Homeschool Self-Guided Education Packet

TEACHER GUIDE

GRADES 2 – 3

STUDENT SHEETS INCLUDED

LEGO DISCOVERY CENTER

VISIT GUIDE: GRADE 2-3

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:

MINI WORLD
Marvel at LEGO® landmarks while learning about geography.

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 2-3

LEGO® MINI WORLD

Explore and play in an updated fantastical world of awesome LEGO builds! Made with over 1.5 million LEGO bricks, planes fly over the tallest towers, day turns to night and some local landmarks creep into the skyline too. Can you recognize them?

Challenge

Students are challenged to explore MINI WORLD and identify historic or notable city landmarks, and look for activities located in specific locations, such as sports and transportation. They are asked to find these key items and locations:

- **Find a sports game** – Answer: Baseball at Fenway Park
- **Find a bridge -** Answer: Leonard P. Zakim Bunker Hill Memorial Bridge
- **Find a river**- Answer: Charles River
- **Find a pond** – Answer: The Swan Pond
- A marketplace – Quincy Market and Fanueil Hall
- **A place of government:** Massachusetts State House, The Old State House
- **Find a sculpture** – Answer: George Washington Statue at Boston Common
- **Find a scene from Boston's early history** – Answer: The Boston Tea Party or USS Constitution
- **Find an iconic building** – Answer: The Prudential, The John Hancock Tower, 111 Huntington

Post Challenge

Students are asked to put each landmark in the correct group (i.e. Natural or Human-made) and tell you why it's important. Then they are tasked to select 5 landmarks to include in their dream version of MINI WORLD and draw them, before finally thinking and reflecting on how landmarks represent culture, history or community needs.

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MA STE Framework Curriculum Alignment

Activity Component	What Students Do	MA STE Standards (Grades 2–3)	Alignment Details
Exploration of Landmarks	Students explore MINI WORLD to locate sports arenas, bridges, rivers, marketplaces, and historic buildings.	**2-ESS2-2** – Obtain information to identify where water is found on Earth and that it can be solid or liquid. **2-ESS2-3** – Identify and compare land and water features.	Students recognize natural features (river, pond) and human-made structures (bridge, marketplace, buildings).
Classification (Natural vs. Human-made)	Students sort landmarks into groups: natural or human-made.	**2-ETS1-1** – Ask questions, make observations, and gather information to define a problem. **3-5-ETS1-2 (intro at grade 3)** – Develop a simple sketch/model to represent ideas.	Students practice distinguishing types of features and their roles in society.
Cultural & Historical Connections	Students reflect on why landmarks are important (e.g., government, history, culture, sports).	**3-ESS3-1** – Use evidence to support a claim about how humans use resources or protect environments.	Students connect landmarks to community needs, history, and cultural significance.
Design Challenge – Dream MINI WORLD	Students select 5 landmarks and draw them in their own "dream city."	**2-ETS1-2** – Develop a simple sketch or drawing to represent a solution.	Drawing models shows design thinking and creative problem-solving.
Reflection & Communication	Students explain why landmarks matter for culture, history, or community needs.	**Science & Engineering Practices (SEPs)** – Communicating Information; Constructing Explanations.	Students articulate their reasoning and share conclusions about landmarks and their roles.

Student Name: _____

Designing MINI WORLD: Natural vs. Human-Made Landmarks

Part 1 – Landmark Scavenger Hunt

What can you see in MINI WORLD? (Check the boxes)

Famous Place or Landmark	For Extra Points: Name the famous place or landmark
☐ A sports game	.....
☐ A bridge and river	.....
☐ A place of government	.....
☐ A sculpture	.....
☐ A scene from Boston's early history	.....
☐ A famous building	.....
☐ A marketplace	.....

Part 2 – Landmark Sorting

Landmark	What Type? (Circle One)	Why Is It Important?
	Natural Human-made	
	Natural Human-made	
	Natural Human-made	
	Natural Human-made	
	Natural Human-made	
	Natural Human-made	
	Natural Human-made	

Student Name: _____

Design Your Own Dream MINI WORLD

Part 3 – Design & Modeling

If you had to build a MINI WORLD of your own out of LEGO® bricks, what are the top 5 landmarks you would include?

Part 4 – Reflection

- What makes a landmark special to people?
- How does your dream MINI WORLD show different people and cultures?
- Why do cities build landmarks?

TEACHER GUIDE: GRADES 2-3

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.

MA STE Framework Learning Objectives

- **Plan and conduct investigations** by predicting outcomes, testing different seat and row variables, and recording results.
- **Collect and organize data** from multiple trials, including peer comparisons, to identify trends.
- **Represent data in multiple ways** such as tables, grids, and graphs to support mathematical reasoning.
- **Analyze results and construct evidence-based arguments** about which conditions affected scores and whether the ride was "fair."
- **Recognize patterns in data** to connect observations with predictions and refine their reasoning.

TEACHER GUIDE: GRADES 2-3

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MA STE Framework Curriculum Alignment

Activity Component	What Students Do	MA STE Standard	Alignment Explanation
Planning Investigations	Students predict outcomes, plan how to test seat location/row variables, and record their plan on the worksheet.	**2-PS1-1** – Plan and conduct an investigation to describe and classify materials by their observable properties.	Students practice planning and carrying out an investigation, treating seats/rows as "conditions" to test and compare.
Testing Seat & Row Variables	Students ride multiple times, changing seat position (right vs. left) and row (front vs. back).	**3-5-ETS1-3** – Plan and carry out fair tests in which variables are controlled.	Students vary only one condition at a time (seat or row) to determine its effect on scores, modeling fair testing.
Collecting & Organizing Data	Students record scores after each ride, ask peers for their scores, and compile data into tables or grids.	**2-PS1-2** – Analyze data from tests of objects to determine which materials are best suited for an intended purpose.	While not about "materials," students are analyzing which conditions (seat, row) yield the best results — applying the same skill of comparing data to determine best fit.
Data Representation & Math Challenge	Students graph scores, calculate averages, compare high/low scores, and answer math-based questions.	**3-PS2-2** – Make observations/measurements of an object's motion to provide evidence of patterns.	Students use data trends (scores by seat/row) to find patterns and make evidence-based claims.
Analyzing Outcomes	Students evaluate whether predictions matched results and reflect on patterns (e.g., "Did changing rows make a difference?").	**2-PS1-4** – Construct an argument with evidence that some changes caused to materials can be reversible.	Students construct arguments using evidence — e.g., "Scores were higher in Row A than Row B" — showing reasoning about conditions and outcomes.
Fairness Reflection	Students discuss whether the game is "fair" based on data collected from different seats/rows.	**Science & Engineering Practices: Engaging in Argument from Evidence**	Students use evidence from data tables and averages to argue whether differences are due to chance or design, applying SEP reasoning.

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:

I think the _____ (seat/side/row) will get the highest score

because _____

Plan Your Test:

- What will you change? (seat, side, row):

_____

- What will you keep the same?:

_____

- What will you measure?:

_____

Part 2 – Collecting Our Data

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

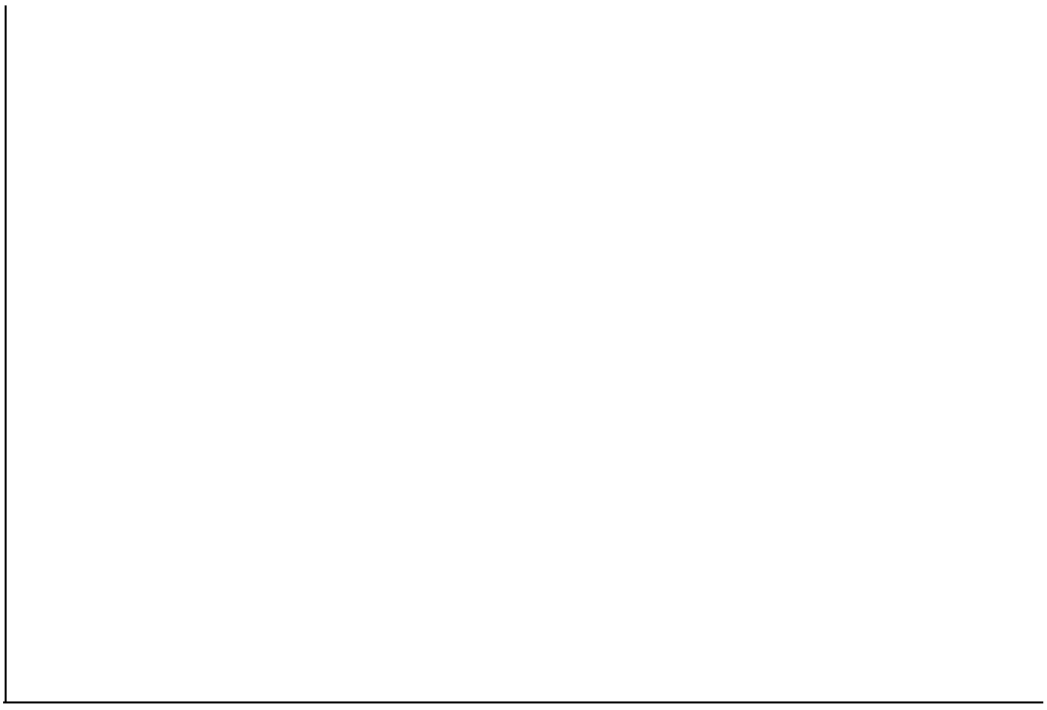
Data Investigation: Is the Game/Ride Fair?

Part 3 – Data Representation & Analysis

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. Label your axes **"Ride #"** and **"Scores."**

Step 2- Math Challenge:

- Which ride had the highest average?
- Which seat/side/row gave the lowest score?
- Did changing sides or rows make a difference?



Data Investigation: Is the Game/Ride Fair?

Part 4 – Evidence & Explanation

1. Was the game/ride fair? Why or why not? Use your data to explain your answer

_____

_____

2. If you could redesign the game to make it fairer, what would you change?

_____

_____

3. How would you test your idea?

_____

_____

Part 5 – Reflection & NGSS Connections

- Analyzing Data: What patterns did you notice in your data?
- Did your prediction match your results? Why or why not?
- What did you learn about how changing variables (seat, side, row) can affect outcomes?

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

_____

_____

TEACHER GUIDE: GRADES 2-3

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.

MA STE Framework Learning Objectives

- **Plan and conduct investigations** by predicting which design features will make cars go faster, building models, and racing them.
- **Collect and organize data** from multiple trials to compare performance across different car designs.
- **Represent data** on structured worksheets to support reasoning about cause and effect.
- **Analyze results and construct evidence-based arguments** about which design features contribute to faster cars.
- **Recognize patterns** in race outcomes to refine their understanding of structure and function in engineering design.

TEACHER GUIDE: GRADES 2-3

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.

MA STE Framework Curriculum Alignment

Activity Component	What Students Do	MA STE Standard	Alignment Explanation
Prediction	Students predict which features will make their car go faster and record their ideas.	*2-ETS1-1*: Ask questions, make observations, and gather information about a situation people want to change.	Making predictions requires students to ask questions and consider possible solutions before testing, aligning with defining problems in engineering design.
Building Cars	Students design and build a model race car with selected features (e.g., wheels, axles, body design).	*2-ETS1-2*: Develop a simple sketch, drawing, or physical model to illustrate how an object solves a problem.	Constructing a car is developing a model to solve the design challenge (make a fast car).
Testing/Racing	Students race their cars on the same track, comparing results between designs.	*2-ETS1-3*: Analyze data from tests of two objects designed to solve the same problem to compare strengths and weaknesses.	Racing cars is a fair test that generates data to compare performance of different design features.
Recording Results	Students use a worksheet to log race outcomes and features of cars.	*Science & Engineering Practice*: Analyzing and interpreting data.	Students collect data systematically, building evidence for which design features correlate with speed.
Finding Patterns	Students examine their data to see which features are common in the fastest cars.	*Crosscutting Concept*: Patterns.	Students recognize patterns (e.g., larger wheels, straighter axles) in winning cars and connect them to performance.
Selecting Top Features	Students identify the five most important design features that make a car go faster.	*2-ETS1-3*: Analyze data to identify best design features.	Students use evidence to evaluate competing designs and choose optimal features, mirroring engineering analysis.
Visual Redesign (Drawing)	Students sketch a new car design that includes the top five features.	*2-ETS1-2*: Develop a drawing/model to illustrate how an object solves a problem.	Creating a visual design is developing and using models to communicate solutions.
Reflection/Iteration *(if extended)*	Students compare predictions with results and consider how to improve their car further.	*2-ETS1-3* and Science & Engineering Practices: Constructing explanations and designing solutions.	Reflecting on evidence and refining a design is the iterative process emphasized in engineering standards.

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 – Prediction

Question: Which features do you think will make the fastest car?

- ☐ 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

Part 2 – 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.

READY, SET GO!

Part 3 – 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 4 – Finding Patterns

Question: Which patterns do you see? Which features helped cars go faster?

Part 5 – Top 5 Features

List the 5 most important features for making a fast car.

1. _____ 3. _____

2. _____ 4. _____

5. _____

Part 6 – Design Your Car

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