LEGO BricQ Motion Prime

Mid-Valley
STEM-CTE HUB

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LEGO BricQ Motion Prime

The LEGO® BricQ Motion Prime Kit brings physical science and engineering to life through hands-on, inquiry-based learning. Designed for middle and high school students, this kit explores forces, motion, and energy transfer by building and testing mechanical models—no screens or coding required. Students investigate real-world physics concepts while developing problem-solving and design thinking skills in a collaborative, engaging environment.

Grade Level

6th - 12th

Group Size

2-3 students per LEGO BricQ set

Time Duration

45 - 90 Minutes

Content of Kits

Components

- 4 complete sets of LEGO BriQ Motion Prime

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Usage

Getting Started

1. **Familiarize Yourself with the Kit** – Before introducing it to students, explore the parts tray and instruction manual to get a feel for key components like gears, axles, and rubber bands.
2. **Use the Included Curriculum** – LEGO Education provides ready-to-use lessons aligned with NGSS and focused on force, motion, and physical science concepts—perfect for jump-starting instruction.
3. **Build a Simple Model First** – Begin with a basic build (like a push car or balance model) to introduce students to how motion and energy are built into the system.
4. **Assign Team Roles** – Have students rotate through roles such as builder, recorder, and tester to support engagement and collaboration.
5. **Discuss Scientific Thinking** – Encourage students to make predictions, observe outcomes, and reflect on changes in design to reinforce inquiry and experimentation.

Storage

- **Keep Kits in Original Bins** – Use the original trays or stackable containers and label by group or class period for easy access.
- **Sort by Component Type** – After each activity, sort pieces into compartments by gears, axles, connectors, and bricks to speed up setup and cleanup.
- **Store Models Disassembled** – Encourage students to fully take apart their builds after each session to prevent loss of parts and maintain kit integrity.

Troubleshooting

- **Model Not Moving as Expected** – Check for tight axle connections or misaligned gears that may create friction or prevent smooth motion.
- **Balance or Weight Off** – Adjust the position of bricks or weights to ensure the model is symmetrical or properly counterweighted.
- **Loose Connections** – Push connectors firmly into place and double-check gear alignment to ensure consistent power transfer.
- **Students Struggling with Instructions** – Break down each step visually or assign peer mentors to guide through more complex builds.

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Activity Guide

Beginner

Push vs. Pull Racer
Students will construct a small wheeled vehicle and test how it moves when pushed or pulled by hand. They'll measure how far it rolls, observe the effects of different surface types, and discuss how applied force and friction affect distance and speed. This activity builds foundational understanding of mechanical systems and Newton's First Law.

Intermediate

Rubber Band Launcher
Students build a launcher that uses a rubber band to power a LEGO vehicle. They'll test how different levels of tension or angles of release affect the speed and distance of travel. This encourages investigation of kinetic and potential energy and introduces fair testing practices through measurement and variable control.

Advanced

Gear Ratio Speed Challenge
Students design and test a vehicle that uses different gear configurations. They'll compare how small vs. large gears affect speed and force, then optimize their design for either maximum speed or climbing power. This activity connects math, physics, and engineering design, encouraging iterative thinking and data analysis.

Extension Activities:

Obstacle Course Engineering
In small teams, students will build a vehicle capable of completing a classroom obstacle course (e.g., ramps, turns, small weights to push). They'll collaborate to plan, build, test, and refine their design while incorporating lessons on motion, mass, resistance, and balance. This activity emphasizes real-world problem-solving and collaborative engineering.

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Learning Extensions

STEAM Connections: Physics - Engineering - Design

Learning Objectives:

- Understand and apply principles of force, motion, and energy in mechanical systems.
- Explore the impact of variables such as friction, mass, and gear ratios on object performance.
- Use hands-on experimentation and data collection to make informed design decisions.
- Collaborate to plan, build, test, and improve prototypes that solve physical challenges.
- Develop scientific inquiry skills through prediction, observation, and analysis of test results.

Career Connections:

- **Mechanical Engineer** – Designs machines and moving systems using knowledge of force, motion, and material properties.
- **Industrial Designer** – Creates and tests physical prototypes, improving design through function and user feedback.
- **Automotive Engineer** – Applies gear ratios, energy systems, and motion dynamics to vehicle performance.
- **STEM Educator or Curriculum Developer** – Builds engaging, hands-on learning experiences that explain scientific concepts.
- **Construction or Robotics Technician** – Assembles and adjusts mechanical structures that require precision and adaptability.

Essential Employability Skills:

- Problem-Solving
- Critical Thinking
- Teamwork & Communication
- Creativity & Innovation
- Attention to Detail

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Resources and Accessibility

Safety Guidelines

- Avoid Forceful Assembly – Teach students not to force pieces together, which can cause part breakage or hand strain.
- Store Pieces Securely – Return all components to bins or trays after use to prevent accidental spills or sharp stepping hazards.
- Supervise Use of Small Parts – Ensure students are aware that small pieces can be a choking hazard; keep kits away from very young children.

Accessibility

- Provide Adaptive Grips or Tools – Offer rubber grips or LEGO-compatible assistive tools for students with fine motor challenges.
- Use Visual Aids and Enlarged Instructions – Offer printed step-by-step guides with larger visuals or color coding to support diverse learners.
- Allow Flexible Roles – Let students who may struggle with building take on roles such as planner, tester, or recorder.
- Use Raised Surfaces – Build on tables or trays that accommodate wheelchair users or students with limited mobility.
- Encourage Peer Support – Pair students strategically to foster collaborative builds where everyone can participate meaningfully.

Library Catalog

Library Resources

Feedback

QR to feedback survey