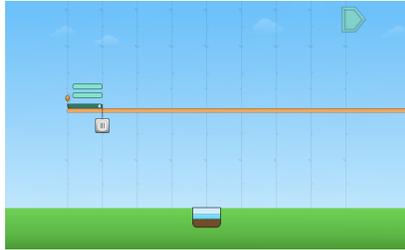
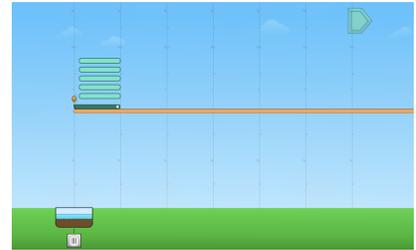


Materials

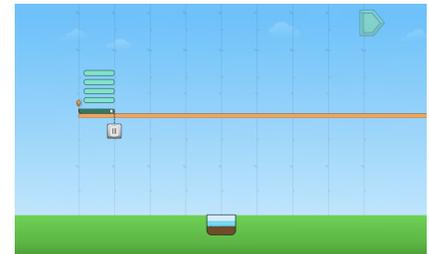
Linking cubes, graph paper (create tape diagrams, bar models)

Directions

- Play a puzzle from Level 1 and have an informal discussion about the relationship between the worm, the green growth bars, the vines, and the seed-drop point.



- Project a puzzle from Level 2. Students use manipulatives or diagrams to show the solution, explaining on paper how they solved it.



- Show a second puzzle from Level 2 and have students compare the two situations.

Sample Questions

- What do the green bars mean? What are you trying to figure out in this puzzle?
- Describe the relationship between the worm and the green growth bars (the green growth bars and the vine, the vine and the seed drop point).
- How do you decide how many spaces to stretch the worm?
- How could you write out the relationship you used to solve this mathematically?
- What proportions are you using to solve this puzzle? How many different ratios can we write?

What to look for

- How does the student:
- explain the question each puzzle is asking?
 - represent the solution on paper?
 - solve the puzzle? (Is the student counting or using ratios?)
 - use formal and informal understandings of proportions?
 - use language, including symbols to express ratios and proportions?

Extensions

- Have the students model the relationships between tape diagrams and double number lines.
- Have the students model what would happen if the worm in their puzzle was longer, shorter, or an extra growth bar was added.
- Have students create their own puzzles, moving the unknown to different positions. Share or have a partner solve. Are there puzzles that can't be solved or have multiple solutions?
- Use one-inch grid paper and then draw a given length of a worm. The student can decide the length of the green growth bars. The student can draw every place a seed would be dropped. They would have to determine how many green growth bars to drop a seed in each location. (Allows for good discussion on rate and consistency.)