

Let it Roll

Design a ball run by setting up cardboard tubes in different ways to make the balls roll at different speeds.

Big Idea

Students will explore the use of various simple machines as they plan and construct a successful ball run.

Standards

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| <p>K-PS2-1 Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.</p> | <p>Students will explore the difference between various ramp angles, investigating which height works most effectively for the run they are constructing.</p> |
| <p>K-PS2-2 Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or pull.</p> | <p>Students will observe changes made to their design and conclude whether the angles and heights are appropriate for their specific ball run.</p> |
| <p>11.A Develop beginning skills in the use of science and engineering practices such as observing, asking questions, solving problems, and drawing conclusions.</p> | <p>Students will observe their peers' constructions, inquire about materials and speed, and draw conclusions on how to make their ball run a success.</p> |

Materials

- Simple Machine Balls
- Ping Pong Balls
- Cardboard Tubes
- Paper and pencils
- Incline Planes
- Cylinder Blocks
- Foam Blocks
- Connectors such as tape, brads, string, or glue sticks

Setup

A large carpeted space for students to create their ball runs, as well as a spot to display and collect all the materials the students could potentially use in constructing their run.

Directions

1. Have the students think about what makes a successful run for a ball and brainstorm ideas on what they think they could do to make the ball roll faster. The students can explore how well various balls roll on or inside various materials, and see if there are ways to increase the speed of the ball.

2. Students should plan out their design using a paper and pencil and decide what materials they want to use to build their run. Encourage students to add twists, turns, and loops to their ideas. They can move on to the designing phase, eventually revisiting the plan and seeing what needs to change.
3. Finally, they can test their ball inside the run, investigating what works and what doesn't work about the track they've constructed. Students can collaborate with others on what can be changed or improved, and students can implement various changes in their design to make the run operate more smoothly.

Investigation Questions:

- Does your ball stay on the track until the end?
- Which balls roll the fastest on each material?
- How can you change the ramps to make the balls roll faster/slower?
- If your ball doesn't work, what can you change to fix it or make it better? Why do you think it isn't working?
- Is there a way to make the ball stop at a certain point?
- How can you change the track to...?