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# Science Expo 2016

— Participants —



## Physical Science

## Answer Key

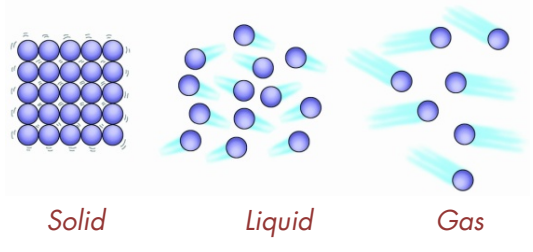
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# Properties of Matter

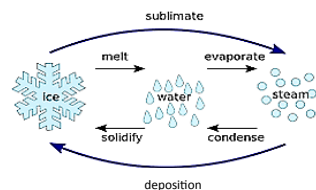
## Physical Properties

**Matter on the Move:** What are the three states of matter?



**Phase Change Poppers:** What is the phase change called when a solid changes directly into a gas?

*Sublimation.*



**Invisible Mass:** Air has mass.  
 True or  False (Circle one)

**It's a Gas:** When citric acid and baking soda react, what gas bubbles out of the solution?

*Carbon dioxide*

**Slime Time:** What type of fluid acts like both a liquid and a solid?

*Non-Newtonian fluid or "Oobleck"*



## Mixtures

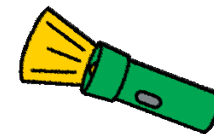
**Separation Anxiety:** Are mixtures separated by chemical or physical means?

Chemical or  Physical (Circle one)



# Energy

## Light



**Color Combination:** When you combine red, green, and blue light, what color light do you get? *White light*

## Colored Shadows:

Color-in the 3 primary colors of light



## Three Little Pigments:

Color-in the 3 secondary colors



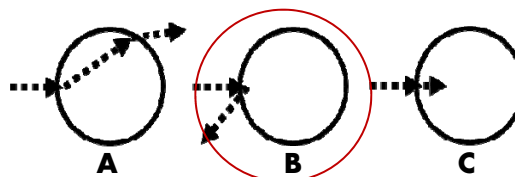
**The Sky is Purple?:** What gives the sky its color?

*Light scattering*



**Great Wall of Color:** Did you see colors reflected in the bubble film?  Yes or  No (Circle one)

**Laser Light Show:** Which image represents reflection? (Circle one)



**Refraction Action:** The bending of light is called Refraction

**Super Spectroscopes:** A spectroscope is a tool used for observing a spectrum of Visible light.

**It's a Mirror-cle:** Why does it look like you are flying?

*The foot off the ground is reflected and looks like a second foot*



## Heat

**Some Like it Hot:** Name 3 methods of heat transfer and an example of each

- 1) *Conduction—touching a hot stove*
- 2) *Convection—hot air rising in a room*
- 3) *Radiation—feeling the warmth of the sun*

# Energy

## Mechanical

**Give it a Ride:** Potential energy is stored energy.

Kinetic energy is energy in motion.



**Keep Your Eye on the Ball:** Energy cannot be created nor destroyed but can change into different forms.

True or False (Circle one)

## Sound

**Musical Coat Hangers:** Which is the best medium for sound waves to travel?

Solid, Liquid or Gas (Circle one)



**Good Vibrations:** What creates sound?

*Sound is created by a vibrating object*

**Resonance in Motion:** To make Ball #4 vibrate, you had to shake:

Slower or Faster (Circle one)

## Electricity

**Sizzling Static Electricity:** Uncharged objects become charged by gaining or losing electrons.

**Human Battery:** Which pair of metals produced the most current:  
(Circle one)

Copper + Brass

Copper + Aluminum

Copper + Zinc

**Electricity, Simply Magnet-ficent:** In this activity you observed

(Circle One)

- a. Electricity causing chemical reactions
- b. Copper wire rotating on a battery and magnet
- c. An electromagnet picking up a paper clip
- d. All of the above



**Currently Working:** A solution with ions is able to conduct electricity.

True or False (Circle one)

# Properties of Matter

## Density

**Bean Box:** What is the definition of density?

*The degree of compactness of a substance.*

**Floating Golf Ball:** Which is more dense?

Freshwater or Saltwater (Circle one)

**Stacking Colors:** Which is less dense?

Oil or Water (Circle one)

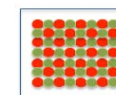


**Hot and Cold Density:** How can you change the density of water?

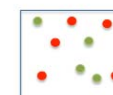
*You can change the density of water by changing the temperature*

**Changing the Density of an Object:** Can two objects have the same volume but different densities?

*Yes, because they have different mass*



High Density



Low Density

## Chemical Reaction

**Gassy Lava Lamp:** What is a chemical reaction?

*A process that rearranges molecular structures of a substance*

**Shake it Up!** What is the name of the chemical that demonstrates a chemical reaction?

*Indicator*

**Exothermic vs. Endothermic:**

*Exothermic* reactions release energy in the form of heat.

(For example, Calcium chloride mixed with water feels warm and can be used to melt ice.)

*Endothermic* reactions absorb energy in the form of heat.

(For example, Urea mixed with water feels cold.)

**Fire Starters:** What is needed for a fire to burn?

*Heat, fuel, and oxygen*



# Forces & Motion

**Hovercraft:** What is Newton's First Law of Motion?  
*A body at rest stays at rest, and a body in motion stays in motion unless other forces act on it.*



## Air Pressure

**Automatic Balloon Inflator:** Which takes up more space?

Hot air or Cold air? (Circle one)

**Mystery Candle:** Is the pressure higher or lower inside the flask?  
 Higher or Lower? (Circle one)

**Balloon in a Bottle:** How do you know air takes up space?  
*Because you can't blow up the balloon without a hole in the bottle.*

**The Power of Words:** True or False (circle one): The more surface area something has, the more atmospheric pressure pushes down on it.



## Gravity

**Gravity keeps you down:** Air Resistance causes falling objects to slow down.

**Drop the Beat:** Gravity and acceleration cause falling objects to fall faster.

**Strike a Balance:** What physics concept keeps objects balanced?

The center of gravity of an object.



**Friction Frenzy:** What is an example of friction in every day life?  
*Examples: driving, skiing, rubbing hands together.*

## Physics of Animal Flight

**Flight:** What are the two things that help animals fly?  
*Wing shape, wing size, mass, wing movement and/or wing speed.*



# Forces & Motion

## Magnetism

**Magnet Magic:** Magnetic fields cause magnetic attraction and repulsion.



**Magnet Mania:** True or False (circle one): All metals are magnetic.

**Eddy Currents:** Does a magnet fall faster in a:  
 Copper tube or Plastic tube? (Circle one)



## Properties of Water

**Magic Playing Card:** What bond is breaking when the water spills out?  
Adhesion OR Surface Tension.

**H<sub>2</sub>Olympics:** Cohesion is the attraction between water molecules.

Adhesion is the attraction between water molecules and other materials.

Surface Tension is the strong bonds formed between water at the surface.

Capillary Action is the movement of water molecules within materials.



## SCORE SHEET:

Throwing in my 2 Cents	Penny Drops	Soapy Boats	Floating Paper Clips	Soak It Up

## Momentum

**Show Me the Momentum!:** Linear Momentum depends on how fast an object is moving and its mass.

**Momentum Machine:** Angular Momentum depends on how fast an object is rotating and how its mass is distributed.