

Course Title: Using Games to Make Math Fun!	
Number of Content Modules: 4	Grade Levels: This course is designed to empower math teachers and math coaches of students in grades K-6, although teachers and coaches in the upper grades may find it helpful.
Questions: 1-855-498-4400 PD@TeachnKidsLearn.com	TKL Catalog: https://teachingknowledgeloop.com/external-catalog

Course Description

Games make learning fun, engaging, and motivating for students. Using games is a great way for students to practice math skills to build computational fluency and develop a deep conceptual understanding of mathematics. Math games serve as a gateway for building enthusiasm and a sense of belonging for groups of students who have historically been marginalized or excluded in the field of mathematics. Playing math games builds computational fluency, reinforces skills, encourages mathematical thinking, and strengthens home-school connections. In this course, you will use math games to engage learners and deepen mathematical understanding and reasoning. By applying culturally responsive practices, you will leverage the complex network of assets, cultures, and identities students bring to the classroom to promote mathematical mastery.

Course Objectives

CO.1: Design and implement math games that enhance student engagement, critical thinking, and mathematical understanding, addressing potential challenges and maximizing accessibility for all learners. [Danielson 1a, 1e 2c, 3c, 4a]

CO.2: Create inclusive math game experiences that value diversity, challenge stereotypes, and build a strong sense of belonging for all students, while actively addressing and reflecting on any biases and assumptions that may impact the inclusivity and effectiveness of the game experiences. *According to NAEP, this learning opportunity gap exists in mathematics for the following groups of students: students who identify as Black, Hispanic, Native Hawaiian or Other Pacific Islander, Native American/Alaskan Native, English learners, students experiencing poverty, and students with special needs.* [Danielson 1b, 1d, 2a, 2b, 3e, 4a]

CO.3: Demonstrate a commitment to learning through math games and cultivate a classroom environment that encourages confidence, collaboration, and a growth mindset. [Danielson 1c, 1e, 2b, 2d, 3a, 3c, 4e]

CO.4: Define fact fluency and analyze the role of flexibility, understanding, and efficiency in achieving it. [Danielson 1a, 1c, 2b, 3a, 3c, 4e]

CO.5: Explore how math games can support math skills and investigate their effectiveness in developing fact fluency and conceptual understanding for diverse learners. [Danielson 1a,1c, 1e, 2b, 2c, 3a, 3c, 4a, 4e]

CO.6: Identify and share a math game that promotes math fluency, explaining how it incorporates engagement, student choice, and inclusivity. [Danielson 1a, 1b, 1d, 1e, 2a, 2b, 2c, 3a, 3c, 4c, 4d, 4e]

CO.7: Reflect on the integration of math games and design an engaging game that effectively teaches mathematical concepts while promoting equity and accommodating diverse learning styles. [Danielson 1a, 1b, 1d, 1e, 1f, 2a, 2b, 2c, 3a, 3c, 3e, 4a, 4c, 4e]

CO.8: Reflect on teaching practices, including personal beliefs and biases, to create a supportive learning environment that fosters deep mathematical thinking. [Danielson 1a, 1b, 1c, 1d, 2a, 2b, 2c, 3a, 3b, 3c, 4a, 4c, 4e, 4f]

CO.9: Integrate manipulatives, effective questioning, and vocabulary development to enhance student learning, reasoning, and communication in mathematics. [Danielson 1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3e, 4a, 4e, 4f]

CO.10: Design and implement math games as assessment tools to gather data on student understanding and inform instruction while critically examining and addressing any biases and assumptions that may affect assessment outcomes and instructional decisions. [Danielson 1a, 1c, 1d, 1e, 1f, 2b, 3a, 3c, 3d, 4a, 4b, 4f]

CO.11: Develop strategies to engage families in math learning, create culturally responsive classrooms, and build strong home-school partnerships through the use of math games. [Danielson 1b,1d, 2a, 2c, 3a, 3e, 4c, 4d, 4f]

CO.12: Incorporate diverse math games into daily instruction, transforming them into inquiry-based investigations to enhance student engagement and learning. [Danielson 1e, 2b, 3a, 3c, 4a, 4f]

CO.13 Reflect in brave learning spaces to a) examine perspectives and experiences of marginalized groups, b) surface and interrogate personal and institutional assumptions, beliefs, and practices that contribute to inequity, and c) reflect on the complex ways identity and culture shape teaching and learning. [Danielson 1b, 2a, 2b, 4a]

CO.14 Critique the efficacy of math games in engaging historically marginalized and underserved groups of students. [Danielson Component 1b, 3c, 4a]

CO.15 Explore the significance of mathematical identity and create inclusive learning experiences by highlighting diverse mathematicians and fostering a sense of belonging for all students. [Danielson 1b,1c, 2a, 2b, 3a, 3c, 4c]

Course Outline

Course Introduction Module

Course available completely online
(24/7 and Self-Paced)

Assignments due by the end of the term.

Module Topics

In this module, you will learn about the course set-up, expectations for learning and collaborating, meet your colleagues, and reflect on your prior knowledge about teaching with artificial intelligence.

- Course Navigation & Methodology
- Course Description
- A Transformative Approach to Education
- Expectations and Community Agreements for Engaging in Brave Dialogue
- Community Building Circle: Course Story
- Course Objectives

Module 1: Why Play Math Games?

Module Topics

In this module, you'll explore the concept of math games and discover their value and benefits for your classroom. You'll also reflect on your attitudes and beliefs about culturally responsive teaching to enhance your approach.

Section 1: The Value of Math Games

- Reflect on It! Defining Math Games [30min]
- Learn about It! Learning Math through Play [45min]
- Learn About It! The Value of Games in Mathematics (45 min)
- Reflect on It! The Active Construction of Math Knowledge [60min]
- Learn about It! Developing Curiosity in Mathematics [45 min]
- Learn about It! Building Fluency through Math Games [30min]
- Reflect on It! Reflecting on the Value of Math Games [50min]

Section 2: Building a Culture of Math Curiosity and Engagement

- Practice It! Classroom Culture: A Foundation of Game-Based Learning [90min]
- Reflect on It! Math Games Build Belonging [60min]
- Reflect on It! How Culturally Responsive Practices Help Students Develop Math Identity [60 min]
- Reflect on It! Elevating Contributions of Indigenous Cultures to Math [40min]
- Reflect on It! Incorporating Bias Awareness into Math Education [30 min]
- Reflect on It! Community Building Circle: Module 1 Wrap-Up [60min]

Module 2: Fact Fluency

Module Topics

In this module, you will explore the development of mathematical fluency and how to assess computational proficiency. You'll learn the difference between memorizing math facts and understanding them conceptually. Educators will evaluate student engagement and performance in math games to support teachers in developing equitable practices to ensure all students achieve mathematical fluency.

Section 1: Fact Fluency

- Learn about It! Fluency through Flexibility (20 min)
- Practice It! Defining Fact Fluency (30 min)
- Practice It! Enriching Fact Mastery through Games (80 min)
- Practice It! Sharing Ideas and Resources (50 min)
- Reflect on It! Fact Fluency Games in your Classroom (40 min)
- Practice It! Fact Fluency Math Games (80 min)

Module 3: Conceptual Understanding

Module Topics

In this module, educators will explore some of the many ways for students to develop a deeper understanding of math concepts. Students can play math games to practice newly acquired skills and reinforcement of previously learned skills. Encouraging students to use concrete manipulatives, mathematical discourse, and content-specific vocabulary provides equitable access to instruction leading to a more developed conceptual understanding of mathematics.

Section 1: Play as a Gateway to Understanding

- Reflect on It! Math Games to Build Conceptual Understanding [60 min]
- Reflect on It! Conceptual Approaches to Teaching Math [60min]
- Reflect on It! Community Building Circle: Using Manipulatives to Develop Conceptual Understanding [80min]
- Practice It! Scaffolding and Differentiation [90min]
- Practice It! Assessing Conceptual Understanding [60min]
- Practice It! Assessing Students' Learning with Math Games [60min]

Section 2: Using Games to Promote Mathematical Discourse

- Learn about It! Thinking is a Mess We Should Talk About [60 min]
- Practice It! Math Talk to Engage and Support Multilingual Language Learners [30 min]
- Practice It! Additional Strategies to Promote Math Discourse [60min]

- Practice It! Questions to Build Conceptual Understanding [60min]
- Practice It! Community Building Circle: Math Games to Encourage Academic Discourse [60min]
- Learn about It! Using Math Vocabulary in Discourse [45min]
- Practice It! Implementing Games that Encourage the Use of Math Vocabulary [40min]

Module 4: Home-School Connection

Module Topics

This module explores various strategies to strengthen home-school connections using math games. Educators will learn about the historical and cultural significance of math games, practice incorporating multicultural math games, and reflect on ways to integrate math games into home activities. A key component is planning a family math night to engage families in their children's mathematical learning.

Section 1: Home-School Connection

- Learn about It! & Reflect on It! A Rich History of Math Games from Different Countries and Cultures [60 min]
- Practice It! Multicultural Math Games [60 min]
- Reflect on It! Math Games at Home [60 min]
- Reflect on It! Math Games at Home [60 min]
- Practice It! Math Games at Home [60 min]
- Master It! Planning a Family Math Night [60 min]

Section 2: Exploring Mathematical Concepts Through Board Games, Pub Games, and Investigations

- Reflect on It! Board Games [60min]
- Learn about It! Pub-Style Games [60min]
- Learn about It! Transforming Mathematical Games into Investigations [80min]
- Reflect on It! Plan for Incorporating Math Games [80min]

Section 3: Exploring Mathematical Concepts Through Board Games, Pub Games, and Investigations

- Reflect on It! Inclusion in the Field of Mathematics [90min]
- Practice It! Developing Math Identity: Elevating Contributions of Multicultural Mathematicians [90min]

Course Wrap-Up Module

Module Topics

In the Course Wrap-Up Module, you will reflect on your self-efficacy for mastering the course objectives.

Section 1: Summative Course Reflection

- Master It! Summative Course Reflection [30min]
- Reflect on It! Course Evaluation and Feedback [30min]
- Learn about It! Course Reference List