Rosie's Walk: A Culturally Responsive Computational Thinking PK-1 Challenge (Resource Exchange)

Tiffany Davis
Nea Sann
Dr. Mia Dubosarsky, Worcester Polytechnic Institute

Dr. Mia Dubosarsky has been a science and STEM educator for more than 20 years. Her experience includes founding and managing a science enrichment enterprise, developing informal science curriculum for young children, supporting Native American teachers in the development of culturally responsive science and math lessons, developing and teaching graduate level courses on assessment in science education, and working with thousands of educators across the country on developing meaningful, standard-based STEM experiences for their students. Mia currently serves as the Director of Professional Development at WPI's STEM Education Center and as PI of an IES funded grant, Seeds of STEM. In these roles she oversees the development and facilitation of STEM themed professional development programs for PreK-12 teachers and administrators and the development and testing of STEM curriculum for preschool classrooms.

Dr. Dubosarsky has an undergraduate degree in Biology from Israel's Institute of Technology and a Doctorate in Curriculum & Instruction (science education) from the University of Minnesota.

Shakhnoza Kayumova, University of Massachusetts Dartmouth
Dr. Katherine C. Chen, Worcester Polytechnic Institute

Dr. Katherine C. Chen is the Executive Director of the STEM Education Center at Worcester Polytechnic Institute (WPI). Her degrees in Materials Science and Engineering are from Michigan State University and MIT. She and the STEM Education Center work to empower PreK-12 STEM educators and transform STEM education by advancing equity in education and broadening the participation of students in STEM (especially those from underrepresented and excluded groups).

Rosie's Walk

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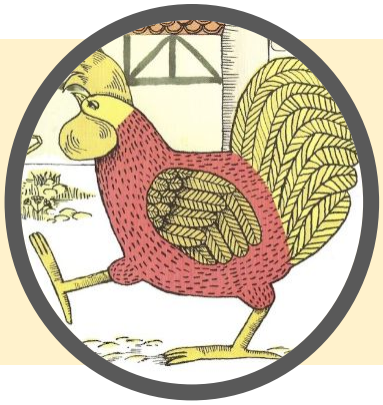


In this challenge students program a robot to retell the story of Rosie's Walk. The simple text introduces commonly used words that express directions—across, around, over, etc.—as Rosie the hen walks around the farmyard, avoiding obstacles that include a rake, pond and beehives, Programming a robot to recreate Rosie's journey provides an opportunity to reinforce these key vocabulary words and teach sequencing skills that are part of ELA and computer science standards.

The Rosie's Walk challenge was developed by a research- practice partnership between 5 public school districts, researchers from Worcester Polytechnic Institute and UMass-Dartmouth, and the MA Department of Elementary and Secondary Education. The group co-developed standards-aligned lessons that integrate computational thinking and culturally responsive pedagogy with other subjects.

Computer Science Learning Targets

- Create and explain algorithms.
- Use a block-based language to program a robot.

ELA Learning Targets

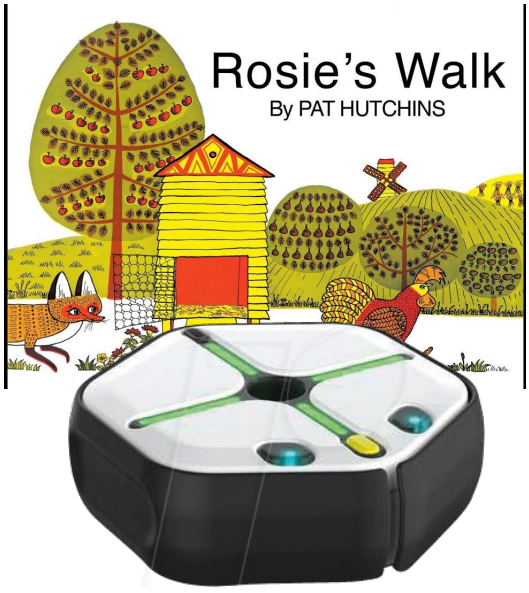
- Listen to a story and retell the events in order.
- Use place and movement words accurately.

Practices

- Communicating
- Creating
- Collaborating

Scan for challenge materials

https://bit.ly/CT-rosieswalk



Four Lessons (30-40 minutes each)

1. Read and make connections to the story
2. Retell the story with place and movement words
3. Explore the coding tool and robot
4. Program the robot to recreate Rosie's Walk

Optional Extension

- Students use multimedia tools that offer multiple modes of expression—writing, drawing, recording audio and/or recording video—to write and illustrate a book about "Root the Robot's Walk."
- Students choose a location for their robot stories, real or imaginary, that connects to their lives.

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Increasing Massachusetts Partnerships for Advancing Computational Thinking in PK-5 Classrooms (IMPACT)

Computational Thinking

1. In what ways does the learning experience ask students to engage in **Abstraction**, i.e. removing unnecessary detail and identifying common features?
2. In what ways does the learning experience ask students to engage in or identify **Algorithms**, i.e. sequential steps and rules, identifying and resolving bugs?
3. In what ways does the learning experience ask students to engage in manipulating, identifying, or processing **Data**, i.e. structured information?
4. In what ways does the learning experience ask students to engage in **Programming and Development**, i.e. creating software, implementing algorithms—on the computer or off, iterating on design, debugging?
5. In what ways does the learning experience ask students to engage in **Modeling and Simulation**, i.e. observing, building, or analyzing representations of real world systems and processes?

Culturally Responsive Pedagogy

1. In what ways is the context of the experience connected to your students' cultural and linguistic backgrounds?
2. In what ways are students encouraged to make connections to their home/community culture?
3. In what ways do students see themselves represented in CT through this experience?
4. In what ways are students encouraged to express and communicate their knowledge and ideas using multiple modes and modalities (i.e. writing, drawing, speaking, etc…), including students' home language?
5. In what ways are materials and tools developmentally appropriate, culturally accepted and easily available for all students?

For more information contact Dr. Mia Dubosarsky at the WPI STEM Education Center:
mdubosarsky@wpi.edu