# Using Puzzles to Encourage Risk-Taking

Applying “Supported Risk” to Challenge and Engage Talented Students

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## Objective
To stimulate and engage extraordinary students by beginning class with a puzzle or brain-teaser aligned with the daily lesson. Incorporating structure and dialogue allows for deeper understanding and encourages pro-social behavior.

## Classroom Context
Where I’ve found this strategy to be effective:
- **Probability and Game Theory**  
  7th – 10th grade  
  Johns Hopkins University CTY, Los Angeles
- **Algebra I & II, Geometry**  
  9th – 10th grade  
  Agua Fria High School, Avondale, AZ

## Motivation

### Challenge
Bright students can feel overlooked by a standard curriculum. Overcoming this involves incorporating rigor, structure, and choice into daily lessons.

### Create dialogue
Some of my brightest students never came out of their shell because they found the level of class rigor to be beneath them. Providing opportunities for talented students to interact with their classmates and lead discussions on hard problems promotes positive social behavior.

### Support risk-taking
Many talented students are used to succeeding with little effort. Simply giving them harder assignments without addressing their needs as learners may make them feel threatened. Working through challenging problems in a supportive way allows students to take risks without feeling that their intelligence is being questioned.

## Procedures

1. Assign students to work with at least one partner and give each student a puzzle worksheet (template below).
2. Present the puzzle to the entire class.
3. Ask students (as a group) if they have any clarifying questions.
4. Tell students they are to first fill out the worksheet by themselves. After an appropriate amount of time, allow students to talk with their partner(s).
5. Call on students randomly for their answers to each question. Have willing students explain their solution in front of the class.

## Worksheet Template

### Instructions

Answer the following questions to the best of your ability. Once you have attempted each question on your own, compare ideas with your partner. Be ready to share your ideas with the rest of the class.

1. Re-write the problem in your own words. Explain using enough detail so that 5th grader could understand exactly what you are trying to find.

2. Without solving, represent the problem graphically or mathematically.

3. Describe how you would go about solving this problem. What technique makes the most sense to you? Would you use an equation? Look for a pattern? Be specific.

4. Solve the problem or make an educated guess. If you are making an educated guess, explain your reasoning. There are no wrong answers!

## Examples

### Chess squares

How many squares are on a standard chess board?

<table>
<thead>
<tr>
<th>Chess squares</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Chess board" /></td>
</tr>
</tbody>
</table>

### Summing 1 to 100

What is the sum of all the whole numbers from 1 to 100?  

\[1 + 2 + 3 + \ldots + 98 + 99 + 100 = ?\]

### Thai 21 (borrowed from “Survivor Thailand”)

You are facing one opponent in a game called “Thai 21.” There are 21 flags in a circle and each person alternates picking up 1, 2, or 3 flags. The goal of the game is to be the last person to pick up a flag. You are the first to move.

Questions to consider:
- How many flags should you pick up in your first turn?
- What rule should you follow after your first turn?

### References