

3.3 PROBLEM-SOLVING

3.3.1 Pisa Tower

Brief description, and rules of the game

"Pisa Tower" is a dexterity game where players take turns placing figures on a wobbly tower. The tower tilts more and more, and the goal is to keep all figures from falling. The first player to make a figure fall loses the game!

Skill focus

- **Primary Skill Focus**
 - Problem-solving
- **Complementary/Secondary Skill Focus**
 - Creativity
 - Flexibility
 - Resilience

Age group	Student number	Duration
6 -10 years old	2-6 children	15-20 minutes

How to play - brief game rules

Preparation:

1. Each player chooses a colour and takes their set of building blocks (usually 3 per player).
2. Place the Pisa Tower base in the centre of the table.
3. Decide who goes first.

Gameplay:

4. Players take turns rolling the die. The dice determines which level of the tower you must place your block or figure on.
5. On your turn, you carefully place one of your blocks on the leaning tower.
6. The goal is to place the blocks without making the tower collapse.
7. Some editions include special rules, like moving previous blocks or using tools to stabilize the tower.
8. Players must strategize, balance, and sometimes negotiate who places next.

Winning the Game:

9. The game continues until the tower collapses.
10. The player who placed the last block before the collapse loses.
11. In some versions, the player with the most successfully placed blocks wins.

Indoor/Outdoor Classroom layout notes

Indoor: Set up tables or mats on the floor where small groups of 2–6 players can comfortably sit around the tower.

How does this game develop the primary skill?

‘Pisa-tower’ develops problem-solving skills because players must constantly analyse and evaluate how to place their blocks to keep the tower stable, especially when the dice determines which level they must use. They need to develop strategies, anticipate the consequences of their choices, and find (creative) solutions if the tower starts leaning.

In doing so, they need to consider aspects of stability and balance. Additionally, they must also think about how to make things more difficult for their opponent without getting themselves into trouble.

What do we want to achieve regarding primary skill development (student understanding and/or behaviour)?

As a result of playing the game, learners:

- Understand which spots on the tower are more stable and why stability matters when placing figures.
- Develop the ability to plan ahead by thinking several moves in advance to prevent the tower from collapsing.
- Learn to adapt strategies when the tower starts to tilt, adjusting placement based on changing conditions.
- Gain insight into cause and effect by evaluating why a figure fell and how to prevent similar outcomes in the future.
- Understand the importance of pausing, thinking, and weighing options before acting rather than acting randomly.
- Acquire the ability to experiment with different placements and compare which is most stable.
- Learn to adjust their approach when the tower becomes unstable, showing flexibility in strategy.
- Develop predictive thinking by anticipating the consequences of their moves and minimizing risk.
- Build reflective skills by analysing previous successes or failures and modifying strategies accordingly.

Suggested use, and practical examples

This game can be played during a science lesson focused on stability and balance, allowing students to experiment weight distribution.

Materials and tools needed for implementation

Game: Pisa tower

Guiding questions

Before the game (preparing and planning strategies):

- What do you think will be the biggest challenge when building the tower?
- How could you best place the blocks to keep the tower stable?
- What would you do if the dice tells you to place a block on an unexpected level?
- What strategies can you come up with to work together and prevent the tower from collapsing?

During the game (adapting):

- What is going well, and what is causing the tower to lean?
- Which choices by you or your teammates affect the tower's stability?
- Can you think of another strategy if something isn't working?

Tips and Tricks for dealing with challenges

- **Challenge:** Students don't know where to place their figure.
Tip: Look at the tower from all sides and find a spot that looks stable. Use the edges wisely: place figures on the edges to distribute weight evenly. Placing pieces in the middle can make the tower unstable.
- **Challenge:** Students lose track of the overall balance of the tower
Tip: Don't focus on just one spot-look at the entire tower. Ask yourself: "If I place it here, what happens to the other side?". Build in layers: think not only about this turn but also about how your next moves will unfold.
- **Challenge:** Students make quick decisions without thinking
Tip: Take a moment to think before placing your figure. Stability is more important than speed: don't rush. Choose a move that makes the tower more stable.
- **Challenge:** Students feel uncertain about risky moves
Tip: Taking risks is okay but think smart: if you choose a tricky spot, know why you're doing it. Sometimes it earns extra points! Anticipate the next moves: try to predict how the tower will change and whether the risk is worth it.
- **Challenge:** Students lose focus during longer turns
Tip: Stay focused and watch what others are doing. Their choices can help you make better decisions. Pay attention to your opponent's moves: if they make the tower unstable, you can take advantage with a smart move.
- **Challenge:** Students get frustrated when the tower falls
Tip: Stay calm: take a deep breath and keep a clear mind. Panicking makes it harder to think. Analyse the problem: figure out what went wrong and learn from it. How can you do better next time?
- **Challenge:** Students struggle with time pressure (at higher levels)
Tip: Stay calm even when the clock is ticking. Choose a spot you can reach quickly and that looks stable. Remember: stability is more important than speed. A safe move is better than a rushed mistake.
- **Challenge:** Students don't understand the scoring system (in advanced mode)
Tip: Remember: a risky move can earn extra points, but only if the tower stays standing. Think carefully about whether the risk is worth it and plan ahead.

Difficulty level tailoring

Beginners (6-7 years old):

- No time limit per turn; children can take their time to think.
- Allow children to discuss with a partner to choose a placement together (encourages collaboration).

Advanced learners (8-9 years old):

- Add a limited time per turn (e.g., 1 minute).
- Introduce a turn rule: You may not place two figures in a row on the same level of the tower.

Experts (9–10 years old):

- Strict time limit per turn (e.g., 30 seconds).
- Add extra rules such as: A rule that you cannot correct your move if the tower tilts. The placement must be correct immediately.
- Extra challenge: Introduce a points or penalty system:
 - Basic rule: Each successful placement = 1 point.
 - Risky placement: A move is considered risky when the figure is placed on top or at the edge of a leaning tower, clearly reducing stability.
- **Extra points:**
 - +2 points if the tower remains standing for at least one full turn after a risky placement.
 - +3 points if the tower remains standing for two full turns after a risky placement.
 - Penalties:
 - 1 point if the tower falls during your turn.
 - 2 points if the tower falls because of a risky placement that does not hold.

Debriefing and reflection questions

- Which strategy worked best and why?
- What did you learn about teamwork and discussing solutions to problems?
- How would you act differently if you played again?
- What does this teach you about coping with setbacks and persevering through challenges?