

ABOUT THIS FIELD TRIP



More than Just a Field Trip

This Field Trip is designed to give the teacher a complete science experience for students. There are 3 sections to this Field Trip. We encourage you to participate in all 3 sections and try out the provided videos and activities to give your students the most enriching and educational experience.



CLASSROOM CURRICULUM: VIDEOS & ACTIVITIES

- Introduce science concepts
- Expose students to scientific terms
- Encourage curiosity and motivate learning

GUIDED BY CUBE STAFF: ATTEND THE FIELD TRIP

- Connect science learned to real-world problems
- Interactive hands-on play and problem solving
- Data collection sheet provided as part of the experience

CLASSROOM CURRICULUM: VIDEOS & ACTIVITIES

- Inspire students to apply their knowledge
- Check for student understanding
- Reinforce concepts through repetition





Field Trip Content

Visit <u>this link</u> to access your Field Trip portal. Here you will learn all about your Field Trip and have access to videos and activities for your students. Your Field Trip portal will guide you along the way with an easy to use Timeline.





FIELD TRIP VIDEO - AFTER BOOKING, AND BEFORE VISITING

Share this special video in the classroom. It introduces science concepts, exposes your students to scientific terminology, and provides a preview of the exciting Field Trip ahead. You may choose from two options to host your

video, and both deliver the same rich, educational experience you want for your students.



LOGISTICS AND PLANNING

For Orange County ONLY: You can choose to order food from our onsite food vendor, Bean Sprouts (phone: 657-247-5880).

For Orange County and Los Angeles: Make sure to sign up your chaperones. Review your arrival and parking plan. Preview the special activity your students will complete using a data collection sheet as part of this experience.





OPTIONAL CONTENT

Optional content is provided so that you, the teacher, can create a weeksworth of science learning from this Field Trip experience. Both before and after this Field Trip, we provide you with hands-on activities with easy to find

supplies, step-by-step instructions, and interactive videos that will be sure to capture your students' attention.



FIELD TRIP VIDEOS - AFTER VISITING

Complete the World of Motion Field Trip with a short video that checks for your students' understanding of the science and engineering topics covered during the field trip experience. Assessment is built right into the fun dialogue and

your students will not even realize how much they are learning.

Celebrate Achievements: if you completed the pre-field trip video, you will be provided with special badges to distriubte to your students at the completion of their post Field Trip experience.



Next Generation Science Standards

The World of Motion Field Trip correlates with these Next Generation Science Standards:

3-PS2-1: Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

3-PS2-2: Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

3-5-ETS1-2: Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3: Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

4-PS3-1: Use evidence to construct an explanation relating the speed of an object to the energy of that object.

4-PS3-3: Ask questions and predict outcomes about the changes in energy that occur when objects collide.

4-PS3-4: Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.

5-PS2-1: Support an argument that the gravitational force exerted by Earth on objects is directed down.



World of Motion

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Physical Science

PS1: Matter and Its Interactions**PS2:** Motion and Stability: Forces and Interactions**PS3:** Energy

Engineering Design

ETS1.A: Defining and Delimiting Engineering Problems

- **ETS1.B:** Developing Possible Solutions
- **ETS1.C:** Optimizing the Design Solution



Vocabulary

Aerodynamics - The way air (or gas) moves over, around, and past things.

Air Resistance - The force of friction that air exerts on a moving object; causes drag; an example of fluid friction.

Axle - A bar or rod attached to a wheel or set of wheels; allows the wheels to spin or rotate.

Balanced Force - When the size of two forces are equal; results in no movement.

Car Body - The part of the car that stores passengers or luggage; the body of the car is not essential for the car to operate, but the design of the body (height and shape) can impact the car's performance due aerodynamics, or how air flows around the body; mounted on the chassis.

Chassis - The main support structure (or "skeleton") for the car; usually runs horizontal to the ground; all major parts of the car are attached to the chassis.

Clearance - The distance between the bottom of the car's body or chassis and the top of the road or track.

Cylinder - The chamber in an internal combustion engine where fuel is consumed (burned); stored (potential) energy from the fuel is converted into kinetic energy (movement) by spinning the drive shaft.

Drag - A force that slows the movement of an object (resistance), caused by fluid friction.

Drive Shaft - The part of a car that transfers the energy from the engine to the wheels so the car will move.

Endurance - How well a car and driver are able to handle to impacts of a long race at high speeds.

Energy - The ability to work; how things change and move.

Engine - In an internal combustion car, the engine is where energy is converted from stored (potential) energy (the fuel) to kinetic energy (movement); electric vehicles do not have engines.

Engineering - The act of designing and building practical machines, systems, or structures.



World of Motion

Fluid Friction - Friction created by an object moving through a fluid, such as air or water; air resistance is an example of fluid friction.

Force - A push or a pull that is needed to make an object move, to stop a moving object, or to cause an object to change direction.

Friction - A force that occurs when two surfaces rub against each other.

Fuel - A substance that is used to provide heat or power; often gasoline for internal combustion engines or electricity for electric cars.

Gasoline - A liquid that is burned inside an internal combustion engine to give the car energy to move; often called "gas".

Gravity - The force that pulls two objects toward each other; on Earth gravity pulls objects down toward the ground.

Grip - When the friction between two objects makes the objects "stick" to each other; the reason tires have treads – more traction (reduces changes of slip and slide).

Handling - How well a car responds when it turns; cars with better handling can go around corners or turns at higher rates of speed while still keeping control over the vehicle.

Kinetic Energy - The energy of movement or motion; active energy.

Load - An object being moved; in a car the load is the driver, passengers, and luggage.

Potential Energy - The stored energy of an object at rest (not moving or doing work).

Power - The rate at which an object does work (for cars, this is often called "horsepower"); more power usually means better acceleration and a higher top speed.

Rolling Friction - Friction that occurs when a round surface (such as a ball or wheel) rolls over a surface (such as a street).

Simple Machine - A tool that has few or no moving parts and makes work easier; work by changing the direction of a force or the amount of force needed to do something (wheel and axle, inclined plane, lever, pulley, wedge, screw).

Sliding Friction - Friction that occurs when two solid surfaces slide over each other (you can feel this friction in action when you slide down a slide); when a racecar's wheels do not have enough grip on the road, it experiences sliding friction.

Speed - How fast something is moving (speed = distance ÷ time); in the USA, we usually show speed as "miles per hour".

Tire - A rubber cushion (usually filled with air) that fits around a wheel.

Unbalanced Force - When two forces are unequal; an object will move in the direction of the greater force (like in a game of tug-of-war).

Wheel - A circle that turns on an axle; wheel and axle (together) are considered a "simple machine".

Wing - On an airplane, a wing is designed to generate lift, which allows the plane to fly through the air; on a race car, a wing is placed upside down and is designed to generate "negative lift", which uses air to push the car onto the track.

