LEGO Duplo with Marble Run

Mid-Valley
STEM-CTE HUB

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LEGO Duplo with Marble Run

This STEAM kit offers young learners an exciting introduction to engineering and physical science. Students build towers, ramps, and tracks to explore motion, gravity, speed, and problem-solving, while strengthening spatial awareness and design thinking. This kit supports creative play and guided inquiry, encouraging students to build structures, test ideas, and iterate in a fun, tactile way.

Grade Level

PreK - 2nd

Group Size

2 - 3 students

Time Duration

20 - 40 minutes

Content of Kits

Components

- 5 Large LEGO build plates
- Various DUPLO LEGO bricks
- Various DUPLO LEGO accessories
- Various marble run components

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Usage

Getting Started

1. **Introduce Key Concepts with Demonstration -** Show how marbles move down ramps and through tubes. Highlight simple terms like fast/slow, high/low, and start/finish to build early physics vocabulary.
2. **Let Students Explore Freely First -** Allow time for students to build whatever they imagine using DUPLO® bricks and marble run pieces to become comfortable with the materials.
3. **Provide Challenge Prompts -** Give simple tasks like “Can you build a ramp that makes the marble roll for 5 seconds?” or “Can you make the marble turn a corner?”
4. **Model Safe Marble Handling -** Demonstrate how to release the marble gently and retrieve it safely to avoid lost parts or frantic grabbing.
5. **Encourage Role Sharing -** Assign light team roles like “Builder,” “Marble Tester,” and “Track Adjuster” to promote collaboration.

Storage

- **Store Marbles Securely -** Keep marbles in a small lidded container or zip pouch to prevent them from rolling away or being misplaced.

Troubleshooting

- **Structure Collapses -** Reinforce with wider DUPLO® bases and double-check that pieces are firmly snapped together.
- **Marble Falls Off Early -** Lower the starting height or add gentle curves to slow the marble’s speed and maintain control.
- **Difficulty Building Tall Structures -** Guide students to build sturdy, wide bases and add height gradually using supporting bricks.

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Activity Guide

Beginner

Ramp It Up
Students build a simple ramp using DUPLO® bricks and test how the height affects how fast and far a marble rolls. They compare different ramp heights and discuss what happens to the marble's speed.

Intermediate

Target Drop
Students build a marble track that ends with the marble dropping into a small target zone (e.g., a bowl or brick bin). They test and adjust the track to improve accuracy and learn how position and angle affect trajectory.

Advanced

Longest Marble Ride
In teams, students design the longest-running marble track possible. They use curves, elevation changes, and delays to increase the marble's run time—then time their runs and redesign to improve results.

Extension Activities:

Marble Story Maze
Students build a track through a themed setting (e.g., jungle, space, or city) using DUPLO® figures and structures. They tell a story where the marble represents a character traveling through the environment, linking narrative and cause-and-effect logic.

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Learning Extensions

STEAM Connections: Engineering - Math - Design

Learning Objectives:

- Understand basic physics concepts like gravity, motion, speed, and incline through hands-on play.
- Strengthen spatial reasoning and structural design by building stable and functional tracks.
- Practice prediction, testing, and redesign using simple problem-solving strategies.
- Develop communication skills through collaborative building and storytelling.
- Build foundational math and science vocabulary by observing and describing marble movement.

Career Connections:

- **Mechanical Engineer –** Designs and tests machines, ramps, and motion-based systems.
- **Architect –** Plans and builds stable, usable structures with an understanding of balance and support.
- **Transportation Designer –** Creates efficient and creative systems for moving objects or people.
- **Theme Park Engineer –** Builds interactive ride systems that rely on gravity, motion, and track design.
- **Early Childhood Educator –** Uses playful, hands-on methods to introduce science and engineering concepts to young learners.

Essential Employability Skills:

- Problem-Solving
- Creativity
- Teamwork
- Communication
- Adaptability

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Resources and Accessibility

Safety Guidelines

- **Supervise Marble Use –** Marbles are small and can be a choking hazard; always supervise use and keep out of reach of children under 3.
- **Walk, Don't Run –** Remind students to move carefully around the building area to avoid knocking over projects or stepping on bricks.
- **Clean Up Thoroughly –** Assign roles for marble and brick collection to prevent lost pieces or slipping hazards.
- **Avoid Throwing Marbles –** Establish clear rules for safe marble use to prevent accidents or disruptions.

Accessibility

- **Offer Pre-Started Builds –** Provide partial builds or starter ramps for students who need more support to begin.
- **Flexible Participation Roles –** Let students contribute as designers, storytellers, or testers if physical building is difficult.

Library Catalog

Library Resources

Feedback

QR to feedback survey