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.

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Curriculum Alignment - TEKS Science & Engineering

Activity Component	What Students Do	TEKS Standards (Grades 4–5)	Alignment Details
Exploration & Observation	Students explore MINILAND, identify buildings, and record observations.	**4.2A, 5.2A** – Plan and implement descriptive investigations, ask questions, and collect data.	Students observe and document landmarks and settings like scientists investigating their surroundings.
Connect to Community	Students reflect on visited places, experiences, and community needs.	**4.3B, 5.3B** – Relate science concepts to the history of science and contributions of scientists in communities.	Students connect landmarks to human purpose, culture, and community functions.
Build LEGO models of landmarks or experiences	Students design LEGO models to represent real-world experiences and city landmarks.	**4.3C, 5.3C / 4.2D** – Represent the natural world using models.	Models help explain and communicate experiences and how structures serve the community.
Define & Solve Problems (Design Challenge)	Students analyze how landmarks serve communities, then sketch and improve ideas.	**4.3A, 5.3A / ETS (4–5.2)** – Analyze problems, evaluate solutions, and use engineering design processes.	Students practice defining problems, applying design criteria, and generating solutions.
Storytelling & Sequencing	Students retell a personal story about their city, sequencing events with drawings.	**ELAR Integration (4.11D, 5.11D)** – Compose and revise drafts with logical sequencing.	Writing integrates literacy with scientific and engineering practices.
Communicate Information	Students write a paragraph explaining their design, story, and evaluation.	**4.2F, 5.2F** – Communicate valid conclusions supported by data in oral and written forms.	Students use evidence and explanation to share ideas clearly.
Science, Engineering, and Society	Students consider how infrastructure and landmarks support people and protect resources.	**5.12A–C (Earth & Space Science)** – Explore human use of natural resources and how communities manage them.	Students connect science, engineering, and society by reflecting on community systems.

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: _____

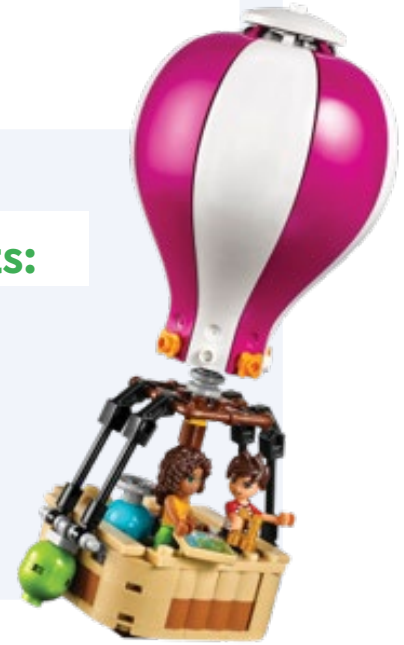
MINILAND: My Favorite Memory

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.

TEKS Aligned Learning Objectives

- **Engineering Design & Fair Testing** – Students practice controlled investigations by changing one variable (seat/row/side) at a time.
- **Scientific Inquiry & Data Practices** – Students collect, organize, and represent repeated and peer-collected data in tables and charts.
- **Mathematical & Computational Thinking** – Students use tallying, averaging, and graphing to identify trends and outliers.
- **Analyzing & Interpreting Data** – Students compare results to spot patterns in performance and variability.
- **Argument from Evidence** – Students make claims about fairness of the ride supported by their collected data.
- **Physical Science Connections** – Students explore how energy transfer and positioning affect motion, accuracy, and outcomes.

TEACHER GUIDE: GRADES 4-5

LEGO® Kingdom Quest

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Curriculum Alignment - TEKS Science & Engineering

Activity Component	What Students Do	Aligned TEKS Standards (Grades 4–5)	Alignment Details
Fair testing with controlled variables	Students ride 4 times, changing one variable (seat, side, row) each time.	**Scientific Investigation & Reasoning: 4.2A, 5.2A** – Plan and implement descriptive investigations. **Engineering Design 3-5-ETS1-3** – Plan and carry out fair tests with controlled variables.	Students control variables (seat/side/row) while keeping the game constant, ensuring fair testing.
Data collection & collaboration	Students record their own scores and gather peer scores.	**4.2B, 5.2B** – Collect and organize data using simple tools, equipment, and technology.	Students expand their data set by pooling peer results, improving reliability.
Data representation	Students organize data in grids, tables, or charts.	**5-ESS1-2 / TEKS 4.2C, 5.2C** – Organize data and represent it graphically to recognize patterns.	Students create multiple data representations (tables, charts) to spot trends.
Analyzing and interpreting data	Students compare scores across seats/rows, noticing trends or outliers.	**Science & Engineering Practices (SEPs): Analyzing & Interpreting Data. 4.2D, 5.2D** – Analyze data to identify trends or patterns.	Students evaluate whether seating position impacts score outcomes.
Using mathematics & computational thinking	Students tally, average, and graph scores.	**TEKS Math Process Standards (4.14, 5.14)** – Apply mathematics to science investigations (mean, tally, compare, graph).	Students practice quantitative reasoning by applying math to experimental data.
Engaging in argument from evidence	Students reflect on whether the ride/game is fair, using collected data as evidence.	**4.3A, 5.3A** – Analyze and critique explanations using evidence.	Students make claims about fairness supported by evidence from their trials.
Energy & motion connection	Students consider how positioning and aiming (energy transfer) impact results.	**4-PS3-4** – Apply scientific ideas to test and refine a device that converts energy.	Students informally test how input energy (aiming/shooting) transfers into score outcomes.

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: _____

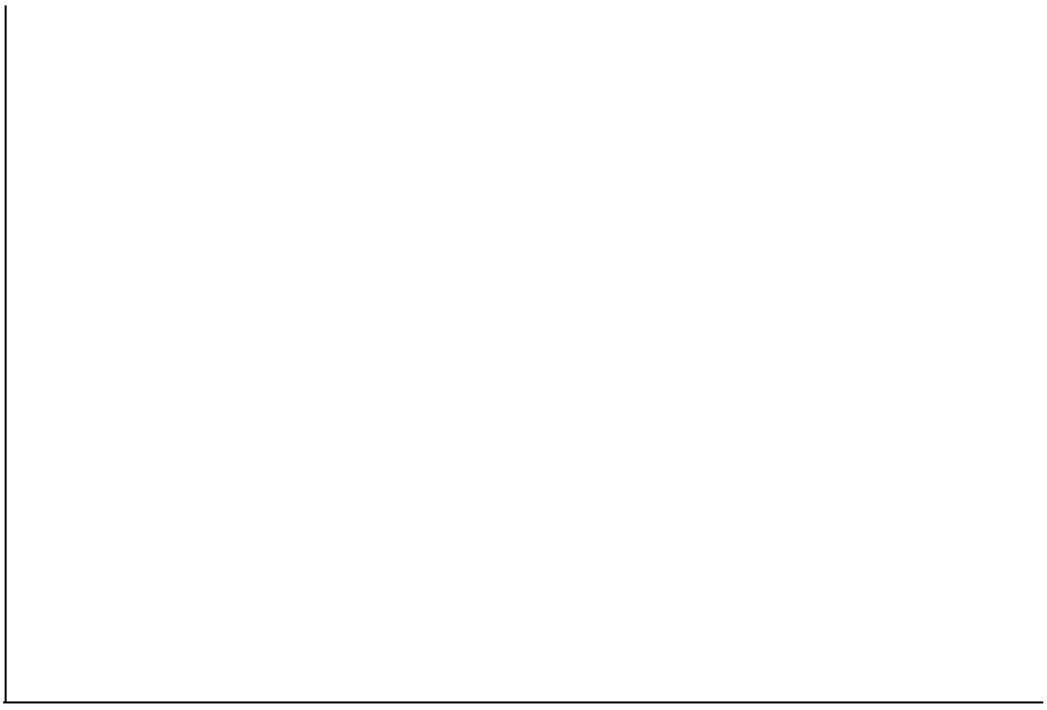
Data Investigation: Is the Game/Ride Fair?

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.

TEKS Aligned Learning Objectives

- **Scientific Inquiry & SEPs** – Collecting, organizing, and interpreting race data, then using it to argue from evidence.
- **Forces & Energy (PS)** – Exploring the relationship between speed and energy, and how materials influence design performance.
- **Engineering Design Process (ETS)** – Defining problems, generating solutions, and refining car designs based on performance data.
- **Fair Testing Practices** – Planning and carrying out fair tests by controlling variables and repeating trials.
- **Data Representation & Communication** – Using charts, tables, and visual models to share results and explain design choices.

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.

Curriculum Alignment - TEKS Science & Engineering

Activity Component	What Students Do	Aligned TEKS Standards (Grades 4–5)	Alignment Details
Science & Engineering Practices (SEPs)	Students collect race data, interpret results, and argue about fairness/design effectiveness.	**4.2F, 5.2F** – Communicate valid conclusions supported by data. **4.3A, 5.3A** – Analyze and critique explanations using evidence.	Students practice argument from evidence and use data to communicate solutions.
Forces & Materials	Students test car speed, observe outcomes, and link speed to energy and design materials.	**4-PS3-1** – Use evidence to explain the relationship between an object's speed and its energy. **5-PS1-3** – Make observations and measurements to identify materials based on their properties.	Students connect speed and energy while also considering how material properties (wheels, body, axles) affect performance.
Engineering & Design Cycle	Students identify features that affect performance, brainstorm improvements, and sketch new cars.	**3-5-ETS1-1** – Define a design problem with criteria and constraints. **3-5-ETS1-2** – Generate and compare solutions based on criteria/constraints.	Students refine their design based on test results and identify key features to include.
Fair Testing Practices	Students race cars multiple times, changing design features while keeping other factors constant.	**3-5-ETS1-3** – Plan and carry out fair tests in which variables are controlled and failure points are considered.	Students compare cars under controlled variables to ensure tests are fair and reliable.
Data Analysis & Visualization	Students tick off features that influence car speed, list top 5 design elements, and create a visual model.	**4.2C, 5.2C** – Collect, record, and organize data in charts, tables, or graphs. **4.2D, 5.2D** – Analyze and interpret data to identify trends.	Students organize data visually and use it to justify their design decisions.

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.