HOMESCHOOL DAYS

LEGOLAND® California
Self-Guided Education Program
Resource Guide

Table of Contents

Welcome to LEGOLAND California!

Education Programs
Education programs have been created by LEGOLAND Education Department. “Dig Those Dinos” has been reviewed for content accuracy by the San Diego Natural History Museum, and Mission Mars has been created with the cooperation of the Planetary Society.

Included in this guide are six unique educational programs, tailored for families in Homeschooling groups, with In-Park activities and curriculum that supports California Content Standards. Use this guide to enhance the educational value of your visit, and enjoy over 50 interactive rides and attractions. Activities subject to availability.

Directions LEGOLAND is located in Carlsbad, 30 minutes north of San Diego and one hour south of Anaheim. From Interstate 5, exit Cannon Road East and turn RIGHT on LEGOLAND Drive.

Arrival and Entry Self-Guided Homeschool Day guests may enter at 10:00 a.m. when the Park opens. You’re the guide!

Lunches School groups may bring lunches in disposable containers and use self-storage bins. Lunches may also be purchased at LEGOLAND restaurants.

Safety LEGOLAND Parks are built to the highest standards of quality and safety. Height restrictions apply on selected attractions throughout the park.

DIG THOSE DINOS

Ages 5+

Educational Objectives

- Learn paleontology vocabulary.
- Identify dinosaurs by name and physical characteristics.
- Dig for simulated fossils with trowels and brushes.
- Use posted information to learn about prehistoric life.

Background Information

A **paleontologist** is a scientist who studies ancient plants and animals, and the layers of rock where remains of ancient plants and animals are found. They try to find out where and when ancient plants and animals lived.
Fossils are the remains or traces of prehistoric animals and plants that lived over 10,000 years ago.
Fossils are formed in many ways. Some fossils hardly change at all, like mammoths frozen in the Arctic tundra. Other fossils are hard and mineralized, like petrified wood. After millions of years, bones and teeth of dead animals are buried underground and there is much pressure from layers of dirt and rock over them. The great pressure causes the bones to mineralize.

Hands-On Activities at Dino Island

Our First Discovery: Dino Footprints!

1. Name the dinosaur and describe the shape and size of each footprint.
2. How is the Velociraptor's footprint different? How would this type of foot help him survive?
3. Which dinosaur weighed the most? Why do you think so?

Fossil Station

1. Look at the T-rex tooth. Do you think T-rex ate meat or plants? Why?
2. Look at the T-rex claw. How do you think T-rex used its claws?
3. Scientists now think T-rex was a scavenger, not a ferocious hunter. Why do they think this?

Dig Site

1. Read display boards and dig for buried "fossils." Remember, paleontologists work together to find fossils.
3. Fossils and LEGOLAND trowels and brushes will be collected at the end of the class.
4. After your visit: Draw and describe the fossil you found. Tell something you learned about dinosaur life.

California Content Standards for Science

Kindergarten: Life Sciences and Investigation and Experimentation
2a. Students know how to observe and describe similarities and differences in the appearance...of ...animals.
2b. Students know stories sometimes give plants and animals attributes they do not really have.
2c. Students know how to identify major structures of ...animals.
4a. Observe common objects by using the five senses.
4e. Communicate observations orally and through drawings.
Grade One: Life Sciences and Investigation and Experimentation
2a. Students know different plants and animals...have external features that help them thrive....
2c. Students know animals eat plants or other animals for food....
4b. Record observations and data with pictures, numbers, or written statements.
Grade Two: Earth Sciences
3d. Students know that fossils provide evidence about the plants and animals that lived long ago and that scientists learn about the past history of Earth by studying fossils.
Grade Three: Life Sciences and Investigation and Experimentation
3a. Students know...animals have structures that serve different functions.... 3e. Students know that some kinds of organisms that once lived...have completely disappeared....5b. Differentiate evidence from opinion and know that scientists do not rely on claims or conclusions unless backed by observations....

GET MOVING!

Ages 6+

Educational Objectives

- Learn about forces, such as gravity, friction, and inertia.
- Build a vehicle.
- Explore how forces cause movement and change speed.
- Relate Hands-On activities to the experience of LEGOLAND attractions.

Background Information

What forces act on a car going down a slope?

Gravity constantly pulls all things toward the center of the earth. TECHNIC® Coaster is gravity-powered. **Wind resistance** pushes the riders' hair backwards. Cars that are low and sleek face less wind resistance. **Weight** can affect a car's speed. In theory, a heavy and lightweight object released at the same time from the same point on a ramp should reach the bottom at the same time. In reality, a light object often travels faster, but not as far. A heavy object often travels slower, but farther. This is due to different amounts of friction in the wheels and axles.

Friction is the amount of surface contact between a car and the slope: Less friction, faster car.

How do we reduce friction to make a car go faster?

- **Change the slope's surface.** The smoother the surface, the faster the car.
- **Change the slope's angle**. The steeper the slope, the faster the car.
- **Change the tires**. Usually the car will go faster with narrow and smooth tires.

Hands-On Activities at Build & Test

Plan Your Design: Think about forces. What design might make the fastest car?
Build and Test your car on the speed ramp. Redesign and test until you are ready to race.
Race on the Maniac Midway! Which car went the fastest? Look at its design. Why was it the fastest?

California Content Standards

Grade Two Science: Physical Sciences and Science: Investigation and Experimentation

1. The motion of objects can be observed and measured...Students know:
   a. The position of an object can be described by locating it relative to another object or the background.
   b. Objects near the Earth fall to the ground unless something holds them up.

4a. Students will make predictions based on patterns of observation rather than random guessing.

Grade Three Science: Investigation and Experimentation;

5a. Students will repeat observations to improve accuracy, and know that the results of similar scientific investigations seldom turn out exactly the same because of differences in things being investigated, methods, or areas of uncertainty in the observation.

5e. Students will predict the outcome of a simple investigation, and compare the result with the prediction.

Grade Three Math: Measurement and Geometry

2.4 Combine and take apart three-dimensional objects to construct new 3D objects.

Grade Three Math: Problem Solving and Mathematical Reasoning

1.1 Students analyze problems by...discriminating relevant from irrelevant information...and observing patterns.
2.1 Students predict outcomes and make reasonable estimates.
3.3 Students make connections between the solution and other mathematical solutions, concepts, other school subjects, and the real world.

Grade FourScience: Investigation and Experimentation

6c. Students will formulate predictions based on cause and effect relationships.
6d. Students will conduct multiple trials to test a prediction draw conclusions about the relationships between predictions and results.

BUILDING AMERICA

Ages 6+

Educational Objectives

- Learn about national landmarks, monuments, and symbols.
- Compare California regions in urban and rural settings.
- Spark students' interest to find out more about featured regions.

National Landmarks: Miniland

Matching. **Underline** the name when you find Miniland model.

1. Marine Corps War Memorial _____ Honors the US president who wrote the Declaration of Independence.

2. Jefferson Memorial _____ Honors the US president who kept the country united during the Civil War and signed the Emancipation Proclamation to end slavery in America.

3. Lincoln Memorial _____This World War II memorial shows US troops raising the flag at Iwo Jima.

4. Washington Monument _____Received its name when white paint covered fire damage after the War of 1812. Every president except George Washington has lived here.

5. United States Capitol _____Honors America's 1st president, a heroic Revolutionary War general.

6. The White House _____This building is where Congress meets to make laws of the United States.

California Regions: Miniland .

Rural Ferndale The first Ferndale settlers were _____immigrants. Ferndale's major industry, then and now, is _____, Find a lumber mill.___ Find people having fun at a rodeo. ____.

Urban San Francisco The _____ crosses the strait between the Pacific Ocean and San Francisco Bay. Find people having fun on Pier 39____. A Scottish immigrant, Andrew Hallidie, invented the _____to carry heavy loads up steep streets. One of San Francisco's oldest districts is _____.

So. California Find miniature orange groves.____. Scientists look at stars through the telescope of _____ in Los Angeles. Find people having fun along the coast_____ Find the Mission and dwarf olive trees_____.

California Content Standards: History/Social Science

Kindergarten Compare and contrast locations of people, places, and environments and describe their characteristics.
Grade One Describe how physical environment affect...transportation, and recreation. Identify American symbols and landmarks....
Grade Two Compare and contrast basic land use in urban, suburban, and rural environments in California.
Grade Three Identify geographical features in their local region, trace ways people have used the resources of the local region. Know the histories of important local and national landmarks, symbols....
Grade Four Demonstrate understanding of the physical and human geographic features that define CA regions. Describe how communities in California vary in land use, population density, architecture,...and transportation.

AMAZING MACHINES

Ages 8+

Educational Objectives

- Learn about simple machines, such as gears, levers, and pulleys.
- Experience and explore how simple machines work.
- Relate the activities to the experience of LEGOLAND attractions.

Background Information

Have you ever used a shovel in the sand? Have you ridden a bicycle? Have you seen a flag raised on a flagpole? If so, then you have seen three simple machines at work—levers, gears, and pulleys!

Levers move diagonally. When we use the lever's power we can lift heavy objects easily. A crane is a lever. A screwdriver can be used as a lever to open a paint can.

Gears are wheels with teeth around the edge. They mesh with other gears to cause circular movement. Gears can be used to change speed, as on a bicycle. Gears can also change the direction of movement.

Gearing up is when a large gear drives a small gear and makes the small gear go faster.

Gearing down is when a small gear drives a large gear and makes the large gear go slower.

Pulleys are smooth wheels with a groove around the wheel, like those on a flagpole. A cable or belt fits into the groove of the pulley wheel. Two pulleys can be connected by the belt, and one pulley turns the other. Pulleys, like gears, cause faster or slower movement when the size of the pulley wheels are changed. Using a pulley helps lift or move things more easily, and reduces friction. Window blinds and tow trucks use pulleys.

Hands On Activities at Maniac Challenge

Build a Motorized Model

At the Maniac Challenge desk, check out and build Windy Windmill, a motorized model that uses gears and pulleys. Make sure the gears mesh and the pulley belts are in the groove of the pulley wheels. When the model is built, attach a battery pack to the motor and see the windmill run!

Find simple machines in rides at LEGOLAND! Remember:

Gears are wheels with teeth. They mesh with other gears to cause movement in a circle.

Levers move diagonally to help lift heavy objects more easily.

Pulleys use a belt or cable to help move things more easily.

California Curriculum Standards

Grade Three: Math: Measurement and Geometry

2.4 Students combine and take apart three dimensional objects to construct new three dimensional objects.

Grades Three, Four, Five, and Six:

Math: Problem Solving and Mathematical Reasoning

1.1 Students analyze problems by identifying relationships, discriminating relevant from irrelevant information, sequencing and prioritizing, and observing patterns.

2.1 Students predict outcomes and make reasonable estimates.

3.3 Students make connections between the solution and other mathematical solutions, concepts, other school subjects, and the real world.

ROBOSPORTS and MISSION MARS

Ages 9+

Educational Objectives

- Discover what makes up a robot.
- Plan a strategy and program a robot to accomplish a robotic mission.
- Predict how different strategies affect a robot's performance.
- Learn to use light and touch sensors.

Background Information

Have you ever seen a robot? Robots are everywhere! Common robots include garage door openers, ATM's and cell phones. All robots have three elements:

- **Body**: A physical body--usually does not look human.
- **Program**: Tells the robot what to do in certain situations.
- **Behavior**: A robot takes action. When an ATM reads a card and takes keypad input, it knows how much cash to dispense, and which account to debit. The ATM can do this task over and over without human help.

What is NOT a robot? Clocks and wind-up toys are not robots. They do not have a program that tells them what to do in certain situations. They just move mechanically until they run out of power.

What are sensors? Sensors "see" and "feel" for the robot. Sensors send information so the robot can respond with action. For example, an air conditioning system's temperature sensor "feels" heat. The robot's program tells it to turn on the air conditioning, and to turn off when a cooler temperature has been reached.

Hands-On Activities at MINDSTORMS

Walk-up, Sign-Up. The attractions run hourly, based on availability, and are led by LEGOLAND staff.

Robosports Activity

1. Learn robot body parts: A tiny computer "brain," an infrared window "ear" that takes in information, a light sensor that can "see," and attachment "arms" to get balls in the goal.
2. Click and drag commands, download, and send your robot to score goals!
3. Did your robot score? Now try to score using a different strategy.

Mission Mars Activity

1. Learn roboto body parts, and how the robot counts and follows lines.
2. Choose Cyclo-Bot, Brain-Bot, or Nose-Bot to complete each mission.
3. Click and drag commands, download programs, and send your robot to "Mars"!
4. Bring on Bumper-Bot for the surprise mission!

California Content Standards

Grade Three Science: Investigation and Experimentation

5a. Students repeat observations to improve accuracy; know that results of similar scientific investigations seldom turn out exactly the same because of differences in things being investigated, methods used, or observation.

5d. Predict the outcome of a simple investigation and compare the result with the prediction.

Grade Four Science: Investigation and Experimentation

6c. Formulate and justify predictions based on cause-and-effect relationships.

6d. Conduct multiple trials to test a prediction and draw conclusions about relationships between predictions/results.

6f. Follow a set of written instructions for a scientific investigation.

Grade Five Science: Investigation and Experimentation

6b. Develop a testable question.

6c. Plan and conduct a simple investigation based on a student-developed question....

6f. Select appropriate tools... to make quantitative observations.

Grade Six Science: Investigation and Experimentation

7a. Develop a hypothesis.

7b. Select and use appropriate tools and technology...to perform tests, collect data, and display data.