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Toilet Paper Olympics

Toilet Paper Olympics includes three engaging embodied learning events designed to deepen conceptual understanding.

Liza Bondurant

Our bodies help us make sense of what we see, hear, and feel. When we physically act out a problem, use gestures, or work with hands-on tools, we are using embodied learning. This kind of learning helps us understand ideas better by moving and interacting with them (Abrahamson et al., 2020; Nathan, 2022). For example, when students convert units by physically stepping out different lengths or manipulating measurement tools, they build a grounded sense of scale and proportion, key mathematical concepts that can be difficult to grasp abstractly. These activities support embodied learning by engaging students' bodies in meaning making, not just to make mathematics more engaging, but to deepen their conceptual understanding. Embodied learning not only strengthens cognitive understanding but also taps into students' natural ways of exploring the world through movement, sensation, and interaction.

The Toilet Paper Olympics bring embodied learning to life by transforming abstract mathematical ideas into physical experiences. In this set of activities, students direct much of their own learning by making predictions, experimenting with measurements, and choosing how to represent their results. They jump, throw, and run, then use those actions to measure, convert, and compare. These playful, inquiry-based events allow students to connect physical action with mathematical thinking. Fun and interactive tasks not only make learning more exciting; they also keep students interested and help them stick with tough problems (Middleton & Spanias, 1999; National Council of Teachers of Mathematics, 2014). This article introduces the Toilet Paper Olympics as a model for integrating embodied learning into meaningful mathematics instruction, particularly around the often-challenging topic of measurement and unit conversions (Smith et al., 2013). The energy and inquiry come from students themselves as they estimate, reason, debate, and discover through movement.

CONNECTIONS TO MATHEMATICS CONTENT

The Toilet Paper Olympics activities are based on the Bedtime Math Foundation's (2022) Crazy 8s extracurricular mathematics club lesson plans. To strengthen connections to standards and focus on a single grade level, this article aligns activities with fourth-grade Common Core content standards in Measurement and Data and Operations and Algebraic Thinking (National Governors Association Center for Best Practices & Council of Chief State School Officers [NGA Center & CCSSO], 2010). Table 1 highlights the specific standards addressed in the activities, ensuring clear alignment with the intended grade level. The tasks allow students to use measurement tools, engage in estimation, apply operations, and explore unit conversions in authentic contexts while physically acting out problems and interacting with materials

in ways that reflect the core principles of embodied cognition.

The Toilet Paper Olympics work best in open spaces like hallways or gymnasiums, where students can run, jump, and throw with freedom. Before beginning, teachers can provide a brief overview of each event and give students time to explore the materials. For instance, students might unroll a few toilet paper strips and test different measuring strategies, such as comparing strip length to a ruler or estimating using body parts (e.g., forearm length). These embodied warm-ups help students form a sensory connection to the task and give them ownership over the tools. A simple scorecard (see Table 2) allows students to track their results across all events and conversions. Older students or volunteers can help supervise, but the activity becomes self-sustaining once students understand the format.

THREE ENGAGING EVENTS

In the long jump event, students test how far they can jump, then brainstorm how to measure it using both toilet paper strips and standard units. After one student lands a jump, their teammate shouts, "Mark it there!"

Table 1 Alignment With Common Core Content Standards

Standard	Description
Measurement and Data	
4.MD	Solve problems involving measurement and conversion of measurements. Represent and interpret data.
Operations and Algebraic Thinking	
4.OA	Use the four operations with whole numbers to solve problems. Gain familiarity with factors and multiples.

Note. NGA Center & CCSSO (2010).

and rushes over to place a piece of masking tape with their initials written on it. They then crouch beside it and count the strips aloud, "One . . . two . . . three and a half!" This physical measurement process directly supports the Common Core's Measurement and Data standards, such as using appropriate tools and converting between units (CCSS.MATH.CONTENT.4.MD.A.1). It also reflects the principles of embodied cognition, as students use spatial reasoning and kinesthetic movement to make abstract units tangible. This collaborative measurement turns into a debate:

Sasha: Wait! That third strip was only halfway. So it's two and a half strips!
Malik: No, I think it was more like three-fourths.
Jamie: Let's measure it in inches to check and then convert to feet.

Their dialogue shows engagement in Mathematical Practice 6, attending to precision, as well as Mathematical Practice 3, constructing viable arguments and critiquing the reasoning of others.

Students then return to their data tables and decide which unit to convert their results into based on what makes sense. One group chooses feet, another inches, and a third yards. These choices require students to make sense of quantities and their relationships, aligning with Mathematical Practice 2. During downtime between jumps, students can estimate how far they will jump next or compare their results with their height, blending embodied prediction with mental math and encouraging connections between lived experience and numeric reasoning. Pictures of students measuring their long jumps can be found in Figure 1.

For the shot put event, students are encouraged to explore rotation and body movement. As they prepare, one student twirls in place:

Jordan: I spun a whole circle . . . 360 degrees! That helped me throw farther.
Ava: Try half a spin. That's 180 degrees. Let's see if that works better!

Liza Bondurant, she/her, lb2206@msstate.edu, began teaching mathematics in upstate New York in 2005. Since 2013, she has worked as a mathematics teacher educator in Mississippi and is currently an associate professor at Mississippi State University. She is passionate about helping mathematics teachers develop learning spaces where each and every learner develops an understanding and appreciation of mathematics.

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This playful engagement with angle measurement draws on geometric reasoning (CCSS.MATH.CONTENT.4.MD.C.5) and demonstrates how embodied cognition helps students physically experience mathematical ideas, such as angles and rotation.

After throwing, like the student pictured in Figure 2, students record distances, measure using toilet paper strips, and collaborate on conversions. One group figures out the conversions:

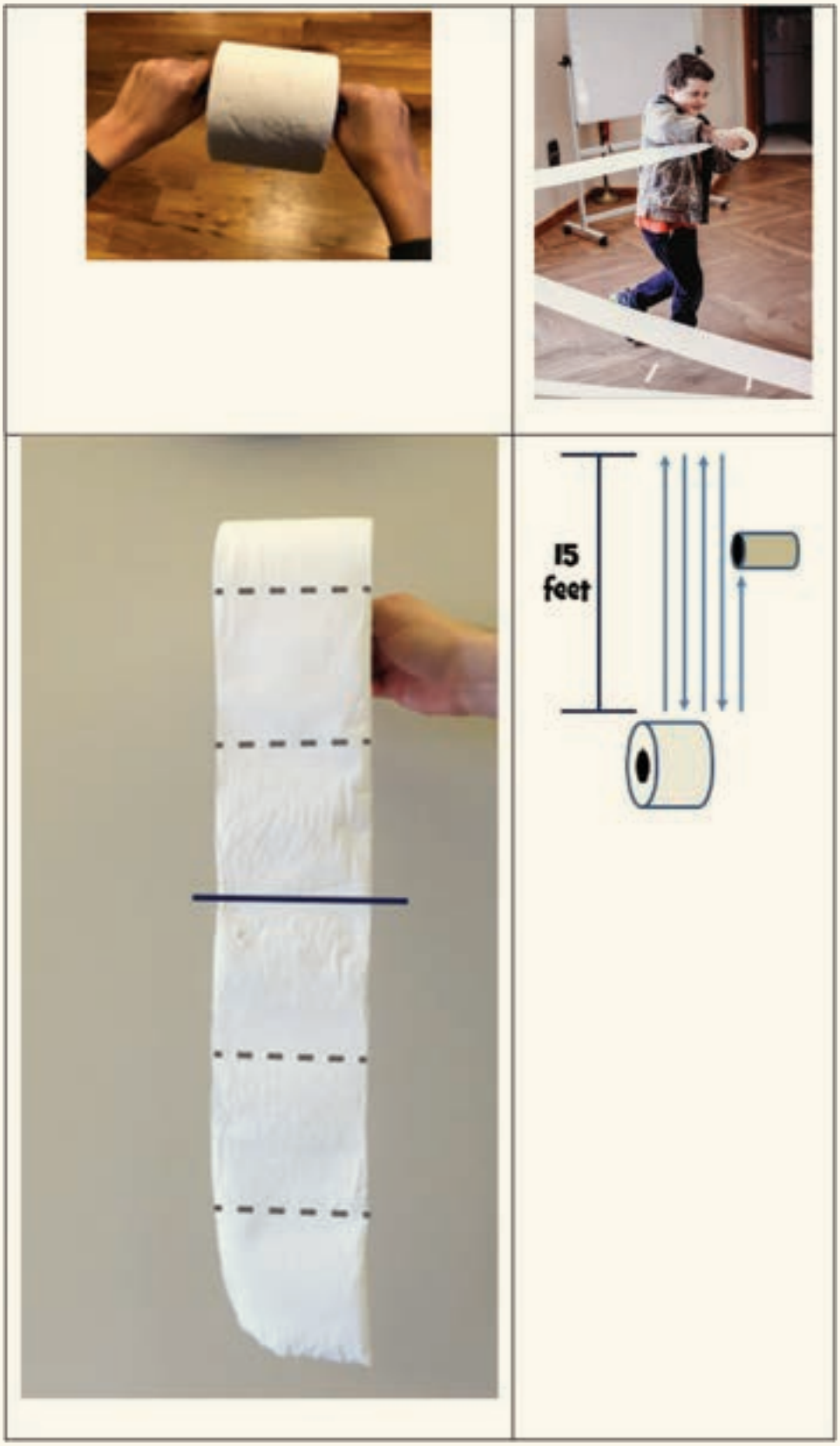
Taylor: We got 20 strips. That's 80 inches because each strip is 4 inches.
Devin: Divide that by 12 to get feet. That's . . . about 6.5 feet.

They debate whether to round up or down and justify their answers. Here, students again engage in Mathematical Practice 4, modeling with mathematics, and develop operational fluency in context. Giving students time before the event to explore how body angle and rotation affect their throw supports intuitive understanding through embodied exploration, reinforcing the link between movement and mathematical outcome.

Figure 2 Shot Put Event

Figure 1 Long Jump Event

Figure 3 Relay Race Event



The relay race sparks a flurry of predictions. Before the race begins, students estimate the total length of the unrolled toilet paper roll in different units:

Miguel: I bet it's 50 feet long!
Raya: That's way too much. Maybe like 20 feet?
Talia: Let's find out how many strips first, then multiply.

As the race unfolds, students cheer for each other, then run to measure the fully unrolled toilet paper trail, as seen in Figure 3. They measure in strips first, then convert to inches and feet. To start, some students may walk the race route slowly and mark segments using their bodies, like steps or hand spans, before converting to strips or standard units. These embodied premeasurements help students develop a sense of spatial awareness and meet Common Core standards related to measurement skills (CCSS.MATH.CONTENT.4.MD.A.2), while encouraging Mathematical Practice 5, using appropriate tools strategically.

OPPORTUNITIES FOR MATHEMATICAL THINKING

Throughout the activities, students generate their own questions, challenge each other's thinking, and justify their reasoning. Here is one exemplary conversion conversation:

Ethan: If one strip is 4 inches, then three strips is 1 foot.
Isla: And a yard is 3 feet, so that's nine strips!
Noah: How many strips in a mile, then?
Leila: 5,280 feet in a mile . . . so three strips per foot . . . that's 15,840 toilet paper strips!
Everyone: Whoa!

This spontaneous mental math illustrates Mathematical Practices 1 and 7, making sense of problems and looking for structure.

Students also reflect on measurement tools and strategies:

Zara: It would be easier with a ruler.
Liam: Yeah, but rulers are too short for this!
Zara: True. Toilet paper is actually kind of smart—it's silly, but it works!
Liam: We could measure anything this way. Like with string or shoelaces or something.

These reflections suggest metacognitive awareness of tools and methods, supporting embodied learning through the evaluation of physical strategies. These conversations often emerge as students wait their turn, fill in their scorecards (see Table 2), or revise earlier estimates. Teachers can prompt further reflection by asking students to compare tools, strategize for accuracy, or predict how changes in method might affect their results.

A fun option to end the events is to wrap the winner in toilet paper, as seen in Figure 4. This celebration brings closure, adds laughter, and reinforces the playful spirit of the Olympics. At the end of the events, one student exclaimed, "I never thought math could be so much fun!"

CONCLUSION

The Toilet Paper Olympics provide students with opportunities to physically engage with mathematics and develop meaningful understandings of measurement and unit conversions. By emphasizing student agency, mathematical dialogue, and embodied exploration, the activities

Table 2 Scorecard

Event	Names	Toilet Paper Strips	Inches	Feet	Yards	Miles
Long Jump						
Shot Put						
Relay						

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shift the focus from teacher-directed steps to student-driven inquiry and sense making. Whether they are debating units, challenging estimates, or physically acting out measurement concepts, students make deep connections between their bodies and mathematical ideas. The Toilet Paper Olympics demonstrate how doing mathematics with your whole body, not just your brain, can make learning more joyful and meaningful.

Figure 4 Wrapping the Winner in Toilet Paper

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