Homeschool Self-Guided Education Packet

TEACHER GUIDE

GRADES 4 - 5

STUDENT SHEETS INCLUDED

LEGOLAND® DISCOVERY CENTER

VISIT GUIDE: GRADE 4-5

Welcome to LEGOLAND® Discovery Center

LEGOLAND® Discovery Center
connects learning and fun together like LEGO® bricks!

Our self-guided homeschool visits allow students to **explore, discover**, **and create** in an engaging environment filled with hands-on activities. The guide is designed to add fun, focused, and interactive learning during your visit.

This guide includes **curriculum-based challenges and activities** covering Mathematics, English, History, and Science for 3 attractions! Including:

MINILAND
Marvel at LEGO landmarks while telling your own story.

LEGO® Kingdom Quest
Think like a scientist on a data investigation!

LEGO® Racers Build & Test
Design and test your way to the finish line!

The attractions can be visited in any order.

TEACHER GUIDE: GRADES 4-5

LEGO® MINILAND

MINILAND is a miniature replica featuring the city's most loved buildings and landmarks.
Fun Facts: All of the MINILAND models took a total of 5000 hours to design and build.
MINILAND is made up of over 1.5 Million LEGO® Bricks. There are over 500 Minifigures!

Challenge

Use MINILAND as inspiration to build and retell a story about an experience you've had in your own city using LEGO Bricks as you tool.

Setting the Scene: As you explore MINILAND, ask your student some of the following questions:

- What buildings do you see in MINILAND?
- How many places have you visited?
- What did you do there?
- Who were you with?
- Did you enjoy it?
- Do you have any stories to share?

Post Challenge

Building the Story: Students are asked to write down observations, collect data, and identify connections to community. Afterwards they are tasked to solve a design challenge and sketch it. Then students are tasked with retelling a personal story, sequencing events and drawing them. Before lastly, writing a paragraph communicating ideas, iterations and evaluation about an experience they had in their own city.

TEACHER GUIDE: GRADES 4-5

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Missouri Learning Standards

Activity Component	What Students Do	Missouri Learning Standards (Grades 4–5)	Alignment Details
Exploration & Observation	Students explore MINILAND, identify buildings, and record observations.	**SCI.PS/ETS Practices A & B** – Ask scientific questions, plan and carry out simple investigations.	Students act like scientists, observing and documenting local systems and structures.
Connect to Community	Students reflect on visited places, experiences, and community needs.	**ESS3.C.4–5** – Human activities in communities use science and engineering to meet needs and manage resources.	Students connect landmarks to cultural and community functions.
Build LEGO Models of Landmarks/Experiences	Students design LEGO models to represent real-world places and experiences.	**ETS1.A.3–5** – Define problems and develop models that represent solutions to design challenges.	LEGO builds become models to communicate how structures serve communities.
Define & Solve Problems (Design Challenge)	Students analyze how landmarks serve communities, sketch, and improve ideas.	**ETS1.B/C.4–5** – Generate and compare solutions, plan and test using criteria and constraints.	Students engage in the engineering design process.
Storytelling & Sequencing	Students retell personal stories about their city, sequencing events with drawings.	**ELA Integration (Missouri ELA Standards: Writing & Sequencing, W.4–5.3)** – Write narratives with clear event sequences.	Writing/storytelling integrates with science and engineering through sequencing and explanation.
Communicate Information	Students write a paragraph explaining their design, story, and evaluation.	**SCI/ETS Practices D & E** – Analyze and interpret data, construct explanations, and communicate information.	Students clearly communicate evidence-based reasoning.
Science, Engineering, and Society	Students consider how infrastructure supports people and resources.	**ESS3.A & ESS3.C.4–5** – Communities use science/engineering to solve problems, protect resources, and support society.	Students link human-built systems with sustainability and societal needs.

Student Name: _____

MINILAND: My Favorite Memory

Part 1 – Observations

As you explore MINILAND, record your observations below.

Landmark/Building	What is it used for?	Have you visited a place like this in your city? (Yes/No)	Notes

Reflection Question: Which building is your favorite and why?

_____

_____

Student Name: _____

MINILAND: My Favorite Memory

Part 2 – Design Challenge

Every building or landmark solves a problem. Pick one and think about how you might improve it.

Landmark	**Problem it Solves:** (e.g., crossing river, government building)	1 Idea to Improve It

Sketch of My Idea

Bonus Question: How would you change or help the community or environment?

_____

_____

Student Name: _____

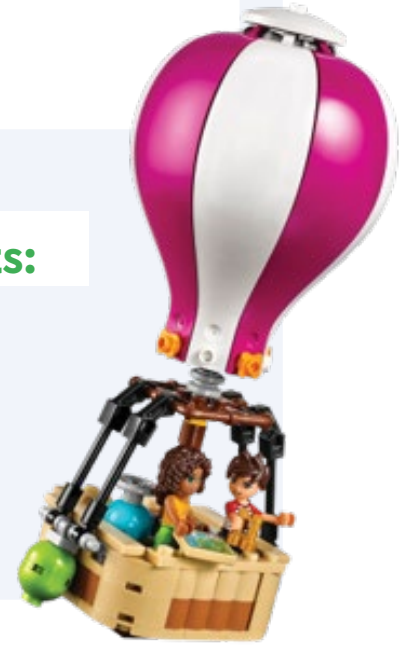
MINILAND: My Favorite Memory

Part 3 – My City Storyboard

Think of a story about an experience you've had in your own city. Use the boxes to sketch and label each part. (Beginning, Middle, Middle, Ending) Then head over to any build zone and recreate your scene using LEGO® bricks.

Writing Prompts:

- Who was there?
- What happened?
- Why was it special?



Student Name: _____

MINILAND: My Favorite Memory

Part 4 – Reflection & Sharing

Write about your LEGO® model and your experience.

Questions to Address: What did you build? What details did you include and why? How does your LEGO model connect to your city? If you rebuilt it, what would you do differently? Share your model with someone and write one nice thing they noticed about your work.

TEACHER GUIDE: GRADES 4-5

LEGO® Kingdom Quest

Kingdom Quest is a ride in which riders board carriages and are transported through a series of interactive screens. Each person in the carriage is provided with a "blunderbuss" and compete to save the princess and get the highest score!

Challenge

Students are instructed via voiceovers to zap the bad guys with the blunderbuss – this is done by pointing and shooting. A score appears on a screen in front of each students which tallies their success in zapping the bad guys. To gather the appropriate amount of data, enjoy the ride up to 4 times! Adults are encouraged to ride also; this way students have more data to utilize.

Ride 1: Choose any seat and sit on the right side.
Ride 2: Choose the same seat but sit on the left side.
Ride 3: Choose a seat in a different row, sit on the right side.
Rode 4: Choose the same row but sit on the left side.

- At the conclusion of each ride, students must remember their score.
- Students can also ask other riders what their scores were.
- After exiting the ride each time, students must write down their score and those of others.

Post Challenge

Students are encouraged to think about the different ways they can represent this data and are to explore how the same data can be represented in different ways. They are challenged to represent the data in a grid form. They can also reflect on whether Kingdom Quest was fair.

Missouri Aligned Learning Objectives

The Kingdom Quest Ride Data Activity aligns closely with Missouri's Grade 4–5 Science standards by integrating engineering design, data analysis, and scientific reasoning. Students practice fair testing by changing only one variable at a time, strengthening their understanding of experimental design. They collect, organize, and represent data in multiple ways, applying mathematical reasoning to spot trends. Through analysis and argument from evidence, students determine whether the ride/game is fair, deepening skills in scientific explanation. Finally, the activity connects to physical science concepts of motion and energy transfer, helping students link game performance to real-world science ideas.

TEACHER GUIDE: GRADES 4-5

LEGO® Kingdom Quest

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Missouri Learning Standards

Activity Component	What Students Do	Missouri Learning Standards (Grades 4–5)	Alignment Details
Fair Testing with Variables	Students ride 4 times, changing one variable (seat, side, row) each time.	**3–5.ETS1.B** – Plan and carry out fair tests with controlled variables and identify failure points.	Students isolate one variable at a time to ensure a fair test of ride/game conditions.
Data Collection & Collaboration	Students record their own and peers' scores.	**SEPs: Planning & Carrying Out Investigations 5.DSP.A** – Collect and organize data.	Students strengthen results through systematic recording and peer data gathering.
Data Representation	Students organize results in grids, charts, and tables.	**5.ESS1.B.1** – Represent and analyze data to identify patterns. **Math: 5.DSP.B** – Represent data.	Students create multiple representations to better see patterns and trends.
Analyzing & Interpreting Data	Students compare scores across rides, noticing patterns or outliers.	**SEPs: Analyzing & Interpreting Data 4.ETS1.C.1** – Compare solutions and analyze test results.	Students reason about how seat/row variables influence outcomes.
Mathematics & Computation	Students tally, average, and graph scores.	**Math Process Standards (4.DSP, 5.DSP)** – Use operations to analyze and represent numerical data.	Students apply mathematical thinking to experimental data.
Argument from Evidence	Students reflect on whether the ride/game is fair using collected data.	**SEPs: Engaging in Argument from Evidence 4.ETS1.A** – Define and critique problems with evidence.	Students make claims about fairness based on quantitative evidence.
Energy & Motion Connection	Students consider how seat position/aiming affects scores (energy transfer concept).	**4.PS3.A.1** – Use evidence to explain the relationship between speed, position, and energy.	Students informally test how energy transfer and positioning impact performance.

Student Name: _____

Data Investigation: Is the Game/Ride Fair?

Part 1 – Planning Our Investigation

Our Question: Is the game/ride fair for all players, no matter where they sit or how many times they play?

Prediction (Hypothesis):

_____

_____

Variables:

- What we will change (Independent Variable):

_____

- What we will measure (Dependent Variable):

_____

- What we will keep the same (Controlled Variable):

_____

Part 2 – Collecting Our Data

Player Name	Seat/Row	Try #	Score	Notes (anything unusual?)

Student Name: _____

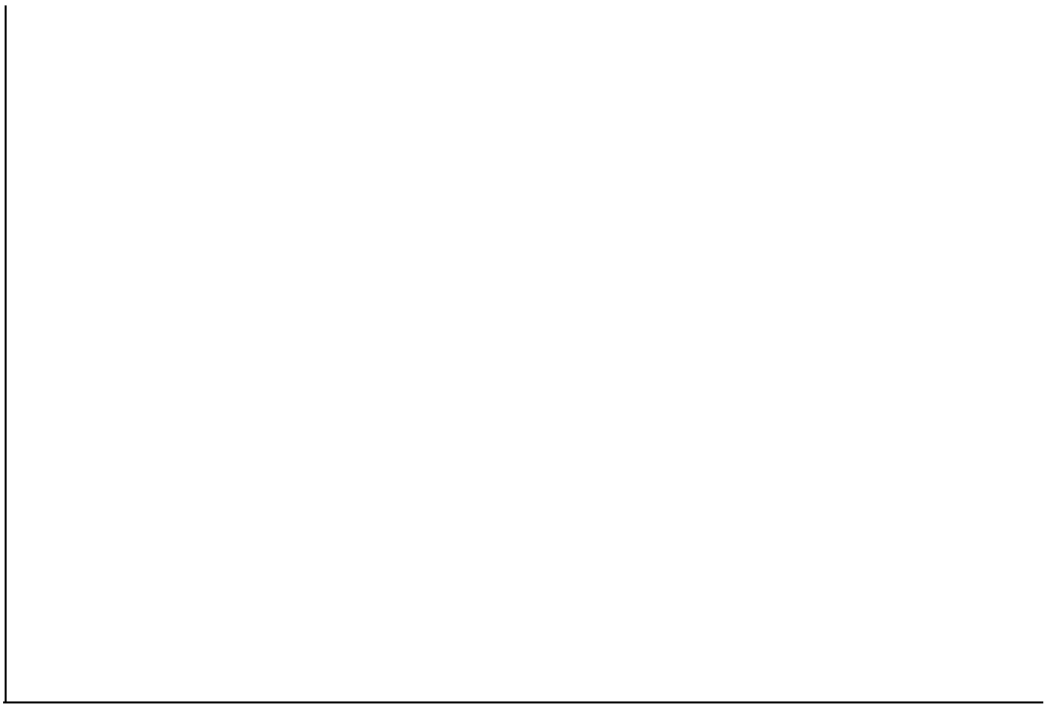
Data Investigation: Is the Game/Ride Fair?

Part 3 – Analyzing the Data

Step1- Organize your data: Make a graph (bar, line, or dot plot) to show scores for different seats/rows. Color code if you want to show first rides vs repeat rides.

Step 2- Look for patterns:

- Do some seats have higher scores?
- Do scores improve with more tries?
- Any unusual results (outliers)?



Student Name: _____

Data Investigation: Is the Game/Ride Fair?

Part 4 – Drawing Conclusions

1. Was the game/ride fair? Why or why not?

_____

_____

2. What could make it more fair?

_____

_____

3. If you did the investigation again, what would you change?

_____

_____

Part 5 – Reflection & NGSS Connections

- Analyzing Data: How did our graph help us see patterns?
- Planning Investigations: How did we keep the test fair?
- Arguing from Evidence: What evidence supports your conclusion?

Final Statement: I think the game/ride IS or IS NOT fair because…

_____

_____

TEACHER GUIDE: GRADES 4-5

LEGO® Build & Test

In the Build and Test area, students will find brick pits featuring car pieces including wheels, body pieces, and axels. They can then use two different ramps to test the durability and speed of their cars.

Challenge

Students must build cars and race them against other students' builds. Students need to observe which cars win the race and critically consider what design features are more prominent in the winning cars. They are then asked to tick which features listed on their worksheet help the cars go faster.

Post Challenge

Students are challenged to review the data from build and test and determine the design features needed for a fast car. They are asked to list the top 5 features. They are then tasked with creating a visual design of the car featuring the five most important design elements.

Missouri Aligned Learning Objectives

The Car Design & Race Activity integrates Missouri's science, math, and engineering standards by engaging students in the engineering design cycle. Students design and race cars, then plan and carry out fair tests by controlling variables such as ramp or seating position. They collect and analyze data, identifying patterns in performance, and use evidence to explain the relationship between motion, speed, and energy. Through data representation and argument from evidence, students determine the most effective design features and communicate their solutions by creating a visual car design that incorporates their findings. This activity builds skills in scientific inquiry, engineering problem-solving, and evidence-based communication.

TEACHER GUIDE: GRADES 4-5

LEGO® Build & Test

In the Build and Test area, students will find brick pits featuring car pieces including wheels, body pieces, and axels. They can then use two different ramps to test the durability and speed of their cars.

Missouri Learning Standards

Activity Component	What Students Do	Missouri Learning Standards (Grades 4–5)	Alignment Details
Science & Engineering Practices (SEPs)	Students collect race data, analyze results, and argue from evidence about which features work best.	**SEPs: Analyzing & Interpreting Data, Engaging in Argument from Evidence**	Students practice reasoning with evidence by supporting claims about car design.
Forces & Energy	Students observe speed, motion, and energy transfer during car races.	**4.PS3.A.1** – Use evidence to explain the relationship between speed and energy. **5.PS1.A.1** – Measure and describe properties of materials.	Students explain how faster cars demonstrate more energy and test materials' properties.
Engineering & Design Cycle	Students build, test, and redesign cars using data to guide improvements.	**3–5.ETS1.A** – Define design problems with criteria/constraints. **3–5.ETS1.B** – Generate/test solutions.	Students apply the engineering design process by creating and refining car models.
Fair Testing Practices	Students control variables in races (same ramp, track, etc.) to ensure fair testing.	**3–5.ETS1.C** – Plan and carry out fair tests with controlled variables and failure points considered.	Students learn to isolate variables when comparing car designs.
Data Representation	Students record results, tick worksheet features, and identify top 5 speed features.	**Math: 4.DSP, 5.DSP** – Collect, organize, and represent data to identify patterns.	Students use tallying, charts, and feature tracking to make evidence-based choices.
Communicate Solutions	Students sketch and visually design a car with top 5 features.	**SEP 8: Obtaining, Evaluating, and Communicating Information**	Students present conclusions visually and in writing, demonstrating communication of design ideas.

STUDENT WORKSHEET

LEGO® Build & Test

Student Name: _____

Car Building & Racing Investigation

You will build and race cars to find out which design features make a car go faster. After each race, record your results and look for patterns. Use your data to design a new car with the best features!

Part 1 – Challenge

Build LEGO® cars and then race them on the ramp. Try and make sure everyone is building different types of cars so you can test which cars are the fastest. Take note of the fastest times: **READY, SET GO!**

Times

1. _____ 3. _____

2. _____ 4. _____

Part 2 – Race Results

Record results below. Tick the features each car had and write the race outcome.

Car #	Wheels (Big/Small)	Weight (Light/Heavy)	Body (Wide/Narrow)	Other Features	Race Result (Win/Lose)
Car 1					
Car 2					
Car 3					
Car 4					

Car Building & Racing Investigation

Part 3 – Evaluation

Tick which design features make a car go faster.

- ☐ Big wheels
- ☐ Small wheels
- ☐ Long body
- ☐ Short body
- ☐ Low body
- ☐ Tall body
- ☐ Wide body
- ☐ Thin body
- ☐ Dark colored bricks
- ☐ Light colored bricks
- ☐ Windshield
- ☐ No windshield
- ☐ Heavy car
- ☐ Light car

Review the data from your test and write down the top 5 things needed for a fast car.

1. _____
2. _____
3. _____
4. _____
5. _____

Car Building & Racing Investigation

Part 6 – Design Your Car

Draw and label your car design below, showing the 5 features you chose.