

# Play, Create, Share, Reflect

## A Detailed Hour-by-Hour Guide

Play (2 hours), Create (5 hours), Share (2 hours), Reflect (1 hour)

### Hour 0 - In Advance

#### Prep the Hour

- If you haven't already, please take the teacher survey.
- Review the appropriate student survey and distribute to your students.

#### Learning Objectives

The learning objectives for this task is for MIND Research and Mass STEM Hub to gauge early markers of students' mindsets regarding mathematics, mindsets regarding creativity, and specific math content knowledge. The post survey at the end of the project is a parallel copy so that we can gather pre-to-post data.

#### ***Asynchronous Adaptation***

*Have the students complete the survey as homework before the project begins.*

*Make sure all responses are from the student's perspective, not what their guardian thinks they should answer.*

#### ***Teacher Tips:***

*You may want to go through the questions one at a time with the class to help explain the questions in your own words without suggesting any one approved answer choice. Especially if students haven't done many surveys like this before, they may benefit from the training and reassurance.*

## Hour 1 - Play

### Prep the Hour

1. Make sure that kids have access to any materials they'll need to play games in the next two hours. Access the games on our [website](#) under Hour 1. For each game we offer several ways to access the game - including free [web and app-based gameplay](#). Another option for accessing the games is to
  - host a prep-session in which kids need to gather household items to create game boards and pieces such as a cardboard box, plastic milk caps, etc. This builds some game familiarity and is good early practice in being both novel and relevant. It's like a warm up for their first mini-design challenge.
2. Decide how you would like to have kids go through the story and play the games.
  - Read a chapter/book as a class then play. Move to chapter/book 2 as a class. Finish with the third chapter/book that connects math to the world around us. Or, read chapter/book 1 as a class then have families/students self-direct themselves through chapters 2 and 3.

#### **Asynchronous Adaptation**

*Students in a virtual or hybrid model could read the book independently or to a sibling or family member with guiding discussion questions on a shared document. Use your preferred communication tool to share the link to the storybook.*

#### **Teacher Tips:**

*Use anchor charts to capture student responses (for example, students share important components of games) as living documents. This could be used throughout all 10 hours as a space to capture student thinking as they continue to build their creative problem-solving capacity.*

### Learning Objectives

The goal for each of the two Play-hours is for students to experience math games that break assumptions of what "math has to be" or "has to look like". This additionally helps them develop deeper gameplay strategies. Combined, these two objectives form a foundation for students to then embark on their own game-making adventure and create something truly engaging.

### Start Making Math Viral!

We would love to see your students playing and exploring games! Use the hashtag #MathMINDs and #MassSTEMweek on your favorite social media channels. Share student's and families playing. To extend this into writing, have students write out their own tweets.

## Recommended Game and Flow By Grade

- Kinder / 1st — Kraal Animals
  - Kraal book 1, then play. Kraal book 2, then play. After some time, play with a different strategy from the end of book 2. Kraal book 3 - connect to the world around us. Have students show various numbers on their fingers in non-standard ways.
- 2nd / 3rd — Achi
  - Achi chapter 1, then play. Achi chapter 2, then play. Now play Tsoro Yematatu. Achi chapter 3 - connect to the world around us. Have students find other meaningful 15s in the world around us (ex, alley way speed limit, quinceañera, first point in a tennis match, etc)
- 4th / 5th — Turtle Sums
  - Turtle Sums chapters 1 and 2, then play. Turtle Sums chapter 3, then the challenge questions at the end of the book. Have students find other equivalences in the world around them.

## Detailed 1-hr Breakdown

- **[4 min.] Launch the Challenge and hour.**  
Build excitement by explaining to students that during this challenge they are going to work with the New England Aquarium and Jiji the penguin to create their own math games. Before we make it to that part, we get to play some fun games that challenge our minds and make us smile.
- **[45 min.] Implement your gameplay strategy.**
  - Play and Replay the game(s), move through the appropriate storybooks and game flow(s).

### **Teacher Tips:**

*It may be helpful to print game pieces before reading the story so you can model the game as you read the story to students. Students could also be asked to model the game instead.*

- **[10 min.] Discussion Questions.** *To support the learning objectives start having students pay attention to and talk more deeply about games and strategies.*
  - Where do we see math built into games that we play? What do you notice about the games? What did you like or didn't like and why? What about these games make them fun to play? What surprised you about these games?
- **[1 min.] Connect.** *Connect to the next hour in the project.*  
In our next hour we are going to continue to play games! We can keep thinking about our discussion questions and we'll see how our games build upon each other. When we meet again, we'll level up the challenge as we play another game.

## Hour 2 - Play

### Prep the Hour

Like above, make sure students and families have their games ready to play. If a family has kids in different grades, perhaps the game is already accessible. All the games can be found on our [website](#).

### Learning Objectives

The goal is to complete students' introduction to strategic math games. The learning objectives remain the same as before — break assumptions of what “math has to look like” and develop deeper gameplay strategies. The more that a students' assumptions of math change and the deeper their strategies are, the better game they tend to make. It's generally better to develop strategies on a game or two than to be exposed, but without much thinking, to a variety of games.

### Keep Making Math Viral!

We would love to see your students playing and exploring games! Use the hashtag #MathMINDs and #MassSTEMweek on your favorite social media channels. Share students playing and student anchor charts. To extend this into writing, have students write out their own tweets to explain their favorite parts, summarize what they have learned, or share their answers to discussion questions.

### Recommended Game and Flow By Grade

- Kinder / 1st — Achi
  - Achi chapter 1, then play. Play the number-free version of Tsoro Yematatu. If your students can handle it, do Achi chapter 2 then play, then the numeric Tsoro Yematatu. Then read Achi chapter 3 to connect math with the world around us, have students find other meaningful 15s in the world around us. If your students aren't ready for 15s, have them find meaningful 10s(e.g., first double-digit age, number of fingers on both hands.)
- 2nd / 3rd — Turtle Sums
  - Turtle Sums chapters 1 and 2, then play. Turtle Sums chapter 3, then challenge questions at the end of the book. Have students find other equivalences in the world around us.
- 4th / 5th — Cannonball
  - All puzzles can be played in any order, but they do increase in difficulty. Have students play a couple 2D puzzles, a couple 3D puzzles, a couple numeric puzzles, and lastly the Red/Blue challenge. They may only make it through a couple of puzzles in the entire hour. This is OK. It's better to think deeply about a couple of puzzles than superficially see all of them.

## Detailed 1-hr Breakdown

- **[4 min.] Launch the hour**

Explain to students that in this hour, they will continue to play games. Although these games are similar to the ones they played in the last hour, some of the rules or game pieces have changed.

- **[45 min.] Implement your gameplay strategy.**

- Play and Replay the game(s), move through the appropriate storybooks.

- **[10 min.] Discussion Questions.** *To support the learning objectives start having students pay attention to and talk more deeply about games and strategies.*

- How did the games differ?
- What made them fun?
- Were you surprised to see math in these games? Why or why not?
- How is this different from math we have seen before?
- What strategies did you use to play the games?
- How did you think about a strategy as you were playing and how did your strategy change as you continued to play?
- How did changing the rules change our game?

**Teacher Tips:**

*Students may need help focusing on strategy instead of design features or game themes.*

*Consider teasing out a conversation around the concept of strategy.*

*What is a strategy? When we think of the word strategy what are some of the things we think of?*

- **[1 min.] Connect.** *Connect to the next hour in the project.*

Now that we have had a chance to play games, in our next session we are going to begin to explore what game designers do!

## Hour 3 - Create

### Prep the Hour

- Pull up the [Maker Story](#), [NEAq Intro Video](#), and [Maker Challenge](#) on your screen.
- It could also be nice to have some additional DIY examples using items from around the house.
  - Ex., cut out the top of water bottle caps and color them to make Achi pieces or make an actual turtle and coins using cardboard making Turtle Sums more tactile.

#### **Asynchronous Adaptation:**

- *Have younger students read the Maker Story with a family member at home the night before.*
- *Have older students read the Maker Story for homework the night before. Then discuss as a class.*
- *Students could watch the NEAq video independently and come back together to discuss the Maker Story, video, and introduce the Maker Challenge.*

#### **Teacher Tips:**

*Use anchor charts where to capture student responses (for example, students share important components of games) as living documents. This could be used throughout all 10 hours as a space to capture student thinking as they continue to build their creative problem-solving capacity.*

## Learning Objectives

The goal of each hour of the Create phase is for students to go through the Maker Cycle without being heavy-handed in how much structure or information we give them. In other words, they begin to self-direct themselves toward a goal with just enough tools to make progress (being creative). To ease our load of implementation and to implant learning in the students' minds, we use a story so that students can use the idea of mimicry (act like Monata the rabbit) to understand the maker cycle.

- Students will understand the Maker Cycle.
- Students will begin to brainstorm and create a game in response to the maker challenge.
- Students will understand the key components of a good game: it's fun when you use strategy to figure out how to play better (act like a detective).

## Keeping Making Math Viral!

Keep sharing photos and videos on social media. Use the hashtag #MathMINDs and #MassSTEMweek on your favorite social media channels. We are on the lookout for some great photos and videos to be used in making a celebration video for Mass STEM Week. We will need [media release forms](#). If you would like for your students to be featured, submit photos and videos through the Mass STEM Hub website.

## Detailed 1-hr. Breakdown

- **[5 min.] Launch the hour**

Now that we have had time to explore some fun games that include math, it is time to begin creating our own games. In today's hour we are going to explore the design process and receive our challenge! Before we start the activities, let's think through a warm up question to get our brains going: How did changing the rules, even a little bit, impact how the games felt? (*Ex., Achi vs Achi II, Achi vs Tsoro Yematatu, gameplay options in Kraal Animals, 2D vs 3D vs numeric Cannonball puzzles.*)

- **[10 min.] Read the Maker Story**

*Go through the Maker Story. It may be helpful to record students' thinking on an anchor chart or virtual slide to capture student responses. You can keep them to refer to them later in the project.*

- **[5 min.] Show the NEAq Intro Video**

*Play the video for students.*

- **[5 min.] Share the Maker Challenge**

Being creative doesn't mean we start from scratch. Sometimes, we make changes to something that already exists. This is where our Maker Challenge comes from. *Read your grade bands maker challenge to students. Build excitement by reminding them that their games will be tested by experts.*

- **[30 min.] Create student maker-pairs have them start making**

### **Virtual and Asynchronous Pairing Tips:**

- *Pair students into parallel buddies. These pairs could design a game together, or design separate games but work as ongoing sounding boards for each other. Consider using a living document or video calls.*
- *Pair students and have them design their game using virtual communication like google meet or zoom breakout rooms.*
- *Have students design the game with a sibling or adult in their household.*

*To provide focus, have students use their time to come up with fun, addictively tricky, crazy game twists that they think will accomplish their challenge. This can be how pieces move, number of pieces, the gameboard, the number of players, how players win, etc. They are the boss. (Tips: Try and include that the game has to be easy to understand, strategic, and with just the right amount of challenge). We don't want to limit their thinking to just game rules or pieces. When we offer knowledge or examples, we want to open their minds to new ideas, not limit their assumptions. It's OK at this stage if they have a few ideas, some of which are half-baked.*

- **[5 min.] Wrap it up**

In our next hour we are really going to dig in and figure out how to get our game ready for testing. Like Monate, we need to test our game ideas a lot. It doesn't need to be perfect or look good, we just want to test our ideas to make the game detective-y and fun: How could you quickly get your game ready for testing?

## Hour 4 - Create

### Prep the Hour

- In advance, watch the [Why Mini Maker Lessons](#) video. This will help guide you as you decide what to include in your mini-lesson. The mini-lesson below is an example of what you could do, but remember we are inspiring creativity and problem solving through just in time learning. Your decision on which of the three lessons to teach in your mini-lesson, as well as whether or not to include the mini-lesson depends on what your students need!
- Pull up the [Mini Story](#), the NEAq Video, and the [Maker Puzzlets](#) and have them ready. As necessary, have the links ready to share as necessary.

### Learning Objectives

All hours of the Create stage have the goal of students developing their creative problem-solving capacity by going through the Maker Cycle. Even if they don't have the steps memorized or even know the name Maker Cycle, that's OK. What's more important is to get a feel for what it's like to test an idea, learn something, and use those insights to make targeted improvements. In particular, it's better that they experience and flow through the cycle, not just academically know it. It's the act of creativity we are looking for here. Sometimes students need a little extra help and a reminder to make this happen. Because of this, we offer three Mini Maker Lessons. The lesson for this hour is on design: good design focuses on the gameplay first and making it pretty last.

Each Mini Maker Lesson has the same three parts.

1. **Mini Story** directly tied to the main Maker Story, but with more focus on the lesson's concept.
2. **NEAq Video** directly tied to the real-world application of the lesson's concept outside of a game-making context.
3. **Maker Puzzlets** are fun, effortful word puzzles designed for students to solidify the key concepts in their minds. Delay them from the mini story a little more so that just enough forgetting has happened for the puzzlet to be challenging.

### Keep Making Math Viral!

Continue sharing on social media and for our end-of-project celebration. But now start posting student work. It shouldn't be pretty yet. It needs to feel like a prototype, yet interesting. The more we can show off our students the more proud they'll be of their effort, which means so much in a math setting. If you can, get some up close shots of some of the games so that in Hour 8, when the games are done, you can show before and after photos of the games.



## Detailed 1 hr. breakdown

- **[5 min.] Mini Maker Story — Good Design.** *Go through the story as a class. Answer the question(s).*
- **[5 min.] NEAq Video — Good Design.** *Watch the NEAq video.*
- **[10 min.] Maker Puzzlet — Good Design**  
*Wait at least 5 minutes after the story before completing the puzzlet. This way, some forgetting has happened, making the puzzlet more effortful. Watching the NEAq video acts as sufficient wait time. If you want, use the puzzlet at the end of the lesson.*
- **[5 min.] Kick off Continued Making**  
*Discuss the book and video in relation to designing for strategic gameplay. Ask students why it may be important to think about designing for strategy before designing for appearance.*  
Now we are ready to get back to our games. Our goal for the hour is to get our game ready for testing. Without feedback, we don't know how fun our game really is.
- **[30 min.] Create**  
*Send students off to continue creating their games. Remind students to design strategically before artistically. Keeping this portion short (only 30 min.) helps provide a sense of urgency and focus so that kids don't spend their time on the wrong things or get back into the rut of designing a game for a theme and not strategy. Their only goal is to get their game testable for tomorrow. Typically, kids like 30-45 minutes of making before getting feedback. Between the last hour and this one, they may feel like they want more time, but they'll have enough time to get some value out of testing.*
- **[5 min.] Wrap it Up**  
*Discuss the questions as a group. Record student thinking on an anchor chart or virtual slide. To increase participation, students could all write a response on a sticky note or a shared document.*
  - What does the word strategy mean? Where do we see strategy in games? What steps are important in designing a game? How can we create a game design that has players be strategic?

It looks like we have made some fantastic progress and have created some initial drafts. What do we think comes next? (Call on students to share). Next hour we will be testing each other's games like the guinea pigs.

### **Asynchronous Adaptations:**

- *Maker Quizlet could be done after the lesson as homework.*
- *Maker Mini Stories can be used as homework or an asynchronous activity- as an opportunity for students to read independently or with a family member. However, it is important to build the bridge between this story and their game making. This will be most successful through synchronous discussion*

### **Extension:**

*Have students create their own Maker Quizlet with a recent book read as a class or one of the game stories read in Hours 1 and 2.*

## Hour 5 - Create

### Prep the Hour

- Pull up the [Mini Maker Story](#), NEAq video, and the [Maker Puzzlet](#), or have the links ready to share.
- Play through a couple of STMath [games](#).
  - These games show what good feedback feels like and will help students have a sense of what to replicate when they are testing their games. They want real-time, useful feedback that shows them what worked or not, and why. This kind of feedback helps you feel like you learned something and have a sense of what to try next.
- Consider using time from art (or other) class to have students make the guinea pig and rabbit hats, or assign it as homework. We offer the hats in [full-color](#), and a [printer-friendly](#) format.
  - It's preferable not to use up too much time for construction during this hour.
  - The reason for the hats is to offer less formality and stress around the concept of testing. Some kids are nervous about this part. Additionally, we leverage the idea of mimicry (act like a guinea pig) for students to recall how to act based on how the character behaved in the story.

### Learning Objectives

Like all Create-hours, the goal is to build student capacity to creatively solve problems. One important component of this is feedback and its ability to create insight and encourage the one receiving the feedback to keep going (social approval, encouragement).

- Students will understand the importance of feedback
- Students will be able to provide effective feedback to peers
- Students will be able to receive feedback and make alterations to their games based on that feedback.

#### **Teacher Tips:**

*During the feedback sessions encourage students to make live design changes and retest right away, just like Monate did in the story. Changes made in the moment are often good signs of a student being creative. This could even happen part way through the game and the same players continue playing with the tweek and giving feedback.*

## Keep Making Math Viral!

Continue sharing photos and videos on social media and for the celebration video. Since this hour is about students giving and receiving feedback, focus photos on students in their guinea pig and rabbit hats testing games. Include any photos of adults doing the same.

## Detailed 1-hr. Breakdown

- **[10 min.] Mini Maker Story — Feedback**

*Go through the story as a class. Answer the question(s) it asks. Have the students play the recommended STMath game to get a sense of what good feedback feels like.*

- **[5 min.] NEAq Video — Feedback - watch the video**

- **[10 min.] Maker Puzzlet — Feedback**

- **[30 min.] Feedback Session**

*Pair up groups of students to play each other's games while giving and receiving feedback. We have included guinea pig and rabbit hats for students to create and wear to remind them of their roles. For younger students, it may also be helpful to create an anchor chart or provide students with note cards which have giving and receiving feedback sentence stems.*

*For example,*

- *I was confused with \_\_\_\_\_, because \_\_\_\_\_.*
- *I liked how you included \_\_\_\_\_, because \_\_\_\_\_.*

*Thank you for that feedback. I will use it by \_\_\_\_\_.*

*An effective structure may be this:-play the first group's game for 5-7 minutes. Provide feedback for 3-5 minutes. Switch roles.*

- **[5 min] Wrap it Up**

Now that we have received some specific, honest, and kind feedback from our guinea pigs, our next step will be to use that feedback to improve our games. May you know exactly what you want to try next. Maybe you are still trying to figure it out. To help us all even more, you now have the opportunity to connect with industry professionals.

*Have students prepare questions to connect with industry professionals. This is a great way to motivate students and for them to recognize their own growing math and problem solving skills. Brainstorm with them a few questions that they would like to have answered by professionals like the exhibit designers at the New England Aquarium and game designers Hasbro. You can then post those questions on our [Ask an Expert forum](#) and then share their responses back with your students.*

*The following starter questions might help jumpstart their ideas:*

- *What have you done when your guinea pigs don't find your game idea as fun as you do?*
- *How have you changed the aspects of a game so that adults and kids can both play together, both be challenged, and both have fun?*

## Hour 6 - Create

### Prep the Hour

Pull up the [Mini Maker Story](#), NEAq video, and the [Maker Puzzlet](#) or have the links ready to share.

### Learning Objectives

It's time to start releasing the reigns a little. Students have already focused on strategy in their games and received feedback from one another. They've also come up with questions for industry professionals. It's time for them to put these skills to use and really dive deep on their games by iterating based on feedback. They should now have a good foundation to self-direct their own work. This is an important part of the project. They should test again, learn more, use those insights to re-ideate. The feedback sessions are not a one and done. A good goal for the project is 3 to 5 iterations based on the Maker Cycle (minimum). Students are also now in their 6th hour in the project. This is much longer than they are probably used to in a math project. Because of this, Hour 6 focuses on struggle and why it's good. This way, students that begin to feel tired or stuck know that this is normal.

- Students will be able to use feedback to make adjustments.
- Students will persevere through challenges and struggles.
- Students will be able to test and modify their games.

#### **Asynchronous Adaptations:**

- *Maker Puzzlet could be an asynchronous lesson after or as a homework assignment. Students could then share their responses with each other or collaborate on it in small group shareable documents.*
- *Maker Mini Stories can be used as an asynchronous activity, students read independently, with a family member, or listen to a recording of the teacher reading it. However, it is important to build the bridge between this story and their game making. This will be most successful through synchronous discussion, but could be implemented using discussion boards or recorded sheets.*
- *Game Play can continue with students testing their games with a family member or sibling. It may be helpful to provide a document for students to collect feedback. Older children may be able to share and play each other's games virtually by creating a rough drawing on a shared document or using communication strategies via a video call.*

### Keep Making Math Viral!

Continue sharing online using #MathMINDs and #MassSTEMWeek. Especially now, post photos of kids making, testing, and iterating. Capturing any adults in guinea pig hats would be awesome.

## Detailed 1-hr. Breakdown

- **[9 min.] Finalize questions for Expert Forum**  
*Use an anchor chart or shard document for students to enter the types of specific game questions they'd like to ask. You will be their primary voice on the forum, so collate the questions and submit them to the experts.*
- **[5 min.] Mini Maker Story — Struggle**  
*Go through the story as a class. Answer the question(s) it asks.*
- **[5 min.] NEAq Video — Struggle**  
*Watch the NEAq video to see this concept put to use in real-life.*
- **[5 min.] Maker Puzzlet — Struggle**
- **[35 min.] Create and Iterate**  
*Send students off to continue to make and test. Have them test their game with other guinea pigs. Continue to test and adjust as needed.*
- **[1 min.] Wrap it Up**  
Now that we have used that feedback from our guinea pigs to make adjustments and improve our games our next step is to add the finishing touches to make the games look nice and attract people to want to play them.

## Hour 7 - Create

### Prep the Hour

This hour is for students to get their games ready for a live audience to play. There will be a follow up, optional, project to submit the game for industry expert review. Select games will be given a chance to further refine and design their games with the creators of STMath and produce final copies of their game to be on display at the New England Aquarium. Because of this, students don't need the most perfect game, they need one that's fun to play and with the potential to be highly engaging. But we do want them to have time to be really proud of their game and include some self-expression.

To prep for this hour, review Hours 8 and 9 to familiarize yourself with the various ways students will share their games and gather gameplay data. In particular, decide how you will have the kids share their games live and capture gameplay data.

**Teacher Tips:**

*Students may need to be reminded to find or make whatever they need, especially when it is fully remote. They may also need supplies (ex., colored pencil, scissors). Perhaps they could pick them up from the school site?*

### Learning Objectives

- Students will focus on how the game looks.
- Students will finalize games to be prepared to share.

### Keep Making Math Viral!

This is a great time to share some before and after photos of the student-made games. We'd love to see them online as well as in the celebration video. Keep those photos and videos coming.

## Detailed 1-hr. Breakdown

- **[1 min.] Launch the Hour**

Now that you have worked hard to create your game and you have tested and made adjustments, it is finally time to make it look nice. As you get your game ready, you want a design that makes people want to play your game. You know your game is pretty fun already. This is where you can take it over the top. How will the look and feel of your game create initial interest so that people will want to play it?

- **[50 min.] Finalize**

Students spend time finalizing their game.

**The Look:**

- Add pictures
- Color completely
- Create final pieces, cards, board, etc
- Finish the look

**The Playability:**

- Finalize directions; make sure they are clear for someone who has never played before
- Make sure all parts needed are included

Also, use the helpful insights from professionals on the forum while they students finalize their new games.

- **[9 min.] Wrap it Up**

Now that you have had the opportunity to put the finishing touches on your game and make it look nice, our next step is to share your game with others and see what people think about it. We are going to share our games live and begin collecting gameplay data to see how we did against our challenge and to get as many minutes on the games as possible. Statewide, our goal is 25,000 math minutes!

*Share with them the plan for showcasing their games live and collecting feedback. This is the plan you selected in prepping for this hour. If students need to do any prep, have them complete that work as homework. For example, setting up a table in the garage, inviting their friends.*

*Consider having students also come up with their own questions, in addition to the Google survey, to capture data during the gameplay sessions.*

**Teacher Tips:**

*It may be nice to pull up the [gameplay survey](#) digitally to talk through it, how to use it, and what it's looks to capture. Remind them of the goal of 25,000 math minutes.*

*The gameplay survey is for statewide data entry. If you want students to capture data they'll be able to keep and analyze, consider having them use the [paper survey](#) or create a couple of questions themselves to capture (ex., total gameplay, what you liked or not and why.)*



## Hour 8 - Share

### Prep the Hour

- Ensure that students have done their homework in preparation for the live showcase.
  - Finished their game, ready with the [gameplay survey](#)
- Refamiliarize yourself with Hour 9 so that students are ready for the final submission to the industry experts.

#### **Game Play Data:**

*The Google survey provided is our **only** way of getting statewide gameplay data. If your students are using the paper and pencil survey, an adult will need to type in the results to the Google form. If you would like kids to see the specific feedback on their game, you need to either use the [physical form](#), use your own questions, or make your own copy of the Google form for students to use.*

*It is important though that complete and accurate data is plugged in to our statewide form.*

#### **Teacher Tips:**

- *If your students would be excited to see themselves in the final STEM Week Challenge celebratory video, consider having the people in the gameplay video complete [this media release](#) to be uploaded with the game for an opportunity to be in the video.*
- *Game Play. Students can continue to test out their games with a family member or sibling. It may be helpful to provide a document for students to collect feedback. Older children may be able to share and play each other's games virtually by creating a rough drawing on a shared document or using communication strategies via a video call.*

#### **Asynchronous and Virtual Adaptations:**

- *Asynchronous: Have students record a video of themselves explaining their game, how it relates to the original game in the story, and briefly modeling how to play it. Post these games on your discussion forum or online platform for students to view.*
- *Virtual Synchronous: Have students share for 3-5 minutes virtually. Students can show their game, explain how its related to the original game, and explain some of their design decisions*
- *Data Adaptations: The survey may not work if students are not physically playing each other's games. Another option would be to provide guiding questions on a living document or google form, and have students provide feedback on each other's games in that way. Questions should be tailored to whatever sharing method is selected (i.e., if students describe their design decisions, questions could focus on providing feedback on those decisions.)*



## Learning Objectives

- Students will be able to share their completed games.
- Students will collect game play data

## Keep Making Math Viral!

Today is the day to really make math viral and show off the kids. Have kids themselves, or their parents, take as many photos of people playing their math games live! Capture as many emotions moments as possible: stumped, challenged, elated, etc. Let's really make math viral, through our students.

## Detailed 1-hr Breakdown

- **[4 min.] Launch the Hour**

*Build excitement over how good it feels to see people enjoy something you've worked so hard on. Remind them of the goal of 25,000 math minutes and share with them how to collect gameplay data - either physical sheet or using the Google form provided for this project.*

- **[55 min.] Live Student Showcase**

*Students play and share their games with classmates, family members virtually or in person. Have participants fill out the game play survey either on paper or virtually. Before students are sent off to play, provide students with a checklist of the components they need for game submission (see below). Let students know that the focus of today is playing each other's games and collecting data, but that they should also try to get pictures of themselves and others playing their game. Pictures of game rules and game boards as well as people actively playing their game will be submitted in the next hour.*

*Components to take pictures and videos of:*

- *Game title*
- *Game board picture*
- *Game rules picture*
- *1-2min video of people engaging in game play*
- *Photos of people engaging in gameplay.*

*Consider using this submission checklist so students are sure to gather all the data they need for Hour 9.*

- **[1 min.] Wrap it Up**

Now that you have had the opportunity to share your game with others our next step is to submit your game to receive industry feedback and maybe even get a chance to display your game at the New England Aquarium. If you haven't had a chance to take a good photo of your game board, game rules, the pieces or the title, do that as homework. Tomorrow we'll share our games for the final STEM Week Challenge.

## Hour 9 - Share

### Prep the Hour

Completely familiarize yourself with the [submission checklist](#) for the Mass STEM Week Challenge. All games submitted will be reviewed by industry experts with feedback sent back to the student. Select games will be chosen to undergo another round of refinements and improvements and can then work directly with the creators of STMath to get their game show ready for the New England Aquarium. Details on the final display are still in the works as it's not entirely clear how COVID will impact schools, families, or the Aquarium.

**Submission Tip:**

*You can submit all the games your students came up with or select a few from your class. If you go the selection route, consider making the decision together as a class. Which game(s) did students most enjoy playing? Which do they think will be most popular with visitors at the NE Aquarium?*

### Learning Objectives

- Students will create and edit submission videos to their teachers.
- Students will follow submission requirements making it easy for the teacher to submit on behalf of her students.

### Keep Making Math Viral!

If you haven't done so already, gather some photos from the kids and post them on social media. Submit some for the celebration video as well.

## Detailed 1-hr. Breakdown

- **[15 min.] Kick off the Hour, Discuss Games**

*If you go the route of submitting all games, take one of the students' games and show kids how to have their parents submit the documents. If you are selecting just a few stellar student games, use this time to discuss as a class which games to pick.*

- **[45 min.] Edit and submit photos and videos for the industry experts**

*Students will use the photos and videos that were taken in the previous hour and begin creating a video to submit. Students will also add pictures of their game rules and game boards. This work should be submitted to the teacher. The teacher then submits on behalf of the students online. Submission must be made by teachers on or before October 23, 2020 at*

*<https://mass-stemhub.org/stem-week-2020/industry-connections/>*

*Refer to the [submission checklist](#) for more details.*

*If there is extra time, students can continue to play each other's games or reflect on the data they collected in the last hour.*

- **[10 min.] Wrap it Up**

*Share with students that the next step is to reflect on the process so far, which is the focus of our next and final hour. In a couple of weeks all of the data collected in Hour 8 will be in and shared with everyone. They should also expect to hear back from our industry experts by mid-November. Details on a planned live event will come out around that time — depending on how we continue to learn about the health pandemic.*

## Hour 10 - Reflect

### Prep the Hour

Review the recommended [reflection questions](#). Consider using a live online doc or anchor chart to capture student data. If any students used physical gameplay data forms, an adult needs to input that information to the Google survey.

### Learning Objectives

- Students will analyze and reflect on their game.
- Students will reflect on the project and what they learned about creativity.

### Keep Making Math Viral!

Share any final photos you've yet had a chance to. Upload all approved photos along with the media release form so that we can create the celebration video.

### Detailed 1-hr Breakdown

- **[5 min.] Launch the Hour**  
You are all now real game makers! What are your feelings about the STEM Week Challenge?
- **[15 min.] Analyze Your Data**  
Look through any data you collected on your game. Was it successful in meeting the challenge? Why or why not? For additional individual reflection/analysis questions, refer to these recommendations.
- **[15 min.] General Reflection**  
*Have students reflect on the project, what they learned, and what they would do the same or differently next time. Use these sample [reflection questions](#). Use a live online document or anchor chart.*
- **[15 min.] Post Survey**  
*Have the students take their appropriate post survey, same for you as the teacher. Please also take the project feedback survey so that we can gather our own insights for what to keep and what to improve. Links to the surveys will be live on the [website](#) (under Hour 10) October 15.*

*We would love to see some of the anchor charts as well.  
Share them with us at [STMathMA@mindresearch.org](mailto:STMathMA@mindresearch.org).*

*We would like your feedback on the project itself.  
Please use this [Google form](#) to submit any [project-specific feedback](#) to us. Thank You!*