Physically Problem Solving

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Time Frame 60 Minutes

Essential Question(s)

How does intentional movement in math deepen understanding, engagement, and problem-solving skills?

Summary

This educator resource intends to help secondary math teachers to use physical movement activities as a tool to strengthen students' conceptual understanding in math practices. The structure of this activity is broken into three parts: an introduction, physical movement activity, and a reflection. In the introduction, teachers introduce a mathematical concept which aligns to their learning goal. The physical movement activity invites students to engage in the math concept using kinesthetic movement, visuals, and collaboration to deepen their experience. The reflection coaches students to process their perceptions of the math concept and their experience during the physical movement activity; it also allows students to connect their learning to real-world experience.

Learning Goals

Standards

College and Career Preparation Standards 6–12 (6th -12th)

7.4 (S): Students will apply algebraic thinking to represent, analyze, and solve mathematical problems, demonstrating an understanding of mathematical relationships and patterns. (Clarification Statement: To achieve this standard, instruction should align to grade-level state standards for mathematics, focusing on concepts such as recognizing patterns, understanding variables, creating equations or expressions, and solving problems using algebraic reasoning.)
8.4 (S): Students will apply algebraic thinking to represent, analyze, and solve mathematical problems, demonstrating an understanding of mathematical relationships and patterns. (Clarification Statement: To achieve this standard, instruction should align to grade-level state standards for mathematics, focusing on concepts such as recognizing patterns, understanding variables, creating equations or expressions, and solving problems using algebraic reasoning.)

Attachments

- Activity Slides—Physically Problem Solving.pptx
- Strategy Harvest—Physically Problem Solving -Spanish.docx
- Strategy Harvest—Physically Problem Solving -Spanish.pdf
- Strategy Harvest—Physically Problem Solving.docx
- Strategy Harvest—Physically Problem Solving.pdf

Materials

- Activity Slides (attached)
- Strategy Harvest handout (attached; one per student)
- Pencils/ Pens
- Materials for Selected Strategy/ Lesson (see strategy/ lesson for more details)

10 minutes

Introduction

Use the attached **Activity Slides** to guide the activity. Use **slide 2** to introduce the activity. Move through **slides 3-4** to go over the essential question and the learning objective.

Display **slide 5** and share the definition of kinesthetic learning. Explain to students the benefits and purposes for learning kinesthetically.

25 minutes

Physical Activity

Display **slide 6** and review the brief description of your chosen lesson. Then ask students to think about how adding movement to this lesson would help them learn the content better. Consider highlighting a specific part of the lesson you think might benefit from some physical movement.

Before reviewing the 2-3 strategies you want to highlight with students, explain that the goal is to think of a way to add physical movement to the lesson you have just reviewed. Our suggested movement strategies can be found in the Moved by Math collection. **Slides 7-32** provide basic instructions for each strategy which we invite you to make your own. You may choose to hide slides depending on which strategy or strategies you want students to engage with. Review in as much detail as needed the basic instructions for each strategy, clearing up misconceptions as they arise.

Move to **slide 33** and introduce students to the Strategy Harvest instructional strategy and pass out the **Strategy Harvest** handout to all students. Inform students that they will first select a physical movement strategy, then they will actually work through it within the context of the lesson. On their handout, they will describe how their strategy helped them and reflect on the pros/cons of it in the space provided. Next, they will find 1-2 partners and ask them about their strategies and again reflect on the pros/cons of each. Afterwards, they will fill out the bottom of the handout reflecting on their choice of strategy as a whole. Allow students time to work. As they work, remind them to listen, ask questions, and provide feedback all while taking notes about their partner's strategy.

10 minutes

Final Reflection

Transition to **slide 34**. Introduce the SCORE strategy to students. Invite students to turn over their Strategy Harvest handout and reflect on the following prompts on the back side of the page:

- Strategy: What did you try today and how long were you engaged?
- Celebration: What good things came from trying the physical movement strategy?
- Obstacles: Can you identify any challenges you faced?
- Refinement: What would you do differently?
- Extra Information: What other thoughts, feelings, or details do you think are important about the lesson today?

If there is time, have them share with a partner or as a whole group. Collect student responses.

Research Rationale

Physical movement incorporated into existing math lessons can increase student motivation, engagement, retention, and cooperation skills. Rather than focusing solely on knowledge retention, physically active learning (PAL) emphasizes the learning process, creating opportunities for students to explore, experience, and interact with mathematical concepts through movement (Mandelid et al., 2023). Research shows that the pedagogical approach of combining physical activity and academic learning creates a cognitive bonding process that enables enhanced comprehension and retention (González-Pérez et al, 2025).

Both González-Pérez et al (2025) and Norris et al (2018) also found that adolescents, particularly secondary students, tend to spend a majority of their school day on sedentary behaviors, but provide hope that schools can provide a structure to integrate physical movement into academics, increasing students' activity and attention. Mandelid et al. (2023) argue teachers play a central role in designing activities that connect movement with clear mathematical goals, structuring tasks, and guiding reflection so that students understand the purpose behind the activity.

By purposefully integrating kinesthetic learning into math, educators design opportunities for students to shift their perceptions of math ultimately creating classrooms that increase student's concentration, motivation, and increase academic performance.

Resources

- Fleming, N. D. and Mills, C. (1992). Not another inventory, rather a catalyst for reflection. *To Improve the Academy: A Journal of Educational Development*. 11, 137-145. https://digitalcommons.unl.edu/podimproveacad/246
- González-Pérez, M., Grao-Cruces, A., Bandera-Campos, F. J., Chalkley, A., Camiletti-Moirón, D., & Sánchez-Oliva, D. (2025). Less is more: Qualitative insights into physically active learning in secondary math education. *PLOS ONE*, 20(11), e0336641. https://doi.org/10.1371/journal.pone.0336641
- K20 Center. (n.d.). ABC graffiti. Strategies. https://learn.k20center.ou.edu/strategy/96
- K20 Center. (n.d.). Appointment clocks. Strategies. https://learn.k20center.ou.edu/strategy/124
- K20 Center. (n.d.). Commit and toss. Strategies. https://learn.k20center.ou.edu/strategy/119
- K20 Center. (n.d.). Expert stay and stray. Strategies. https://learn.k20center.ou.edu/strategy/2650
- K20 Center. (n.d.). Gallery walk/carousel. Strategies. https://learn.k20center.ou.edu/strategy/118
- K20 Center. (n.d.). Human bingo. Strategies. https://learn.k20center.ou.edu/strategy/3888
- K20 Center. (n.d.). Human scatter graph. Strategies. https://learn.k20center.ou.edu/strategy/172
- K20 Center. (n.d.). Math lessons with movement. Collections. https://learn.k20center.ou.edu/collection/5517
- K20 Center. (n.d.). Mingle. Strategies. https://learn.k20center.ou.edu/strategy/53
- K20 Center. (n.d.). Moved by math. Collections. https://learn.k20center.ou.edu/collection/5501
- K20 Center. (n.d.). SCORE. Strategies. https://learn.k20center.ou.edu/strategy/3694
- K20 Center. (n.d.). Scoot. Strategies. https://learn.k20center.ou.edu/strategy/2298
- K20 Center. (n.d.). Snap, clap, pop. Strategies. https://learn.k20center.ou.edu/strategy/190
- K20 Center. (n.d.). Still pictures. Strategies. https://learn.k20center.ou.edu/strategy/4960
- K20 Center. (n.d.). Strategy harvest. Strategies. https://learn.k20center.ou.edu/strategy/135
- K20 Center. (n.d.). Three stray, one stays. Strategies. https://learn.k20center.ou.edu/strategy/85
- Mandelid, M. B., Thurston, M., Reinboth, M., Resaland, G. K., & Tjomsland, H. E. (2023). Just because it's fun, it's not without purpose: Exploring the blurred lines of physically active learning. *Teaching and Teacher Education*, 133
- Norris, E., Dunsmuir, S., Duke-Williams, O., Stamatakis, E., & Shelton, N. (2018). Physically active lessons improve lesson activity and on-task behavior: A cluster-randomized controlled trial of the "Virtual Traveler" intervention. *Health Education & Behavior,* 45(6), 945–956. https://doi.org/10.1177/1090198118762106