



This booklet belongs to:













### **STEP 1 - ASK**

#### THINKING ABOUT THE PROJECT

Engineers ask questions about what they want to design. During ST Math Immersion, you will be designing a math game. Questions to consider: What type of game do you want to design? Who are you designing for? What are the requirements of the game? What is your goal?

### **STEP 2 - INVESTIGATE**

#### **EXPLORING WHAT YOU KNOW**

Think about the different types of games you've played and who the games were designed for. What are some ways you can incorporate the different aspects of other games to create a unique game? What materials do you have to make the game?

### **STEP 3 - IMAGINE**

#### **BRAINSTORMING MATH GAME IDEAS**

As a team, work together to brainstorm ideas and develop a game idea you want to design. Every team member should have an opportunity to share ideas and build off of each other. Remain focused on the task. A good design is about working together. Think about the areas in math that you or others may have struggled in and could use more help.

### **STEP 4 - PLAN**

### DISCUSSING WHAT YOU WANT TO DESIGN

Once everyone has shared, take all your ideas and combine it to make one big idea. Be sure to review the requirements of the math game and the game planner found in the Design Challenge Station Booklet. Start a plan and move forward to creating it.

### **STEP 5 - CREATE**

### CONSTRUCTING YOUR FIRST MODEL

Using your plans, build your first model and make your ideas real! This is the time to be creative, use your imagination and construct a math game.

### **STEP 6 - TEST**

### **EVALUATING THE GAME**

Once you have built your first model, you need to test it and see how it works. Get some feedback from other classmates. Use the information you learned from your classmates to decide what works and what needs to be changed.

# **STEP 7 - IMPROVE**

### **REVIEWING FEEDBACK**

Discuss how you could improve your design. Make the changes needed. Repeat steps 6 & 7 until you are happy with your design.



**STEP 1: ASK** 

# **EXPERIENCING A NEW GAME**

Good designers begin their process of designing by exploring what they games they already are familiar with and ask themselves what other games they can create like it. As you play the game Traffic Lights Tic-Tac-Toe and Dara, think about what style of game it is, what are the rules, what do you have to do to win?

# **Reviewing Games**

### Compare the two games below.



# **STEP 2: INVESTIGATE**



## **COMPARISON GAMES**

When creating a new game, it is important for designers to experience playing a variety of games. As you play Traffic Lights Tic-Tac-Toe and Dara with your group, think about what you are learning, how the game makes you think, and the strategies you were using. Good game designers work to uncover the characteristics of a good game. Answer the questions below.







**STEP 3: IMAGINE** 

# **GENERATING GAME IDEAS**

Review the research and use it to help brainstorm ideas. Begin to imagine what type of game you would to create. Think about all the games you've explored up until now. What information will you take from your knowledge of these games to help you brainstorm with your game ideas?

# **Brainstorming Ideas**



# **STEP 3: IMAGINE**

# **DECIDING ON A MATH CONCEPT**

Discuss among you different concepts of math you have struggled with. Now think about which math concept or concepts you want to design your game around. Below are some questions to help you refine your thoughts about how to articulate the concept as a game.

# Math Concept Reflection

Concept Choice(s):					
1 How have you used/experienced this concept? Give examples.					
2 Describe the concept mathematically.					
3 How could you create a game to help someone with this concept?					
4 What are some of the things that make this concept hard? Why?					
5 How is this concept related to things you have learned before?					
<b>6</b> Draw a visual representation of the concept.					



ST	TEP 3: IMAGINE
GA	ME PLANNING MOCK UP
Goo wha In cr mat	In d game designers look at all their ideas and the come up with a solution. They imagine of their game will look like, how their audience will interact with the games, and much mor reating a math game, it is important to think about how your audience will explore the or problem solve and demonstrate their understanding.
3 We are cho	osing this style of game because

# **STEP 3: IMAGINE**



# **GAME RULES CHALLENGE**

What game doesn't have rules? Think about some games you have strategized to win and how you win. Let's explore a very simple old game below.





# **STEP 4: PLAN**

## GAME BLUEPRINT

Good game designers develop a plan before building a game. They use creativity and the information they gathered to write a "blueprint" for their game. This gives them the opportunity to see what the game will look like.



# **STEP 4: PLAN**

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**GAME MECHANICS:** How does the player interact with the game?

**GAME RULES & CHALLENGES:** 

What are things a player can and cannot do in the game?

What obstacles are in place to make the game more challenging and interesting?



# **STEP 4: PLAN**

## **GAME RULES**

Every good game has clear rules. In the space before, write the rules for your game.

# New Game Rules





**STEP 5: CREATE** 

## **JOB ROLE ASSIGNMENT**

Before you begin creating your own prototype, which designers call their first model, divide the workload. Use the table below to identify the jobs that will need to be done to create this game. Assign each team member a role. Choose due dates to help you stay on time and determine what materials will be needed.

Team Member	Job Role	Materials Needed	Due Date

# **STEP 5: CREATE**

## **INITIAL REFLECTION**

Good game designers analyze their game as honestly as they can. Be sure to continually rethink aspects of your game and play it as often as you can, especially during development.

ANALYZING YOUR GAME







# **STEP 6: TEST**

## WATCHING OTHERS TEST YOUR PROTOTYPE

Good game designers test their prototype and gather feedback. Watch the gameplay and respond to the following questions based on what you observe. Have a group of people play your game and test it out. Provide them with the Game Tester Report to share their experiences playing the game.



# **STEP 7: IMPROVE**

## MAKING ADJUSTMENTS

Once the games have been tested, good game designers use the feedback to improve their games. What ideas do you have for improving your game? How will these improvements make your game better?





# PRESENTING YOUR GAME

## PREPARE A STORY BOARD

Game designers present their ideas to others after they've made updates to improve their game. Use a Story Board to help you share your game design. The Story Board helps you organize what you want to say and in what order you want to share it. Decide what each team member will share.

# Share Your Game

**Use the boxes to write notes.** Don't forget to include: title of the game, how many players, who it was designed for, style of game, concept(s) used in the game and why, rules of the game, team members and their roles.

