

Teacher Guide: Building Background Knowledge for "Problem Solving – Creating a Game Strategy"

Grade Level: 4-5

Duration: 20-25 minutes

Location: Classroom

Introduction

Why are arcade games designed to include different levels of difficulty and obstacles that change as players progress? What is the advantage of using advanced strategies, like timing or special moves to win a game? And why do certain game mechanics or features remain unchanged, despite the player's attempts to outsmart them?

Arcade games are enjoyed by players of all skill levels because they offer immediate feedback and results (such as achieving high scores or unlocking levels), yet they also challenge players to improve for years without necessarily reaching the perfect game. The mechanics of game design, such as timing, physics, and strategy, illustrate key concepts from math and physics that are accessible even to young learners.

By exploring the unique characteristics of arcade games, we can provide a fun and academically enriching addition to the classroom curriculum, increasing cross-curricular opportunities for learning.

This addition to the educational curriculum was designed to meet the growing needs of STEAM instruction in elementary education. In a simple arcade game, we can observe various aspects of motion, speed, velocity, acceleration, and forces in action. Through this program, educators can use science terminology and language arts skills to explain game mechanics. Students will encounter cross-curricular learning opportunities, blending physical activity with academics.

This guide ensures a structured yet interactive approach to teaching strategy concepts in a way that excites and prepares students for hands-on learning at Chuck E. Cheese!

Objective

By the end of the lesson, students will:

- Understand how problem-solving applies to real-world scenarios, including games.
- Practice defining problems, brainstorming strategies, and evaluating potential solutions.
- Build excitement and foundational skills for the upcoming visit to Chuck E. Cheese.

Materials

- Whiteboard or large paper
- Markers
- Sample pictures or short videos of arcade games (e.g., ski ball, basketball hoops)
- Mini whiteboards or paper for group work

Lesson Outline

1. Introduction (5 minutes)

- **Hook:** Start with a question to engage students:

“Have you ever played a game where you had to think hard to figure out the best way to win? What made your plan work?”

Allow a few students to share their experiences.

- **Discuss the Concept of Strategy:**

Explain that games often require more than just luck—it takes careful planning and problem-solving. Highlight the steps involved in creating a successful strategy:

- **1. Define the problem (goal)** – What are we trying to achieve in the game?
 - **2. Brainstorm possible strategies** – What are different ways to reach the goal?
 - **3. Test the strategies** – Try out each strategy and see how well it works.
 - **4. Reflect and improve** – After testing, think about what worked, what didn’t, and what you can adjust to do better.
- **Relate to Chuck E. Cheese:**

Share that the class will soon visit Chuck E. Cheese and apply these steps as they play games, to become expert game strategists.

💡 *Did you know? Strategy is Everywhere: Strategy isn't just for games! Sports like soccer or basketball also involve creating plays and thinking ahead to outsmart the other team. In fact, players spend hours studying strategies to improve their game!*

2. Explore Game Mechanics (15 minutes)

- **Step 1: Understand the Games**

Show pictures or short videos of popular arcade games and discuss how they use strategy:

- **Fishbowl Frenzy:** In this game, you need to toss balls into various fishbowl targets. The strategy lies in deciding whether to aim for the larger, easier-to-hit targets or the smaller, higher-value ones. Precision and timing can help you maximize your score.
- **Skee Ball:** Skee-Ball requires a strategic approach to maximize your score. Knowing when to aim for the high-point targets (like the 100-point rings) or when to play it safe by aiming for mid-range targets can make a big difference in your total score.
- **Football 2 Minute Drill:** Players must throw footballs into different holes for different amounts of points based on difficulty. Some of these holes will have bonus points during the game and players must decide if risking extra points for a harder shot is worth it, or quickly racking up points for easier throws is a better strategy.


Discuss the goals and mechanics of these games with the class. Ask the following:

- “What do you think the goal is for this game?”
- “What skills might help you succeed in this game?”
- “What challenges could you face while playing this game?”

- **Step 2: Group Brainstorming Activity**

Divide students into small groups and assign each group a specific game to analyze (e.g., Skee-Ball, Basketball Hoops, etc.). Have students answer these questions on mini whiteboards or pieces of paper:

- **What is the goal of the game?**
- **What challenges might you face when playing?** (e.g., limited time, specific mechanics like angle, speed)
- **What strategies could help overcome those challenges?**

 *Did you know? The very first arcade game was Pong, created in 1972 by Atari. It was inspired by the game of table tennis, and it became an instant hit. Pong's simple strategy of bouncing a ball back and forth introduced millions of people to arcade gaming!*

3. Reflect and Share (7 minutes)

- Bring the class back together and invite groups to share their brainstorming findings.
- Facilitate a discussion on how different strategies work for different games.
Possible questions:
 - “How do different strategies work for different games?”
 - “Can the same strategy work for multiple games?”
 - “What strategies are the most effective for achieving the highest score?”
- Emphasize that problem-solving involves experimenting, learning from mistakes, and refining strategies over time.

4. Wrap-Up and Build Excitement (3 minutes)

- **Preview the Visit:** Remind students that they'll have a chance to test out their strategies at Chuck E. Cheese and refine them while playing arcade games.
- **Make Connections:** Explain that this problem-solving process is used by engineers, scientists, and game designers in their work.
- **Encourage Creativity:** Ask, “How might the strategies you use for games help you solve other challenges in school or life?” This prompts students to connect the skills they practice in games to other areas of learning and problem-solving.

Modifications and Extensions

- **Advanced learners:** Challenge them to think about how math or physics concepts (e.g., angles, force, trajectory) could be used to improve game strategies.
- **Struggling learners:** Provide guiding questions or a "strategy cheat sheet" to support the brainstorming process.
- **Optional extension:** Allow students to create a short "promo video" explaining their chosen game and strategy to build excitement for the visit.

Vocabulary:

Term	Definition
Strategy	A plan of action designed to achieve a particular goal, such as winning a game.
Goal	The desired outcome or objective that a person or group wants to achieve (e.g., getting the highest score).
Challenge	A difficulty or obstacle that might make achieving a goal harder.
Constraint	A limitation or restriction that affects how a solution can be created (e.g., time, resources).
Reflection	Thinking about how things went after trying a solution, in order to improve or make changes.

Brainstorm	To come up with as many ideas as possible, without judging them, in order to find potential solutions to a problem.
Game Mechanics	The rules and physical elements that define how a game works (e.g., how points are scored, the action of throwing or rolling).
Test	To try out a strategy or solution to see if it works.
Revise	To make changes and improvements to a strategy or plan based on testing and feedback.