Homeschool Self-Guided Education Packet

TEACHER GUIDE

GRADES 4 - 5

STUDENT SHEETS INCLUDED

LEGO DISCOVERY CENTER

VISIT GUIDE: GRADE 4-5

Welcome to LEGO® Discovery Center

LEGO® 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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Georgia Standards of Excellence Alignment

Activity Component	What Students Do	GSE Standards (Grades 4–5)	Alignment Details
Exploration & Observation	Students explore MINILAND, identify buildings, and record observations.	**S4P1. Obtain, evaluate, and communicate information through observations.**	Students act as scientists, observing landmarks and urban systems to gather data.
Connect to Community	Students reflect on visited places, experiences, and community needs.	**S4E3. Obtain, evaluate, and communicate information about human interaction with Earth systems.**	Students link landmarks to **cultural, historical, and community significance**.
Build LEGO Models of Landmarks/Experiences	Students design LEGO models to represent real-world places and experiences.	**SEPS 3-5-ETS1-2: Develop and use models to explain phenomena or design solutions.**	Students create **physical models** to explain and communicate experiences and urban design.
Define & Solve Problems (Design Challenge)	Students analyze how landmarks serve communities, sketch designs, and brainstorm improvements.	**SEPS 3-5-ETS1-1: Define a design problem with criteria and constraints; 3-5-ETS1-2: Generate multiple solutions.**	Students practice the **engineering design cycle**, applying problem-solving and criteria-based evaluation.
Storytelling & Sequencing	Students retell personal stories about their city, sequencing events with drawings.	**ELA Integration – GSE Literacy in Science/Engineering 4-5**	Students use **literacy skills** to sequence events and communicate ideas effectively.
Communicate Information	Students write a paragraph explaining their design, story, and evaluation.	**SEPS 8: Obtaining, Evaluating, and Communicating Information.**	Students communicate conclusions and reasoning based on evidence.
Science, Engineering, and Society	Students consider how infrastructure and landmarks support people and resources.	**S4E3.5-ESS3-1: Explore how communities use science and engineering to solve problems and conserve resources.**	Students connect **science and engineering solutions** to societal 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: _____

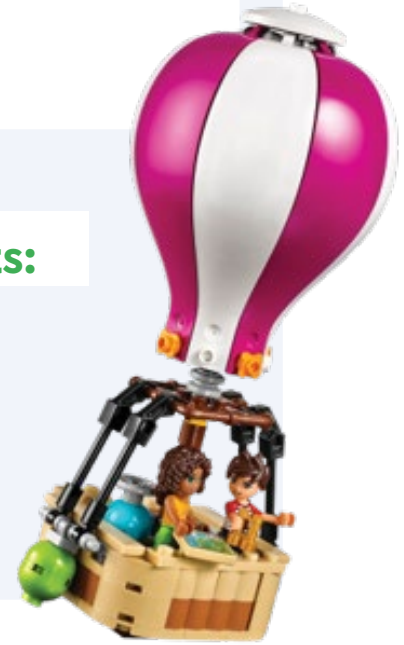
MINILAND: My Favorite Memory

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.

GSE Aligned Learning Objectives

The Kingdom Quest Ride Data Activity engages students in engineering and physical science practices through hands-on data collection and analysis. Students ride multiple times, controlling variables such as seat, row, and side, to explore how these factors influence their performance. They record, compare, and represent data in grids or charts, practicing quantitative reasoning and pattern recognition. By reflecting on the fairness of the ride/game and arguing from evidence, students develop critical thinking and reasoning skills. The activity also introduces connections to energy and motion, as students consider how positioning and aiming influence results. This aligns with Georgia Standards of Excellence for grades 4–5, combining engineering design, data analysis, and physical science concepts in a collaborative, interactive setting.

TEACHER GUIDE: GRADES 4-5

LEGO® Kingdom Quest

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Georgia Standards of Excellence Alignment

Activity Component	What Students Do	GSE Standards (Grades 4–5)	Alignment Details
Fair Testing with Controlled Variables	Students ride 4 times, changing one variable each time (seat, row, side) and compare results.	**SEPS 3-5-ETS1-3** – Plan and carry out fair tests with controlled variables.	Students learn to isolate variables to ensure fairness in testing, a core engineering practice.
Data Collection & Collaboration	Students record their own scores and gather peer scores.	**SEPS 1 & 3** – Obtain, evaluate, and communicate information; plan investigations.	Students expand their dataset and improve reliability by collaborating with peers.
Data Representation	Students organize scores in grids, tables, or charts.	**5-ESS1-2** – Represent data to identify patterns; **SEPS 4** – Analyze data.	Multiple visual representations help students identify trends or differences in performance.
Analyzing and Interpreting Data	Students compare scores across seats/rows, noticing trends, outliers, and patterns.	**SEPS 4** – Analyze and interpret data.	Students practice interpreting numerical data to make evidence-based conclusions.
Using Mathematics & Computational Thinking	Students tally, average, graph, and compare scores.	**GSE Math Standards** – Apply math to science (mean, tally, compare, graph).	Students apply math skills to represent data quantitatively and identify patterns.
Engaging in Argument from Evidence	Students reflect on whether the ride/game is fair, using collected data as evidence.	**SEPS 7** – Engage in argument from evidence.	Students justify claims about fairness based on evidence from their trials.
Energy & Motion Considerations	Students think about how aiming/shooting energy, positioning, and motion affect scores.	**4-PS3-4** – Apply scientific ideas to test and refine devices that convert energy from one form to another.	Students connect energy, motion, and outcomes, applying physical science concepts to real scenarios.

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: _____

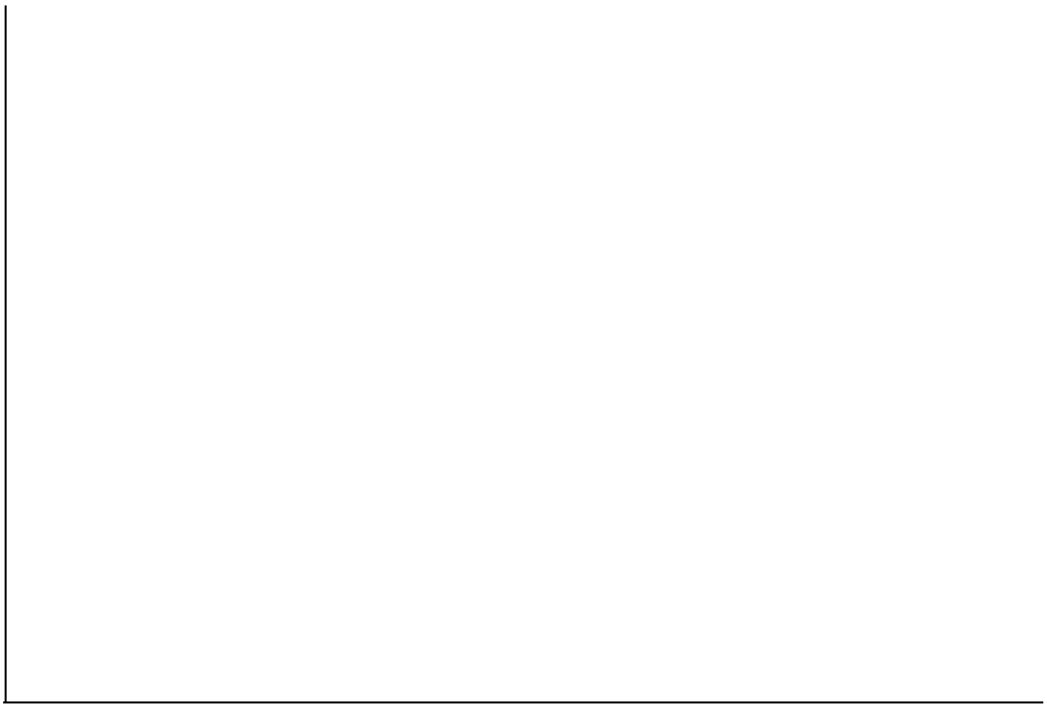
Data Investigation: Is the Game/Ride Fair?

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.

GSE Aligned Learning Objectives

In this LEGO Race Car Engineering Activity, students engage in hands-on engineering practices aligned with Georgia Standards for grades 4–5. They define design problems, build and test cars, and observe how design features and materials influence performance. Students conduct fair tests, changing one variable at a time, then collect and analyze data to identify patterns in which features improve speed. Using evidence from their observations, students select the top 5 design features, create visual representations of their optimized cars, and justify their choices. This activity combines engineering design, forces and materials concepts, fair testing, and data analysis, fostering critical thinking, problem-solving, and communication skills consistent with GSE standards

TEACHER GUIDE: GRADES 4-5

LEGO® Build & Test

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Georgia Standards of Excellence Alignment

Activity Component	What Students Do	GSE Standards (Grades 4–5)	Alignment Details
Engineering & Design Cycle	Students define a problem, test materials and design strategies, and build LEGO race cars.	**3-5-ETS1-1, 3-5-ETS1-2** – Define problems, plan and test solutions, and optimize designs.	Students practice designing and improving solutions based on constraints and criteria.
Fair Testing Practices	Students race cars, changing design features one at a time and comparing performance.	**3-5-ETS1-3** – Plan and carry out fair tests controlling variables.	Students isolate variables to understand the effect of individual design features.
Data Collection & Analysis	Students record race outcomes, tally which cars win, and note features contributing to success.	**SEPs: Analyzing & Interpreting Data; Using Math & Computational Thinking**	Students collect quantitative data, recognize patterns, and evaluate which design elements are most effective.
Materials & Forces	Students observe how car materials, weight, and shape affect speed and performance.	**4-PS3-1, 5-PS1-3** – Apply science ideas to test devices, measure energy transfer, and properties of materials.	Students connect physical science concepts to real-world performance outcomes.
Argument from Evidence	Students justify why certain features make cars faster and identify the top 5 features.	**SEPs: Engaging in Argument from Evidence**	Students use evidence from testing to support claims and decisions about car design.
Communication & Representation	Students create a visual design showing the top 5 most important features of their car.	**SEPs: Obtaining, Evaluating, and Communicating Information**	Students visually and verbally communicate design decisions, supported by data.

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.