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.

Ohio Aligned Learning Objectives

- Supporting scientific inquiry skills (observation, data collection, use of models, communication).
- Connecting engineering design practices with real-world problem-solving.
- Integrating ELA skills (storytelling, sequencing, writing explanations) into science/engineering.
- Highlighting the connection between science, engineering, and society, particularly how communities design and manage resources.

TEACHER GUIDE: GRADES 4-5

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Ohio Learning Standards for Science

Activity Component	What Students Do	Ohio Standards (Grades 4–5)	Alignment Details
Exploration & Observation	Students explore MINILAND, identify buildings, and record observations.	**Scientific Inquiry & Application (Gr. 3–5)** – Observe, ask questions, collect and record information.	Students act like scientists by documenting landmarks and city features as data.
Connect to Community	Students reflect on visited places, experiences, and community needs.	**Grade 5, Earth & Space Science** – Interactions within systems (how human activities affect Earth's systems).	Students consider how landmarks and infrastructure meet human and community needs.
Build LEGO Models of Landmarks/Experiences	Students design LEGO models to represent real-world experiences and city landmarks.	**Scientific Inquiry & Application (Gr. 3–5)** – Use models to represent natural and designed systems.	LEGO models serve as scientific/engineering models to represent real-world systems.
Define & Solve Problems (Design Challenge)	Students analyze how landmarks serve communities, then sketch and improve ideas.	**Engineering Design (Gr. 3–5 ETS)** – Define problems, set criteria/constraints, and test design solutions.	Students engage in problem-solving by proposing improvements for community design.
Storytelling & Sequencing	Students retell a personal story about their city, sequencing events with drawings.	**ELA Integration (Gr. 4–5 Writing Standards)** – Sequence ideas logically, use writing to communicate explanations.	Literacy is integrated with science/engineering practices through story-based reflection.
Communicate Information	Students write a paragraph explaining their design, story, and evaluation.	**Scientific Inquiry & Application (Gr. 3–5)** – Communicate scientific procedures and explanations.	Students practice written communication by supporting claims with evidence.
Science, Engineering, and Society	Students consider how infrastructure and landmarks support people and protect resources.	**Grade 5, Earth & Space Science** – Human use of natural resources; design solutions to reduce impacts.	Students reflect on how science and engineering address community and environmental 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: _____

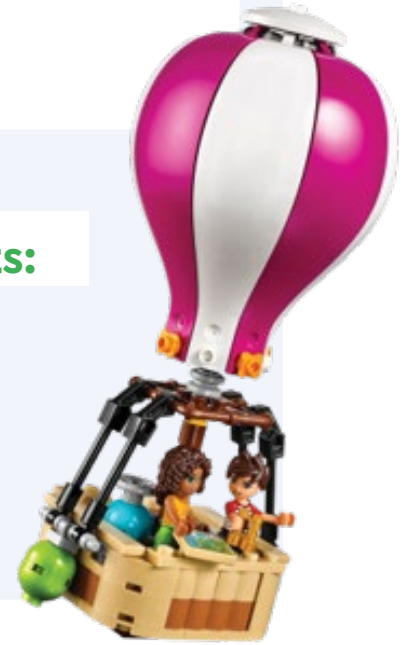
MINILAND: My Favorite Memory

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.

Ohio Aligned Learning Objectives

- Reinforcing scientific inquiry practices (fair testing, data collection, representation, analysis).
- Applying math in science through tallying, averaging, graphing, and computational thinking.
- Strengthening argumentation skills, as students use evidence to make claims about fairness.
- Connecting to Physical Science concepts of force, motion, and energy transfer in an engaging, game-based way.

TEACHER GUIDE: GRADES 4-5

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Ohio Learning Standards for Science

Activity Component	What Students Do	Ohio Standards (Grades 4–5)	Alignment Details
Fair testing with controlled variables	Students ride 4 times, changing one variable (seat, side, row) each time.	**Scientific Inquiry & Application (Gr. 3–5)** – Plan and conduct investigations, control variables, and identify cause-effect relationships.	Students design a fair test by changing only one factor at a time.
Data collection & collaboration	Students record their own scores and gather peer scores.	**Scientific Inquiry & Application (Gr. 3–5)** – Collect and record data systematically.	Pooling peer results improves data reliability and sample size.
Data representation	Students organize data in grids, tables, or charts.	**Scientific Inquiry & Application (Gr. 3–5)** – Organize and present data in tables and charts to identify patterns.	Students create visual data displays to better analyze results.
Analyzing and interpreting data	Students compare scores across seats/rows, noticing trends or outliers.	**Grade 4 Physical Science: Electricity, Heat, and Motion** – Recognize patterns of motion and energy transfer. **Inquiry (Gr. 3–5)** – Analyze and interpret data.	Students evaluate whether seat position impacts performance, connecting to motion/energy.
Using mathematics & computational thinking	Students tally, average, and graph scores.	**Mathematical Application in Science (Gr. 3–5)** – Apply math skills in measurement, graphing, and computation.	Students apply averages, comparisons, and graphing to experimental data.
Engaging in argument from evidence	Students reflect on whether the ride/game is fair, using collected data as evidence.	**Scientific Inquiry & Application (Gr. 3–5)** – Use evidence to support claims and communicate conclusions.	Students construct explanations and critique fairness using their data.
Energy & motion connection	Students consider how positioning and aiming (energy transfer) impact results.	**Grade 4 Physical Science** – Energy transfer and motion; forces affect motion of objects.	Students see how aiming/energy input transfers into score outcomes, reinforcing force & motion concepts.

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: _____

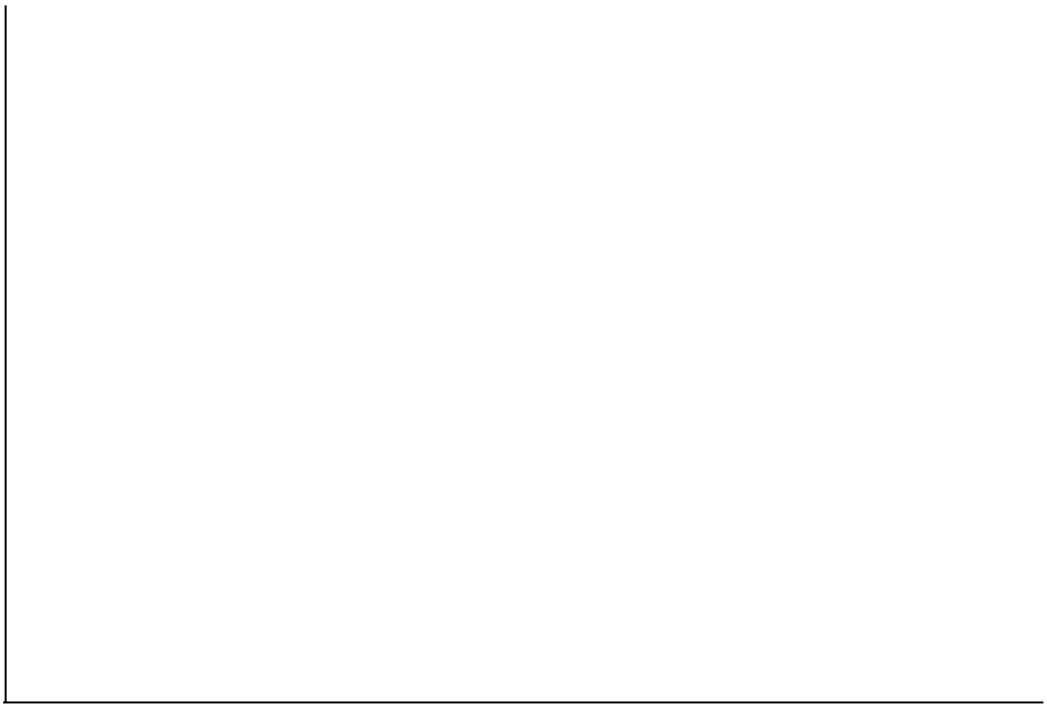
Data Investigation: Is the Game/Ride Fair?

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.

Ohio Aligned Learning Objectives

- Inquiry & Application Skills – Students plan, test, analyze, and communicate results.
- Forces & Motion Concepts – Students see how car design changes affect speed, direction, and energy.
- Energy Transfer & Materials – Students observe how energy and material properties impact performance.
- Engineering Design Cycle – Students define problems, test solutions, and refine their designs.
- Fair Testing & Data Skills – Students collect and represent race results in tables/graphs, using evidence to support claims.

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.

Ohio Learning Standards for Science

Activity Component	What Students Do	Aligned Ohio Standards (Grades 4–5)	Alignment Details
Scientific Inquiry & SEPs	Students collect race data, interpret results, and argue about fairness/design effectiveness.	**Science Inquiry & Application (Gr. 3–5)** – Conducting investigations, analyzing data, developing explanations, communicating results.	Students use inquiry skills to record data, compare results, and communicate conclusions.
Forces & Motion	Students race cars and compare how design features affect speed and performance.	**Grade 5 – Physical Science: Light, Sound & Motion** • Objects can change motion by speeding up, slowing down, or changing direction when acted upon by forces.	Students observe how changes in design (wheels, weight, balance) impact motion and race results.
Energy & Speed	Students explain why faster cars have more energy.	**Grade 4 – Physical Science: Electricity, Heat & Matter** • Energy can be transferred from one object or system to another.	Students connect car motion and speed with energy transfer concepts.
Properties of Materials	Students evaluate how materials (wheels, axles, body types) affect performance.	**Grade 5 – Physical Science: Conservation of Matter & Properties** • Objects and materials can be identified by their properties.	Students compare how design/material features influence speed.
Engineering Design & Problem Solving	Students identify the top 5 performance features and redesign their cars.	**Science & Engineering Practices (Gr. 3–5)** – Defining problems, designing solutions, testing, and refining.	Students apply the design cycle to improve their cars based on evidence from races.
Fair Testing Practices	Students race multiple times, change one variable at a time, and compare outcomes.	**Science Inquiry & Application (Gr. 3–5)** – Planning and conducting fair tests by controlling variables.	Students practice experimental design and reasoning about fairness.
Data Representation & Communication	Students use grids, charts, and visual models to explain results and communicate car design.	**Math Connections (Gr. 4–5 Data & Measurement)** – Represent, analyze, and interpret data using tables/graphs.	Students integrate math skills by organizing and interpreting data patterns.

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.