, pokemon, states, student names)

- **Alternate Ciphers**

There are many other more complex ciphers students could use. For example:

- Letter in the Alphabet = # of Dots
- Letter in the Alphabet = # of Dots - # of Tiles
- Letter in the Alphabet = # of Triangles + 2 * (# of Squares)
- Letter in the Alphabet = Area - Perimeter (square patterns)

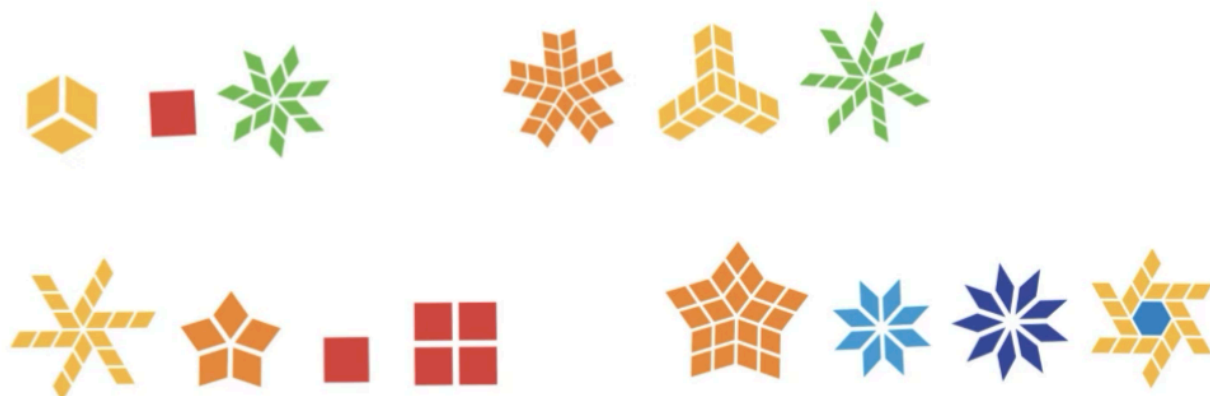
- **Decode Race**

Place the coded designs around the room. Pairs rotate, racing to crack as many messages as possible in a certain amount of time.

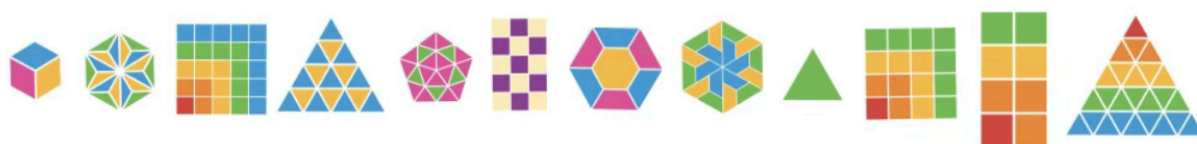
- **Secret Cipher (Advanced)**

Instead of doing different phrases, everybody does the same word or phrase, but comes up with a unique cipher for representing it. Students are then tasked with coming up with the rule for the cipher (i.e. it might be number of triangles minus number of hexagons).

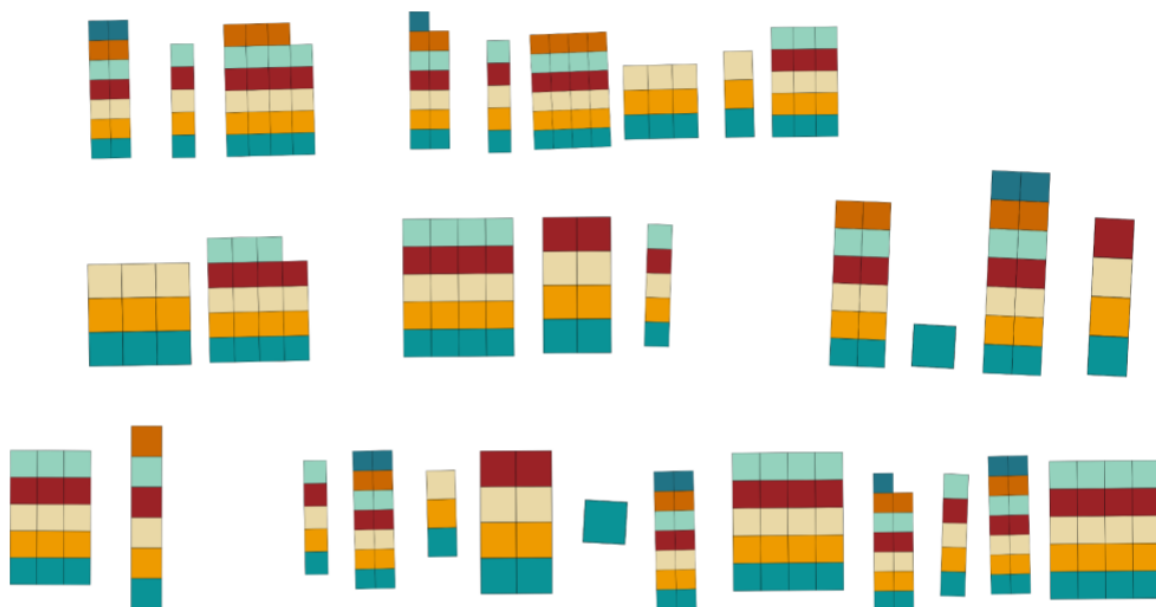
CryptoTiles Example 1



CryptoTiles Example 2



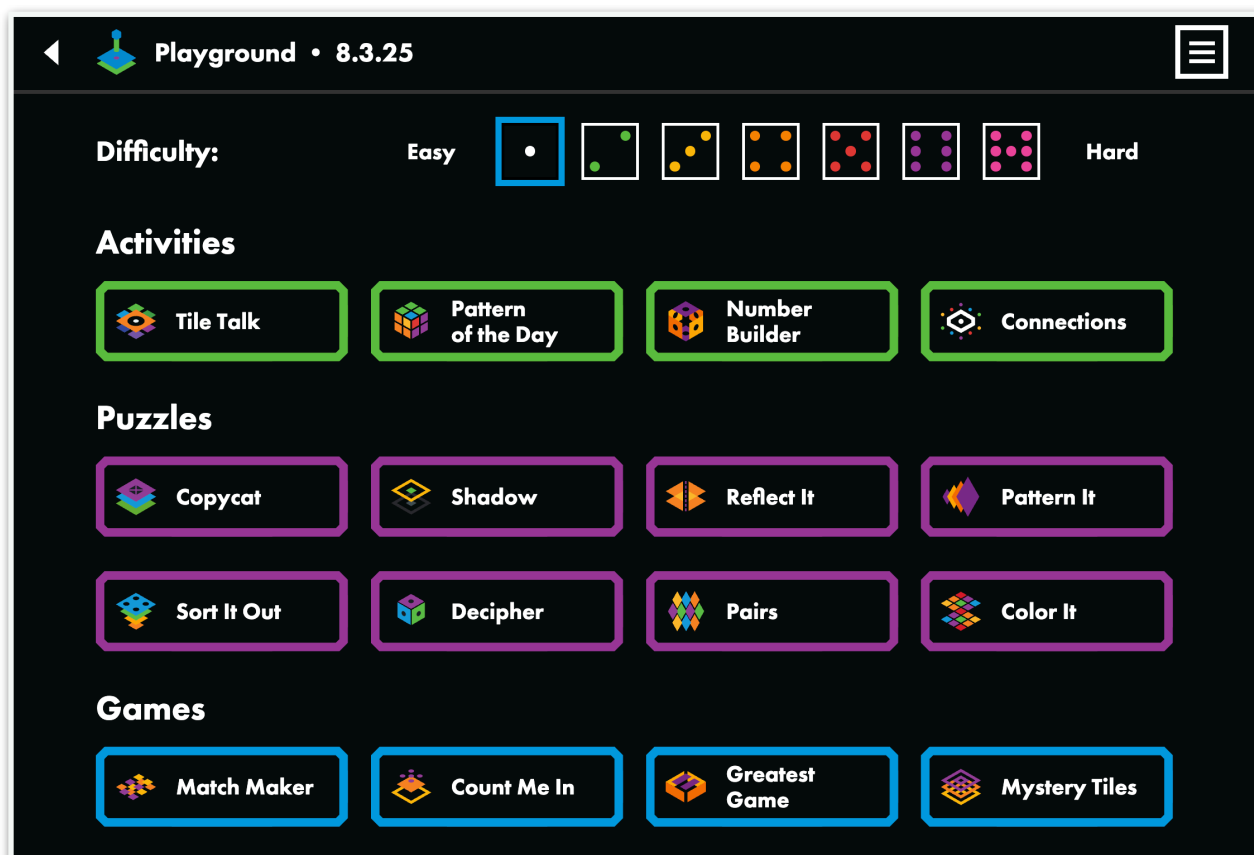
CryptoTiles Example 3



Re-Play #6 - Level Up

Overview

In Level Up, students choose a game, puzzle, or activity from Tile Farm Playground and start at Level 1. Their goal: see how far they can go. Whether working solo or in pairs, this challenge builds perseverance and problem-solving stamina. Many of the puzzles—like Copycat, Reflect It, and Shadow—also build skills students later use in Studio. You can have everyone try the same activity or let them choose based on interest. Either way, students love the satisfaction of climbing through the levels and seeing their own progress.



Tile Farm Playground has 16 different games, activities, and puzzles that can be used for Level Up.

Why This Works:

- **Perseverance in Action** - Students face increasingly difficult challenges at their own pace, developing stamina and confidence with each success.
- **Problem-Solving Skills** - The puzzles, games, and activities build logic, spatial reasoning, and visual thinking in playful, structured ways.
- **Preparation for Studio** - Many games develop skills that directly translate to learning how to build better in Tile Farm Studio.
- **Choice, Differentiation, & Breathing Room** - Students can choose activities that match their energy and interests. It's easy for teachers to run, and perfect for days when students need space to focus, reset, or quietly engage in their own thinking.

Sample Lesson: Harvest Show & Tell

- **10 minutes - Daily Digits Warm-Up**
Students complete Daily Digits to build fluency and focus before diving into Playground.
- **3 minutes - Choose a Game or Puzzle**
You can assign a single activity (like Reflect It or Color It) or let students choose. Provide a short list of easier and harder options for guidance.
- **20 - 30 minutes - Level Up Challenge**
Students start at Level 1 and try to get as far as they can. Encourage careful thinking, perseverance, and reflection after each puzzle.

- **5 - 10 minutes - Share & Reflect**

Students share how high they got, what strategies helped, and where they felt stuck. Encourage them to celebrate growth, not just completion.

- **0 - 30 minutes - Free Exploration**

If time permits, students can continue their current puzzle, try a new one, or jump into Tile Farm Studio to explore a related concept.

Optional Extensions & Variations:

- **Partner Play**

Have students work in pairs and take turns solving—alternating every problem. Encourage discussion and strategy sharing between turns.

- **Creative Focus**

The Creativities section in Playground has Tile Farm Studio-style challenges. These are great for students wanting more creative challenges.

- **Easier Puzzles & Games**

Color It and *The Greatest Game* tend to be two of the easier activities in Playground and are great for beginners.

- **Become a Studio Building Master**

Copycat is a great puzzle for students who want to level up their skills and learn new tricks for building things in Tile Farm Studio.

- **Harder Challenges**

Mystery Tiles, *Sort It Out*, *Match Maker*, *Engineer It*, and *Shadow* are some of the hardest puzzles in Playground. Even an absolute master would have a hard time completing all of these at all seven levels.