Motivating the Unmotivated: Access to Learning

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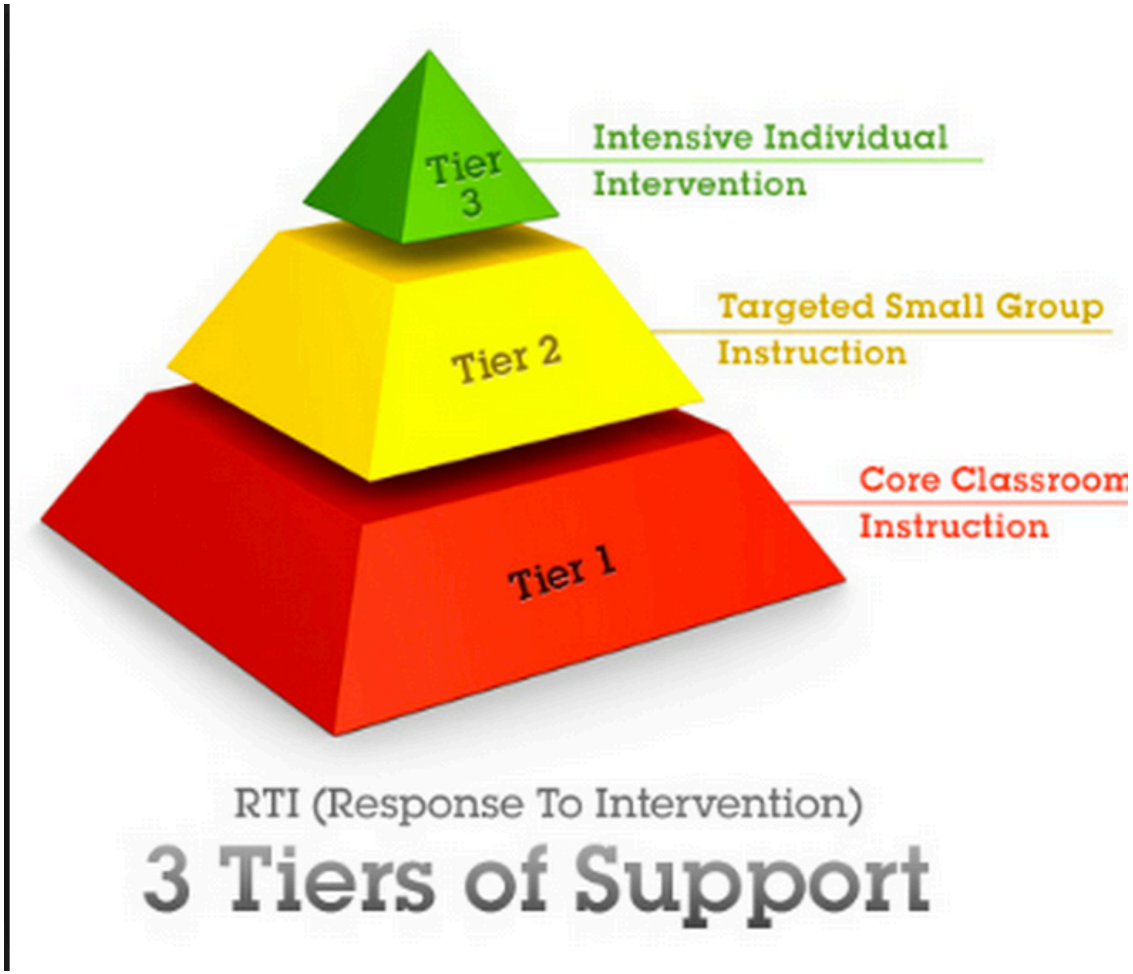
Focus of Session

- Characteristics of students that are unmotivated
- Tasks to motivate engagement
- Discussion techniques
- Questioning strategies
- Question and answer/closure

Why are students unmotivated?

3-Tiered Support Model



Struggling Students in Mathematics

- Students who struggle with mathematics often
  - use procedures that younger, typically achieving students use;
  - make frequent errors when executing procedures; and
  - have a poor understanding of concepts that are foundational to performing procedures (Geary, 2004)
- Additionally, they are often
  - Dependent upon the teacher
  - Quick to give up
  - Frustrated by ‘word’ problems (Dougherty & Foegen, 2011)

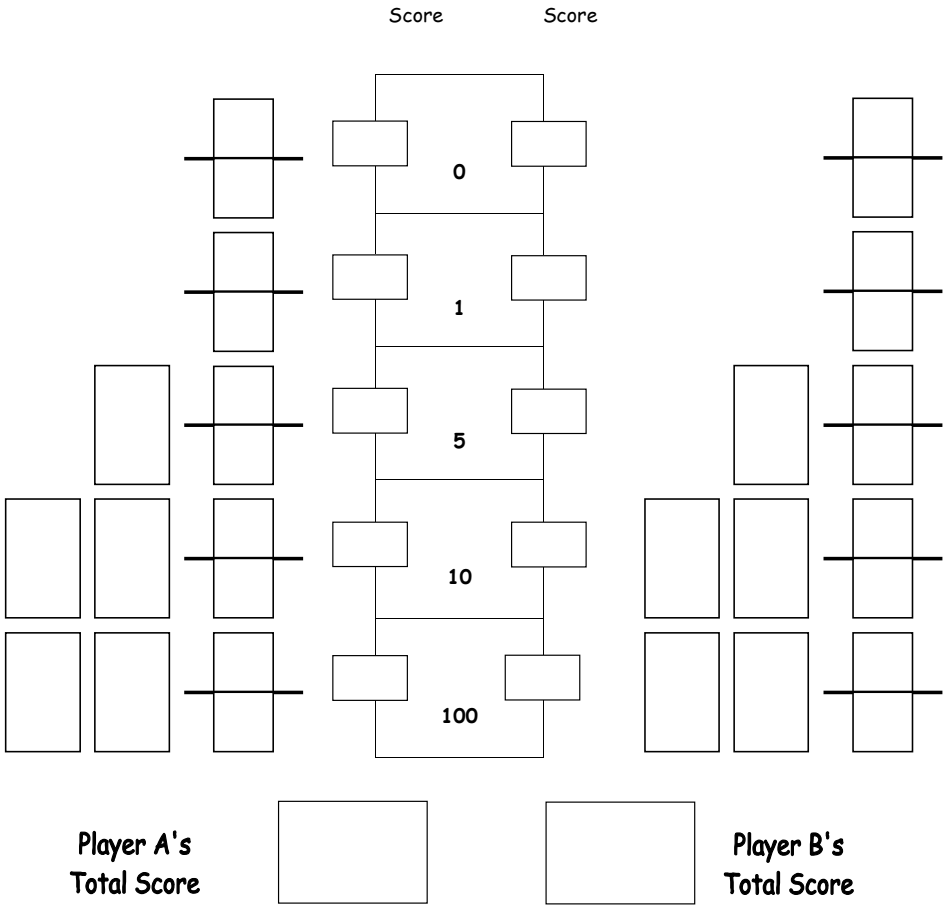
Tasks that Motivate

FIND A PLACE

(2 Players)

Use 40 cards numbered 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 (four of each).

Player A **Player B**



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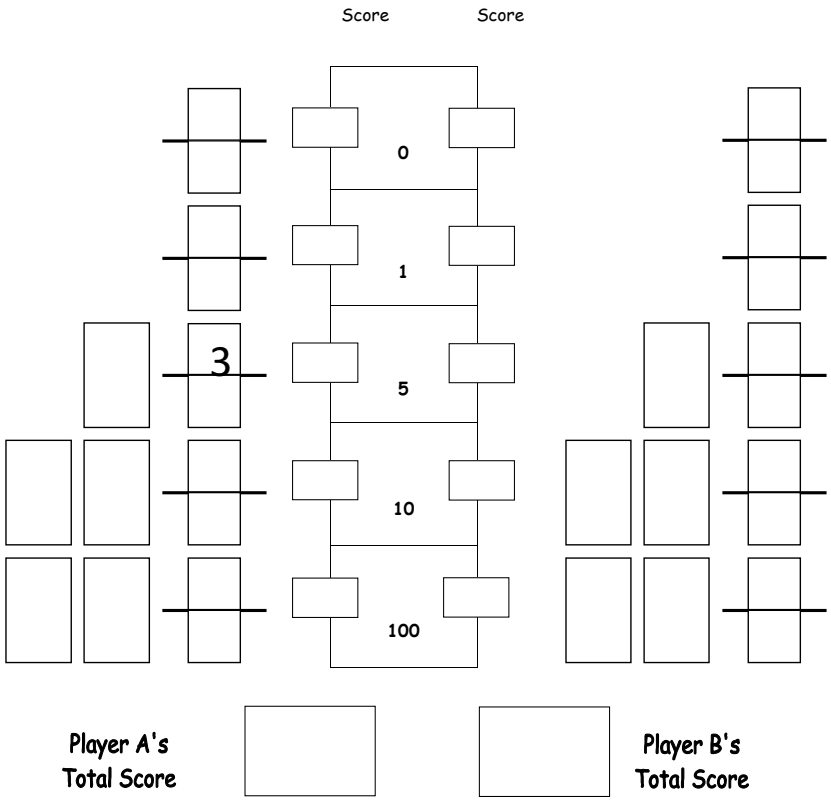

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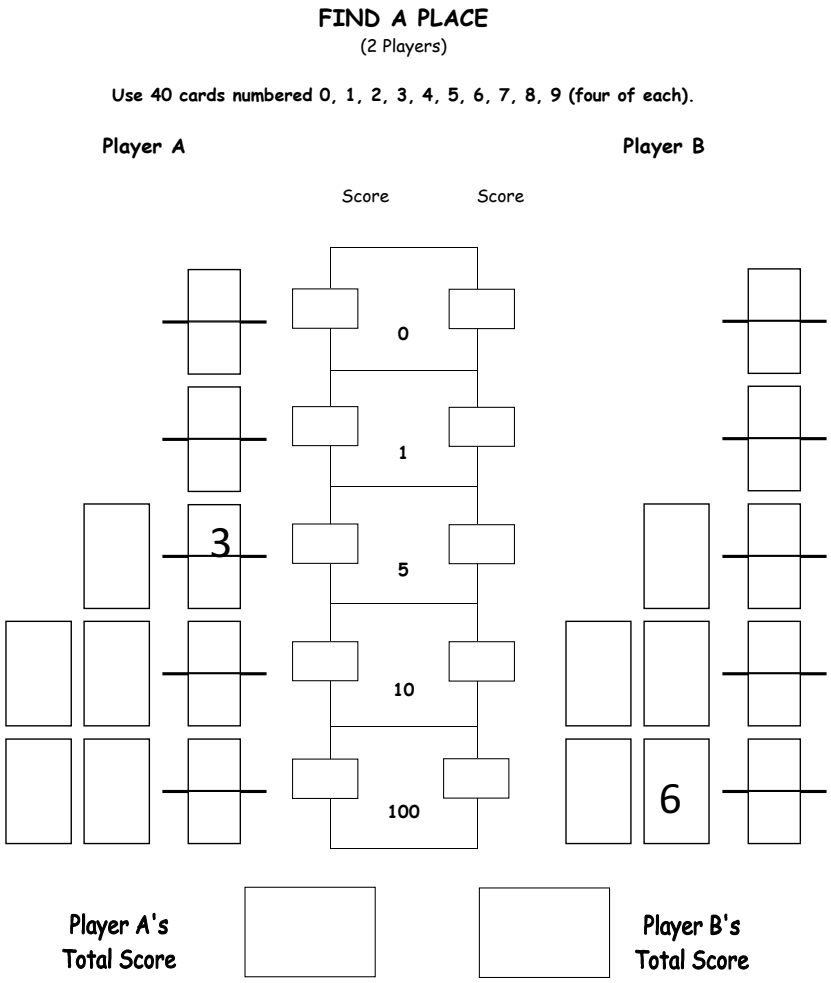

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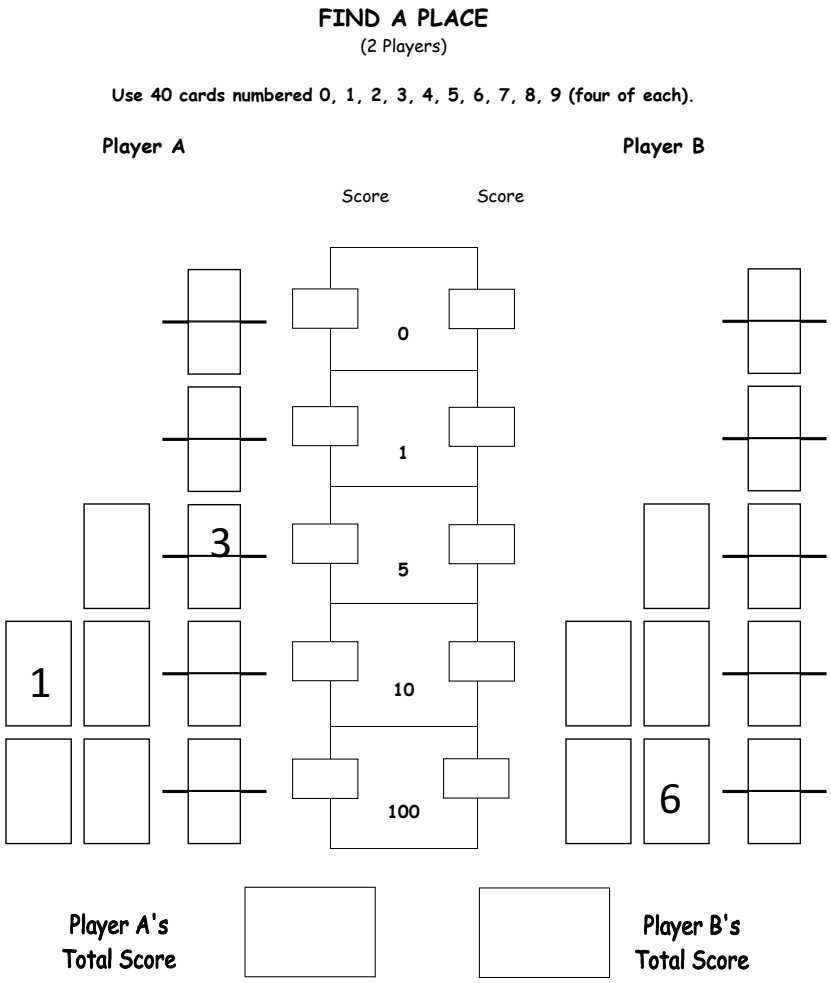

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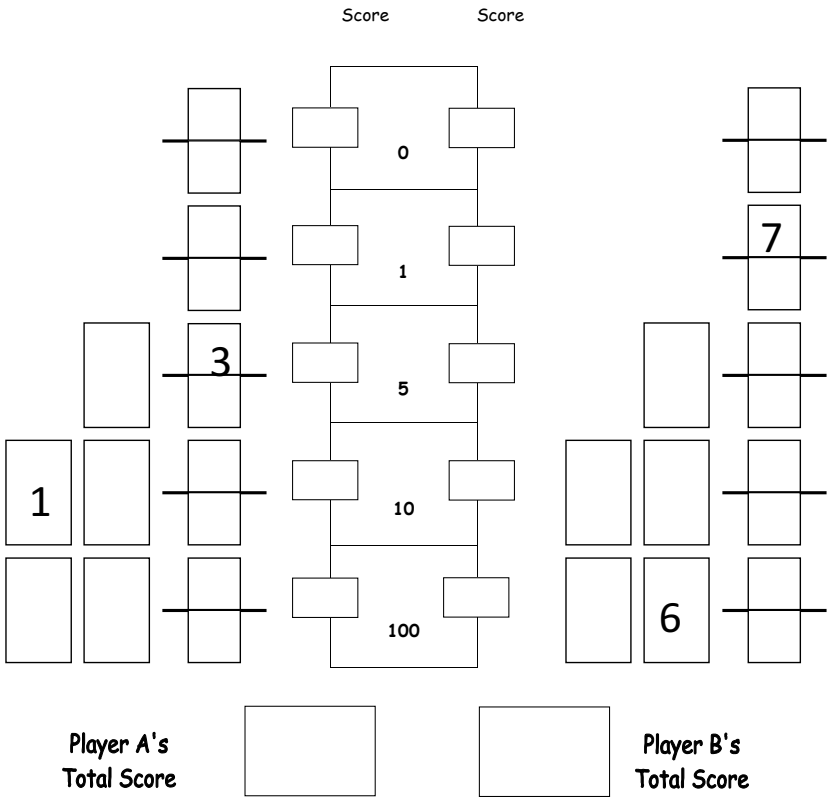

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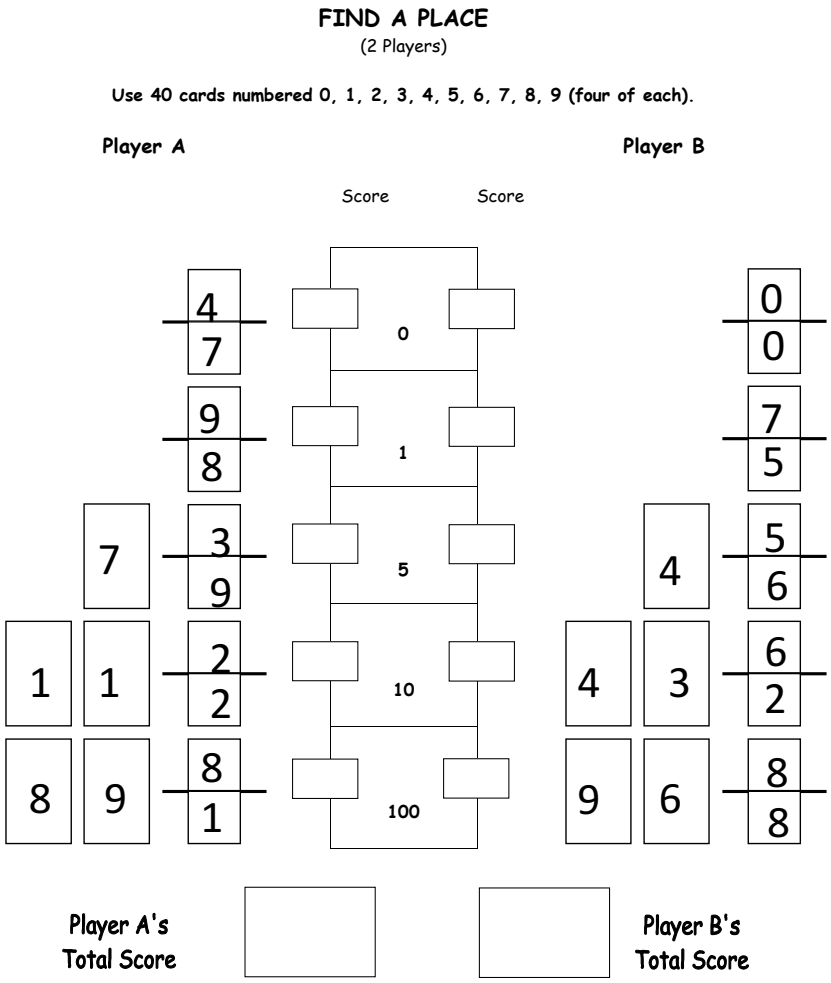

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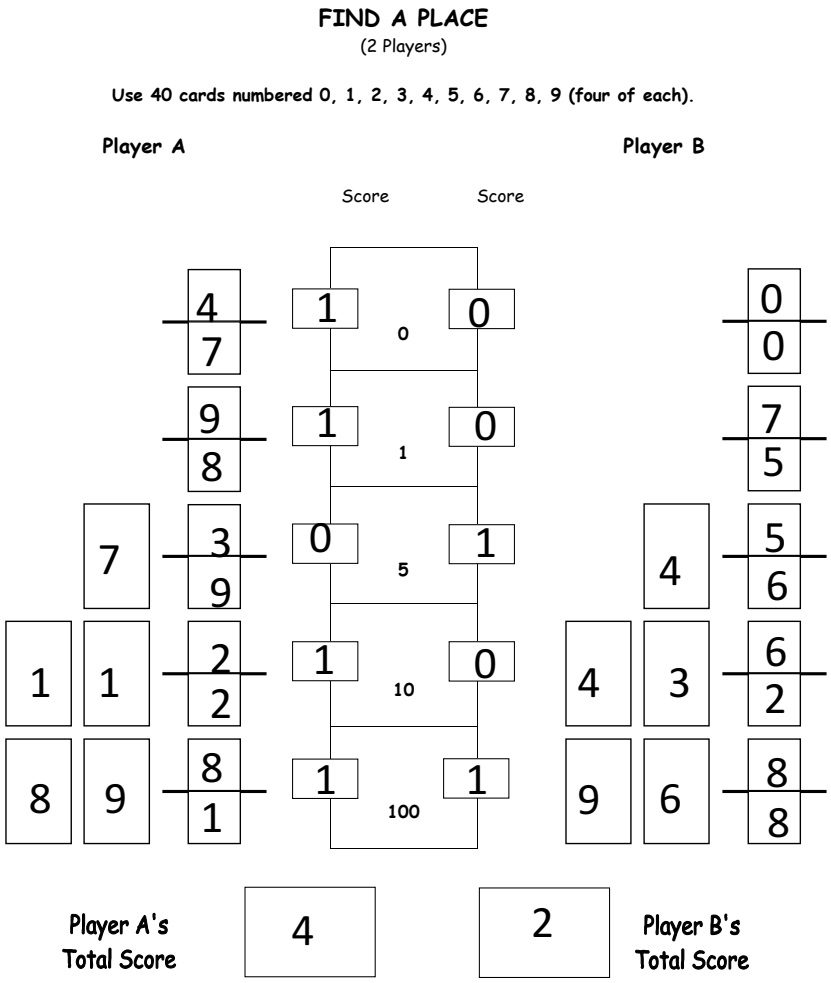
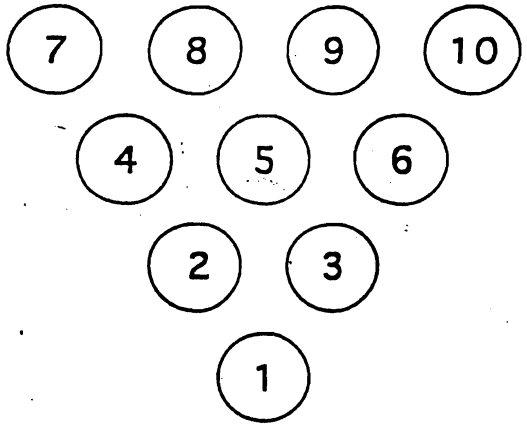


Bowl-A-Fact

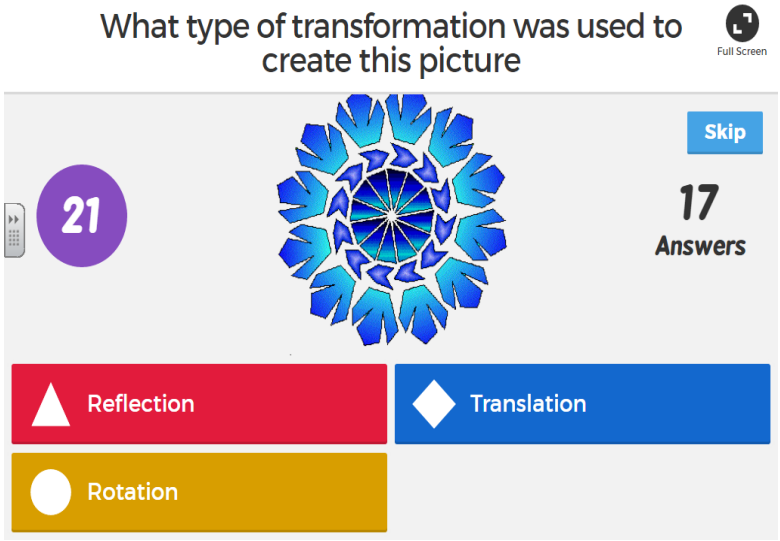


Tasks to Motivate

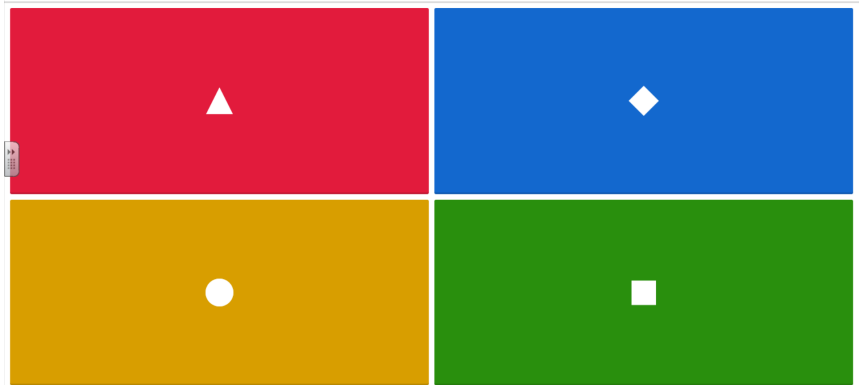
- High interest
- Require some collaboration or cooperation
- Incorporates significant mathematical ideas

Kahoot

Teacher View



Student View



Questions to consider:

- Why are you creating the Kahoot?
- What is your anticipated outcome?
- What knowledge of the concept do your learners already have mastered?
- What steps will be taken to ensure success for all levels of learners?
- Do you need to build in extra time for discussion, debate or other activities between questions?
- Are you intending to open it up to the public? How would you utilize the Kahoot to its fullest potential?

Instructional Techniques

Consider your use of homework:

- What is the purpose of homework that you assign?
- How do you manage homework on the day it is due?

Discussion Structure: Expert Groups

- Benefits
  - All students must talk
  - Students have to analyze work
  - They feel confident about the problem they are responsible for
- Number off in the group
- Problem assigned to each number
- Meet as an expert group
- Come back to original group to share

Discussion Structure: Collaborative Groups

- Groups select a problem
- Meet as a group to decide on a solution(s) and method
- Presenter chosen randomly
- Present to class

Student Created Rubric

Presentation Rubric: 6th Grade

Group: _____

Presentation Criteria

_____ Talks confidently about his/her group's perspective

_____Makes eye contact with the audience

_____Answers/addresses audience with respect

_____**Has organized the work and the presentation and it is legible**

_____Lets others in audience give ideas or ask questions

_____Uses appropriate voice volume with good enunciation

_____Actively listens to others

_____Has a positive attitude toward the presentation and work presented

Presentation section worth 2 points: Must have at least 5 checked and non-negotiable for 2 points; 3 or 4—1 point

Mathematics Criteria

_____Uses appropriate mathematical vocabulary

_____**Gives supporting evidence for answer or process—describes and shows thinking**

_____Answers and anticipates questions peers may ask

_____Shows multiple methods or answers as appropriate

_____Revises any incorrect or inaccurate solutions or solution methods

_____Accurate mathematics

Mathematics section worth 3 points: Must have 4 or more checked and non-negotiable for 3 points; 3–2 points; 2–1 point.

Total Score _____ out of 5 points

Discussion Structure: Poster Session and Gallery Walk/Carousel

Discussion Structures

- Expert groups
- Collaborative groups
- Poster session
- Carousel or gallery walk

Food for Thought

- Critical thinking questions should be asked in every class, every day
- Consistency helps students understand the expectations and move toward higher proficiency

Can I be excused? My brain is full.

Questioning Techniques

- Factual questions comprise the majority of questions asked in a mathematics class
  - More than 145 questions in 48 minute class period
  - Less than 2 seconds for response

Dougherty & Foegen, 2010

Changing skill tasks to support deeper thinking

Solve for x:

$$2x + 4 = 3x - 8$$

Change the Task

- Reversibility question
  - Find an equation whose solution is 12.
  - Find another equation, with variables on both sides of the equal sign, whose solution is 12.

Change the Task

- Generalization questions
  - Write a linear equation whose solution is not a whole number.
  - Is it possible to predict if the solution of an equation is a whole number? Why or why not?

Change the Task

- Flexibility question

  Solve:

  $2x - 8 = 3x + 4$

  Solve it another way.

Change the Task

- Flexibility question

  Solve:

  $2x - 8 = 12$

  $2(x + 2) - 8 = 12$

  $2(2x + 2) - 8 = 12$

Questions to promote problem solving and conjecturing

- Generalization questions
  - Asking students to find and describe patterns
  - What patterns do you notice?

Questions to promote problem solving and conjecturing

- Flexibility questions
  - Asking students to solve a problem in multiple ways OR to use what they know about one problem to solve another one
  - Solve the problem in another way.
  - How are these problems alike? How are they different?

Your Turn: Dig Deep!

- Consider the three types of questions.
  - Think about the topic you are currently teaching.
  - What are the most important ideas that you want students to learn? (Go beyond skill)
  - Construct a question for at least one type on a topic you are currently teaching.

Non-examples of questions

- What is your process for dividing fractions? (generalization)
- What equation could be used for the story problem? (flexibility)
- Why are addition and subtraction inverse operations? (reversibility)