

PHYSICS

BEGINS WITH AN “M”

The following is an abbreviated list of things we hope to figure out in Physics.

NOTE: We are in the transition between the recently discontinued California Science Standards and the newly minted Next Generation Science Standards. NGSS covers fewer topics, so some items here may not be covered. Anything not covered in NGSS Physics will be covered in AP Physics 2!

MYSTERIES we hope to solve.

- What are the Rules of the Universe • Why should you learn to think like a four-year old
- How do magicians slip tablecloths out from under dinnerware without spilling anything • Why do crosswalk lines get wavy
 - How can gravity be simulated on a space station • How can you weigh the earth
 - How can you survive if your parachute doesn't deploy
- Which takes more energy: driving up a long, shallow incline or driving up a short, steep incline • Why is the first hill of a roller coaster always the highest
 - Why is there air (on Earth but not on the moon, on Titan but not on Mercury) • What is the temperature of outer space • What's the best color to paint your house
 - What is lightning • Why does a rubbed balloon stick to the wall
 - Why are there no A or B batteries • How do magnets work
- How can energy be transferred without the transfer of matter • Why do ocean waves break • Why do fast cars go “neeeeeeeoowww” when they pass by
 - What makes rainbows appear • How do face masks help you see clearly under water
 - Why is the sky blue • How do 3-D movies work

MAGIC we hope to demystify.

Blowout blowgun • The force mirror • Amazing egg toss
The Van de Graaff generator • Electric lemons • Paper magnet
Dr. Shive's groovy wave machine • Visible sound
Laser viewing tank • Curved laser beam • Laser tree

MYTHS are false, inaccurate, or otherwise misleading. We will debunk these!

- If you keep asking “why,” you'll go nowhere or go around in circles
- A stick of dynamite has a lot of force • Friction opposes the motion of an object
- A zero-g environment is one in which gravity doesn't act • It is colder in winter because the earth is farther from the sun
 - Passengers would be safer if cars were made of rubber
 - Power is the rate at which work is done • It's difficult to conserve energy
- Hot objects have more heat than cold objects • Absolute zero is the temperature at which all molecular motion ceases • There is no temperature lower than absolute zero
- If your car is hit by lightning, you'll be safe because you're insulated from the ground by rubber tires • Franklin's kite was struck by lightning
 - Metal objects are magnetic • Magnetic North is a magnetic north pole
- Claims about springs in mattress ads • If a tree falls in a forest and there's no one around, there is no sound • If something explodes in space, there is a sound
 - Microwave ovens cook food from the inside out • Cats can see in the dark • The color of light is determined by its wavelength • Mirages are psychological • A full-length mirror must be at least as tall as the person looking into it
 - Inexpensive sunglasses are inferior to expensive ones