Homeschool Self-Guided Education Packet

TEACHER GUIDE

LEGOLAND DISCOVERY CENTER

GRADES 4 - 5

STUDENT SHEETS INCLUDED

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.

Arizona Aligned Learning Objectives

- Arizona Curriculum emphasizes SEPs and Engineering Design, where students model, test, and communicate solutions while considering community needs and sustainability.
- This lesson integrate ELA skills (storytelling, sequencing, and writing) to strengthen communication in science.
- This activity bridges STEM + literacy by combining scientific practices, design thinking, and storytelling, giving students an authentic way to connect science to their own communities.

TEACHER GUIDE: GRADES 4-5

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Arizona Curriculum Standards Addressed

Activity Component	What Students Do	Arizona Standards (Grades 4–5)	Alignment Details
Exploration & Observation	Students explore MINILAND, identify buildings, and record observations.	**SEP 1: Asking Questions & Defining Problems SEP 3: Planning & Carrying Out Investigations**	Students act like scientists, observing and documenting local systems and structures.
Connect to Community	Students reflect on visited places, experiences, and community needs.	**5.E2U1.9** – Obtain, evaluate, and communicate information about how human societies use science to meet needs.	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.	**3-5.E2U1.8** – Develop and use models to explain phenomena or design solutions.	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.	**3-5.E2U1.6** – Define design problems with criteria/constraints, plan and test solutions.	Students engage in the engineering design process.
Storytelling & Sequencing	Students retell personal stories about their city, sequencing events with drawings.	**ELAR Integration** (Arizona English Language Arts Standards)	Writing/storytelling integrates with science and engineering through sequencing and explanation.
Communicate Information	Students write a paragraph explaining their design, story, and evaluation.	**SEP 8: Obtaining, Evaluating, and Communicating Information**	Students clearly communicate evidence-based reasoning.
Science, Engineering, and Society	Students consider how infrastructure supports people and resources.	**5.E2U1.9** – Analyze how human societies use science/engineering to manage resources.	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?

____

____

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**
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Sketch of My Idea

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

____

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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 WORKSHEET

LEGO® MINILAND

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.

NGSS-Aligned Learning Objectives

- Strengthening Science & Engineering Practices (SEPs) such as data collection, mathematical reasoning, and constructing evidence-based arguments.
- Reinforcing the Engineering Design Process (3-5.E2U1.6) through fair testing and controlled variables.
- Connecting to Physical Science (4.P2U1.3, 5.P2U1.4) by analyzing how energy and motion affect performance outcomes.
- Integrating data representation and analysis (5.E2U1.7) through grids, charts, and graphs.

TEACHER GUIDE: GRADES 4-5

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Arizona Curriculum Standards Addressed

Activity Component	What Students Do	Arizona Science Standards (Grades 4–5)	Alignment Details
Fair testing with controlled variables	Students ride 4 times, changing one variable (seat, side, row) each time.	**3-5.E2U1.6** – Plan and carry out fair tests in which variables are controlled and failure points are considered.	Students design a fair test by systematically changing one factor at a time while collecting comparable data.
Data collection & collaboration	Students record their scores and gather peer scores.	**SEP 3: Planning and Carrying Out Investigations SEP 4: Analyzing and Interpreting Data**	Students expand the dataset by pooling results with peers, improving the accuracy of their conclusions.
Data representation	Students organize results into grids, charts, or tables.	**SEP 5: Using Mathematics and Computational Thinking 5.E2U1.7** – Represent data in tables/graphs to identify patterns.	Students practice graphing and visualizing data to better spot patterns in ride scores.
Analyzing and interpreting data	Students compare scores across seats/rows, noticing trends or outliers.	**SEP 4: Analyzing & Interpreting Data 5.P2U1.4** – Interpret data to recognize patterns of motion and energy.	Students analyze whether seat/row positions affect game performance.
Using mathematics & computational thinking	Students tally, average, and graph results.	**SEP 5: Using Mathematics and Computational Thinking**	Students strengthen math-science connections by calculating averages, graphing outcomes, and comparing results.
Engaging in argument from evidence	Students reflect on whether the ride/game is fair, using collected data as evidence.	**SEP 7: Engaging in Argument from Evidence**	Students use claims, evidence, and reasoning to argue about fairness and test validity.
Energy & motion connection	Students consider how seat position and aiming (energy transfer) affect scores.	**4.P2U1.3** – Develop and use models to explain energy transfer and its effects on motion.	Students see how input energy (aiming/shooting) transfers into measurable outcomes (score).

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):

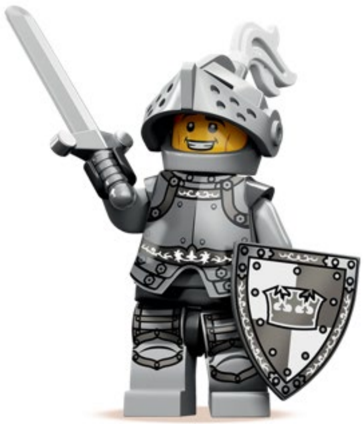
____

Part 2 – Collecting Our Data

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

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)?

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

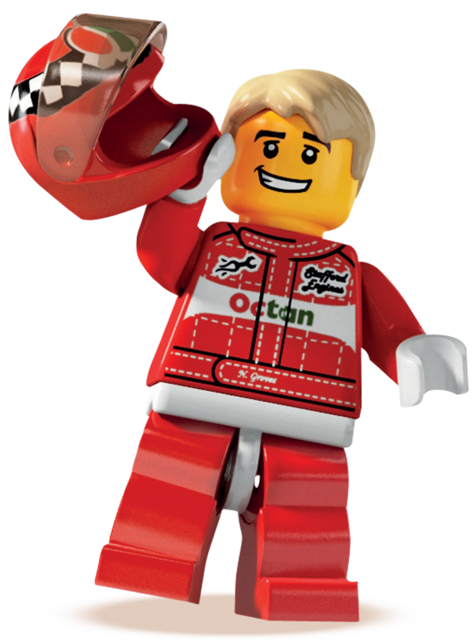
Students must build cars and race them against other students' builds. Students need to observe which cars win the race and critically consider what design features are more prominent in the winning cars. They are then asked to tick which features listed on their worksheet help the cars go faster.

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.

Arizona Aligned Learning Objectives

- Reinforcing Science & Engineering Practices (SEPs) through data collection, mathematical reasoning, and evidence-based communication.
- Addressing Forces & Motion concepts (4.P2U1.3) by connecting speed and energy to design features.
- Practicing the Engineering Design Cycle (3–5.E1U1.4, 3–5.E2U1.5, 3–5.E2U1.6): defining the design problem, generating and testing solutions, refining based on data.
- Strengthening fair testing and data representation skills, ensuring investigations are systematic and replicable.



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.

Arizona Curriculum Standards Addressed

Activity Component	What Students Do	Arizona Science Standards (4th–5th Grade)	Alignment Details
Science & Engineering Practices (SEPs)	Collect race data, interpret patterns, argue about fairness/design.	**SEP 4, 5, 6, 7** – Analyzing & Interpreting Data; Using Mathematics & Computational Thinking; Constructing Explanations; Engaging in Argument from Evidence.	Students collect data, calculate averages, and use evidence to support claims about car performance.
Forces & Motion / Energy	Observe which cars are faster/slower, connect speed to energy and force.	**4.P2U1.3** – Develop and use models to explain that energy can be transferred and that it affects motion. **5.P1U1.1** – Plan and carry out investigations to describe and classify materials by their properties.	Students see how force (push at start) and car design (wheels, weight) impact motion and speed.
Engineering Design Cycle	Define the problem (fastest car), brainstorm features, test, improve design.	**3-5.E1U1.4** – Define design problems, specify criteria/constraints, generate solutions. **3-5.E2U1.5** – Test and refine prototypes.	Students iterate car designs, balancing creativity with engineering constraints.
Fair Testing Practices	Control variables (same ramp, track, test conditions) while changing design features.	**3-5.E2U1.6** – Plan and carry out fair tests in which variables are controlled and failure points considered.	Students experience controlled testing by racing under the same conditions.
Data Representation & Communication	Record results in tables/charts, tick which features lead to faster cars, design visual models.	**SEP 8: Obtaining, Evaluating, and Communicating Information**	Students visually communicate their conclusions in a final car design diagram.

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. ____________________
2. ____________________
3. ____________________
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					

Learn And Build

STUDENT WORKSHEET

LEGO® Build & Test

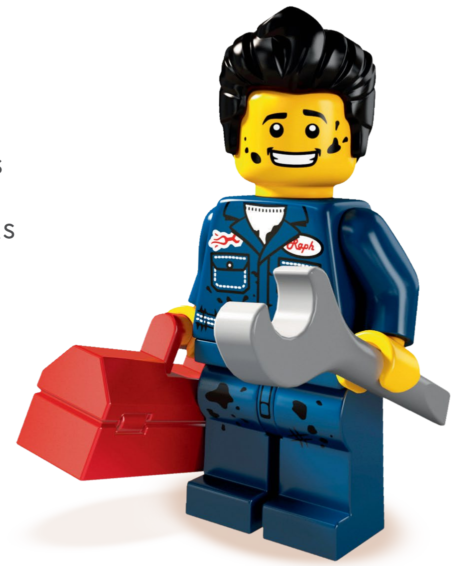
Student Name: ____________________

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.