

A decorative border made of colorful LEGO bricks in red, green, blue, and yellow, arranged in a stepped pattern around the edges of the page.

Road Builders

Constructing Safe and Efficient Roadways

Keywords:

Road Construction, Engineering, LEGO, STEM, Transportation

Target group:

primary school pupils (ages 6-11), Educators, Parents

Objectives:

This hands-on activity introduces participants to fundamental road construction principles while emphasizing how safe, efficient roadways support community connectivity. Through the process of designing and building LEGO road models, students will develop practical engineering skills and problem-solving strategies, transforming abstract concepts into tangible learning experiences. By engaging with real-world infrastructure challenges in a creative format, the project bridges theoretical knowledge with applied design thinking.

General Guideline on Time Allocation:

The duration needed to carry out this activity may vary depending on the specific group of children. Teachers are encouraged to adapt the implementation according to the needs, interests, and dynamics of the group.

In the preparatory phase, teachers may use a variety of activities to introduce and contextualize the chosen topic. These can include discussions, videos, drawings, storytelling, or even a field trip, depending on the age and background knowledge of the children.

The main construction phase, during which children plan and build their urban element using LEGO bricks, should typically not exceed 45 to 60 minutes. However, this phase often stimulates further curiosity and questions among the children, potentially leading to extended engagement or follow-up activities. For more detailed instructions and pedagogical support on how to implement activities of INNO-kids project, please download the Teacher's Methodological Guide.



Materials and Resources Needed:

- LEGO bricks and baseplates
- LEGO vehicles
- Markers, crayons, or colored pencils
- Chart papers
- Rulers and measuring tape
- Recycled materials (e.g., cardboard, plastic bottles)

Introduction:

Start by showing students images of different road types - urban streets, rural routes, and highways. Engage them with two thought-provoking questions: "Why do we need roads?" and "What makes a road 'good'?" as conversation starters. During the discussion, introduce and explain the three key engineering concepts they'll need: pavement (focusing on materials and durability), signage (for safety communication), and traffic flow (how we manage efficient movement). This foundation naturally leads into exploring why road construction matters in our communities.

Procedure:

Preparation

Group Formation: Divide into small groups of 3-4.

Challenge Introduction: "Design and build a safe and efficient road using LEGO bricks."

Discussion Points:

- What makes a road safe?
- What features are important for efficient roadways (e.g., lanes, intersections, signs)?
- How do roads impact our daily lives?

Planning:

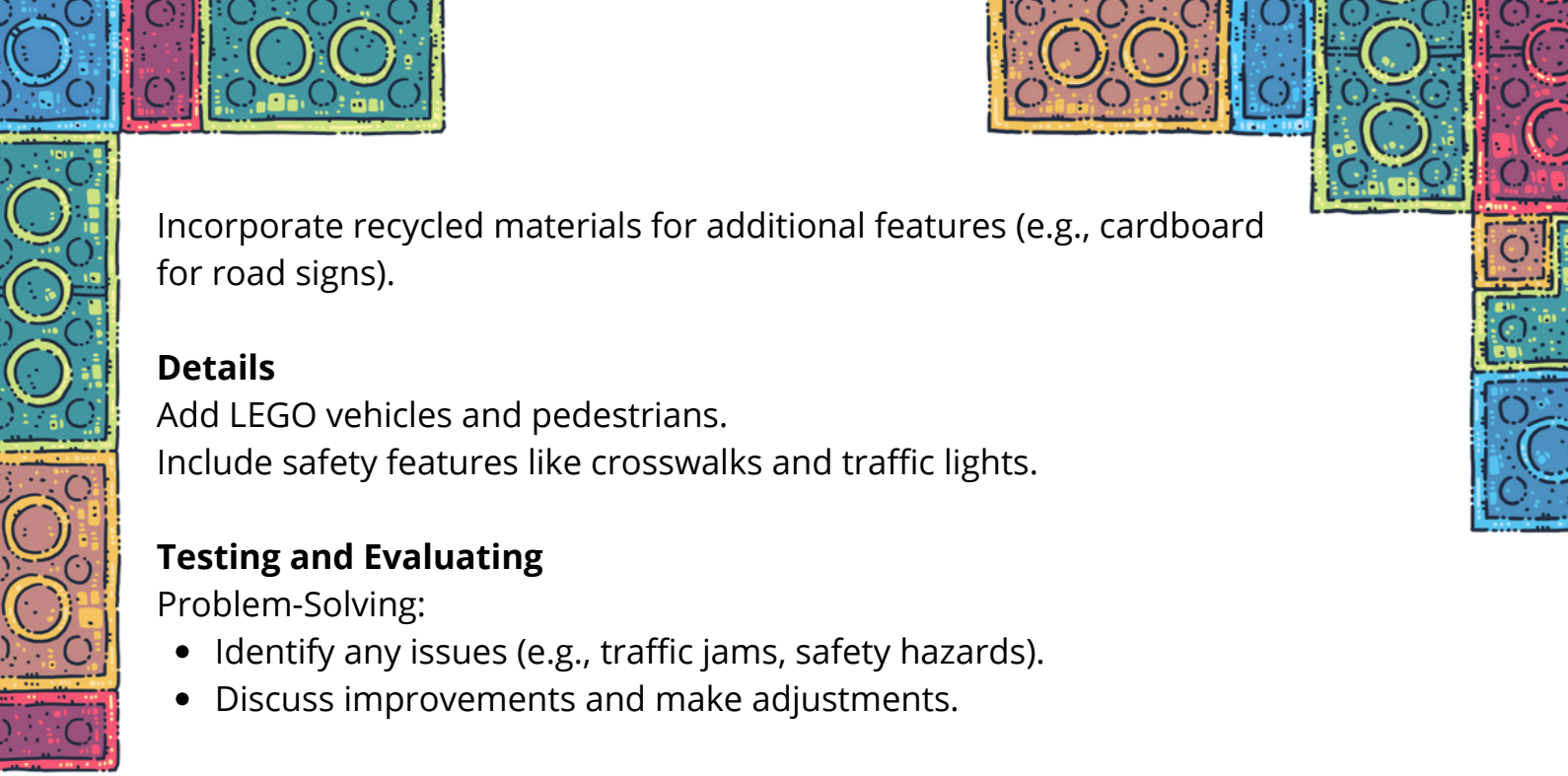
- Draw a road plan on chart paper.
- Include features like lanes, intersections, crosswalks, and traffic signs.

Material Selection: Choose LEGO bricks and other materials needed for construction.



Construction

Build the road on a LEGO baseplate. Use LEGO bricks to create lanes, sidewalks, and traffic signs.



Incorporate recycled materials for additional features (e.g., cardboard for road signs).

Details

Add LEGO vehicles and pedestrians.

Include safety features like crosswalks and traffic lights.

Testing and Evaluating

Problem-Solving:

- Identify any issues (e.g., traffic jams, safety hazards).
- Discuss improvements and make adjustments.

Reflection/Discussion:

Share experiences and discuss what worked and what didn't.

Tips:

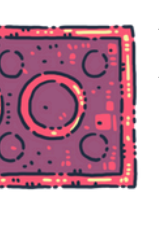
- Here are some refined questions for the reflection moment:
 - "What features made the road safe and efficient?"
 - "How do engineers design real roads?"
 - "What improvements can be made to our road model?"
- Encourage creativity and teamwork.
- Provide guidance and ensure safety during construction and testing.

Additional Considerations:

Differentiation:

Provide additional support or simplified instructions for pupils who may require extra assistance. For advanced pupils, offer extension tasks such as researching further sustainable practices or designing more complex models.

Assessment:



Assess pupils based on their participation and engagement during discussions and hands-on activities. Evaluate the creativity, effort, collaboration, depth of understanding demonstrated in their models, critical thinking, ability to provide constructive feedback and presentation skills.



Curriculum Connections:

Environmental Studies (*the role of infrastructure in communities*)

Citizenship Education (*awareness of the importance of road safety, public infrastructure, and responsible use of shared spaces*)

Mathematics (*spatial reasoning, measurement, geometric shapes in road design, and interpretation of symbols and traffic patterns*)

Language (*oral communication; written expression*)

Social Skills (*critical thinking, teamwork and collaboration in problem-solving*)

SDG Connections:

- **SDG 9:** Industry, Innovation, and Infrastructure – Pupils explore how to design and build quality, reliable, and sustainable road infrastructure that supports economic development and human well-being, considering aspects like durability, efficiency, and accessibility.
- **SDG 11:** Sustainable Cities and Communities – Pupils investigate what makes roads safe and efficient, understanding how infrastructure contributes to sustainable transport systems and thriving communities.

