

## Core Skills Analysis

### Science

- Understanding of gravity and motion by observing how marbles move through the run.
- Introduction to simple machines like ramps, chutes, and levers that affect the marble's movement.
- Exploration of cause and effect relationships through experimenting with different track designs.
- Learning about potential and kinetic energy as marbles are released from different heights.

### Math

- Practice with measurement and spatial awareness when designing and building the marble run.
- Opportunities to learn about angles and trajectories to predict marble movement.
- Enhancement of counting and basic arithmetic skills by keeping track of the number of marbles used or comparing lengths of runs.
- Introduction to geometry concepts by identifying shapes like circles (marbles) and rectangles (track pieces).

### Engineering

- Application of problem-solving skills to construct stable and functional marble runs.
- Understanding of stability and balance to prevent collapses or jams in the marble run.
- Introduction to the design process including planning, testing, and iterating on ideas.
- Exploration of concepts like friction and momentum in the context of building and improving the marble run.

### Tips

To extend the learning from building marble runs, encourage your 7-year-olds to experiment with incorporating different materials like cardboard tubes, paper cups, or even recycled materials into their designs. Encourage them to document their creations through drawings or videos and prompt them to explain the principles of physics or math they used in their designs. Additionally, consider organizing a mini marble run competition with siblings or friends to foster teamwork and friendly competition.

### Book Recommendations

- [Simple Machines: Wheels, Levers, and Pulleys](#) by David A. Adler: This book introduces young readers to the world of simple machines in an engaging and accessible way, perfect for further exploring concepts learned while building marble runs.
- [Rosie Revere, Engineer](#) by Andrea Beaty: Follow Rosie, a young aspiring engineer, on her creative journey to pursue her dreams. This inspirational story will resonate with kids who enjoy building and problem-solving like with marble runs.
- [Math Curse](#) by Jon Scieszka: Combining humor and math, this book takes readers on a fun and educational journey where everything turns into a math problem. A great way to keep young minds entertained and engaged with numbers after marble run building.