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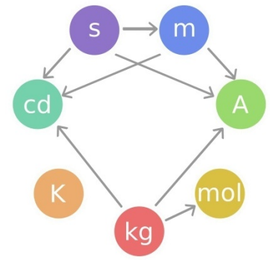

HoneycuttScience Work Book

PHYSICAL SCIENCE

Contents

11.1 What is Physical Science?

Physical Science

Summarize main points from each video.

Video Title / topic _____

Video Title / topic _____

Video Title / topic _____

Topic Introduction

Summarize your understanding of each paragraph.

You are about to study Physical Science. This subject area deals with the physical sciences: the branches of natural science and science that study non-living systems, in contrast to biological sciences.

This year, you will be introduced to three important types of physical science: Chemistry, Physics, and Earth/Space Science. Probably, you already know some things about each of these. Prior knowledge will be helpful to you as you study Physical Science.

You will learn some things about chemistry. Chemistry is the study of matter. You will be introduced to some words like "the Periodic Table" and "acids, bases, and solutions."

You will learn some things about physics – such as "motion" and "work and energy." Also you will learn some things about our planet Earth and the solar system that you may have been curious about.

Read/Summarize Text

1. **Read the passage.**
2. **Underline key expressions in each sentence.**
3. **Re-write each word (or expression) you underlined.**
4. **Summarize the passage.**

Your Future Study of Physics

1

2

This year's science will introduce you to physics. There are much more advanced courses in physics you may want to study in the future – including in college classes.

This year, you will be introduced to "waves" because they are a predominant part of modern physical theory. You will also learn about the basics of motion and electromagnatism.

Some examples of advanced topics that won't be covered in this introductory course are thermodynamics, geophysics and Nuclear Physics.

HoneycuttScience.com

Re-write words you underlined

3

_____ _____ _____

_____ _____ _____

Using a complete sentence, summarize or rephrase the passage

4

Read Text for Comprehension

Read this article for deeper understanding. No summary is required, although you may want to circle, underline, or mark key ideas and words.

From Wikibooks

While this course will only introduce some concepts in chemistry – it is a very interesting subject. Remember that Physical Science deals with non-living things. Chemistry is important to understand for living things also – but that is called organic chemistry.

The type of chemistry you will be exposed to in this course is called "in-organic chemistry" – which is the chemistry of non-living things.

Inorganic chemistry is the study of the synthesis, reactions, structures and properties of compounds of the elements. This subject is usually taught separately from organic chemistry, which concerns the synthesis and reactions of compounds of carbon (typically containing C-H bonds).

Inorganic chemistry encompasses the compounds - both molecular and extended solids - of everything else in the periodic table, and overlaps with organic chemistry in the area of organometallic chemistry, in which metals are bonded to carbon-containing ligands and molecules.

Inorganic chemistry is fundamental to many practical technologies including catalysis and materials (structural, electronic, magnetic,...), energy conversion and storage, and electronics. Inorganic compounds are also found in biological systems where they are essential to life processes. (1)

From ACS Chemistry for Life

Inorganic chemistry is concerned with the properties and behavior of inorganic compounds, which include metals, minerals, and organometallic compounds. While organic chemistry is defined as the study of carbon-containing compounds and inorganic chemistry is the study of the remaining subset of compounds other than organic compounds. (2)

(1) https://en.wikibooks.org/wiki/Introduction_to_Inorganic_Chemistry
(2) https://www.acs.org/content/acs/en/careers/college-to-career/areas-of-chemistry/inorganic-chemistry.html

Draw Illustration

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Natural Sciences

Life Sciences

- *Biology*
- *Organic Chemistry*
- *Ecology*
- *Medicine/Anatomy*

Physical Sciences

- *Physics*
- *Inorganic Chemistry*
- *Geology & Climate*
- *Astronomy*

www.honeycuttscience.com

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Interpret a Graph

Write the title of the graph _____

Circle the type of chart this represents

Bar Chart *Line Chart* *Pie Chart* *Other*

If applicable,

What does the X-axis represent _____

What does the Y-axis imply _____

Summarize what this graph represents or conveys

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https://www.nap.edu

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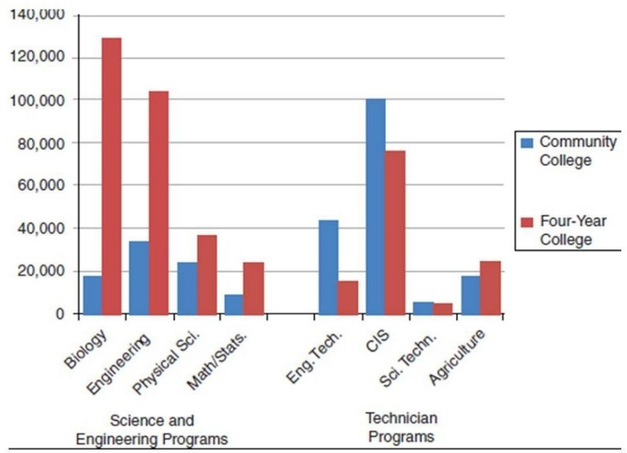

12.1 Introduction to Matter

Physical Science

Summarize main points from each video.

Video Title / topic _____

Video Title / topic _____

Video Title / topic _____

Topic Introduction

Summarize your understanding of each paragraph.

Matter is the substance of which all material is made - that means objects which have mass. Ordinary matter is made of tiny particles called atoms.

Matter is the **Stuff Around You**. Matter is everything around you. Atoms and molecules are all composed of matter. Matter is anything that has mass and takes up space.

A common definition for matter is “matter is any substance which has mass and occupies space.” All physical objects are composed of matter. Physical objects are made up of atoms. Atoms are made up of protons, neutrons, and electrons.

Matter consists of particles, each with mass and size. The most familiar examples of material particles are the electron, the proton and the neutron. Matter can exist in several states, also called phases. Solid, liquid and gas are “states” or “phases” of matter.

Read/Summarize Text

1. **Read the passage.**
2. **Underline key expressions in each sentence.**
3. **Re-write each word (or expression) you underlined.**
4. **Summarize the passage.**

Title of Passage.

1

In order to recognize what “matter”, you also need to recognize what “mass” is. Matter occupies space AND matter has mass. 2

- Mass is a property of a physical body.
- Mass is a measure of an object's resistance to acceleration.
- Acceleration is a change in an object’s state of motion when a force is applied.

Mass is NOT the same as weight, even though mass is often determined by measuring the object's weight using a spring scale.

Weight is a force, while mass is the property that (along with gravity) determines the strength of this force.

Adapted from https://en.wikipedia.org/wiki/Mass

Re-write words you underlined

3

_____ _____ _____

_____ _____ _____

Using a complete sentence, summarize or rephrase the passage

4

Read Text for Comprehension

Read this article for deeper understanding. No summary is required, although you may want to circle, underline, or mark key ideas and words.

More about Mass and Weight

Though the terms weight and mass are used interchangeably in common language, in science there is distinct difference between the two terms.

The weight of an object = force of gravity felt by that object but the mass of an object is the amount of matter the object has.

Mass is a measure of the object's resistance to acceleration: a push on a skateboard will make it roll away quickly but the same push on a more massive car will barely budge it.

An object's weight depends on the pull of the gravitating object but the object's mass is independent of the gravity. For example, Joe Average weighs himself on the Earth's surface and then on the Moon's surface. His weight on the Moon will be about six times less than on the Earth but the number of atoms in his body has not changed so his mass is the same at the two places.

A kilogram is a quantity of mass and a newton is a quantity of force.

One kilogram (kg) = 2.205 pounds of mass and 4.45 newtons (N) = 1 pound of force. If someone uses ``pounds'', be sure you understand if s/he means force or mass!

http://www.astronomynotes.com/gravappl/s4.htm

Copy the Chart

Copy the Comparison Chart in the Space Provided

Comparison chart

	Mass	Weight
Definition	Mass is the quantity of matter in a body regardless of its volume or of any forces acting on it.	Weight is a measurement of the gravitational force acting on an object.
Effect of gravity	Mass is always constant at any place and any time	The weight of an object depends on the gravity at that place
Unit of Measurement	Mass is expressed in kilogram (kg), grams (g), and milligram (mg).	Weight is expressed in Newton (N)

http://www.diffen.com

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Interpret a Graph

Write the title of the graph _____

Circle the type of chart this represents

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If applicable,

What does the X-axis represent _____

What does the Y-axis imply _____

Summarize what this graph represents or conveys

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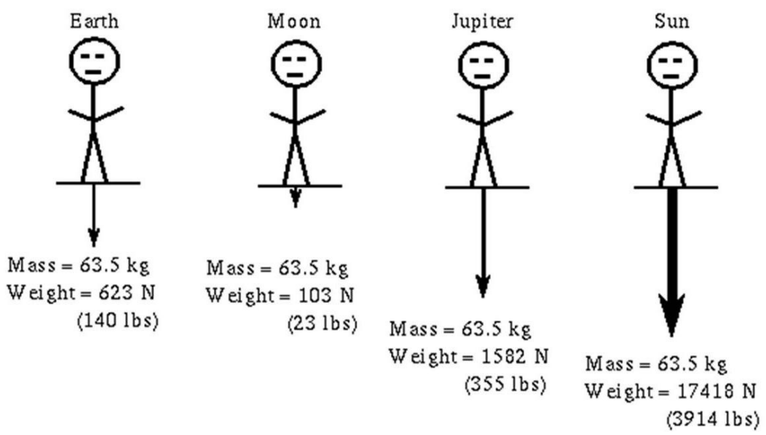
http://www.astronomynotes.com

Comparison of Mass and Weight of a Person
On Earth, the Moon, Jupiter, and the Sun



13.1 States of Matter

Physical Science

Summarize main points from each video.

Video Title / topic _____

Video Title / topic _____

Video Title / topic _____

Topic Introduction

Summarize your understanding of each paragraph.

Ok. Get ready to read something kind of weird. Ready?
……..
You can not “make something cold” … you can only “make something less hot.” (SAY WHAT?).

Weird, right? Think of a refrigerator for a second. It SEEMS like a refrigerator makes things colder. And while in day-to-day language, it sort of does do this … as a science student you deserve the full truth. A refrigerator REMOVES heat, it does NOT “add cold.”

As you learn more and more about matter, you will learn more about thermal energy. Thermal energy (heat energy) is an important property of matter. For example, by adding thermal energy to liquid water, the water will evaporate into steam (water in gas form).

By removing thermal energy (heat energy) from liquid water, you may cause the water to freeze. Frozen water is commonly called ice. Adding and removing heat from a substance sometimes causes a physical change (a change in state) or may cause a chemical change.

Read/Summarize Text

1. **Read the passage.**
2. **Underline key expressions in each sentence.**
3. **Re-write each word (or expression) you underlined.**
4. **Summarize the passage.**

Heat.

1
2

You can usually warm something by adding energy. The added energy can be from light, electricity, friction, a chemical reaction, nuclear reaction, or any other kind of energy. When first added to a substance, energy might be concentrated in one atom, but this one will soon bump into others and spread the energy. Eventually, every atom or molecule in the substance will move a bit faster. When the added energy is spread throughout a substance, it is then called heat energy, thermal energy, or, simply heat. All three terms mean the same thing. Heat is a form of energy, so it has the units of energy. In the SI system, this is Joules. Many other units to measure thermal energy are in common use. Calories and BTU's are common heat units.

Re-write words you underlined

3

_____ _____ _____

_____ _____ _____

Using a complete sentence, summarize or rephrase the passage

4

Read Text for Comprehension

Read this article for deeper understanding. No summary is required, although you may want to circle, underline, or mark key ideas and words.

Question: What is a calorie and why is it important to know how many calories there are in certain foods?

Answer: A calorie is actually a unit of heat energy. That's right. We think of calories as just things that are in food and all foods have calories. But your body sees calories as energy and it's energy to produce heat. And heat energy is what really fuels our body just the same way that gasoline is what fuels your car's energy.

Now all foods have calories and different foods have different amounts of calories. Calories are provided by fat, carbohydrate, and protein.

Fats have the highest concentration of calories. That's nine calories per gram of pure fat. Protein and carbohydrates each have four calories per gram of pure protein or pure carbohydrate. Alcohol, pure alcohol, has seven calories per gram. So understanding the role of calories in your diet can help you balance your calories in with your calories out.

http://abcnews.go.com

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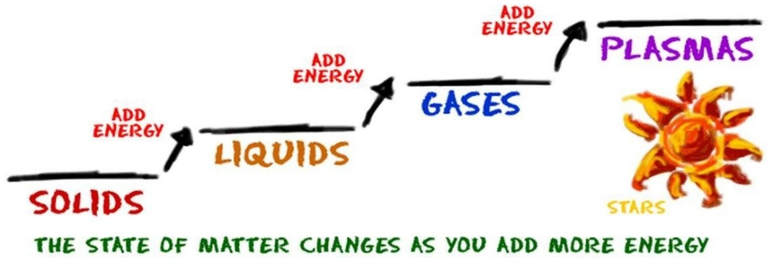
Illustration



http://www.chem4kids.com

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Write the title of the graph _____

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What does the Y-axis imply _____

Summarize what this graph represents or conveys

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http://www.npr.org

14.1 Atoms

Physical Science

Summarize main points from each video.

Video Title / topic _____

Video Title / topic _____

Video Title / topic _____

Topic Introduction

Summarize your understanding of each paragraph.

An atom is the smallest constituent unit of ordinary matter that has the properties of a chemical element. Every solid, liquid, gas, and plasma is composed of atoms.

Every atom is composed of a nucleus and one or more electrons bound to the nucleus. The nucleus is made of one or more protons and typically a similar number of neutrons.

Protons and neutrons are called nucleons. More than 99.94% of an atom's mass is in the nucleus. The protons have a positive electric charge.

The electrons of an atom are attracted to the protons in an atomic nucleus by this electromagnetic force. The protons and neutrons in the nucleus are attracted to each other by a different force, the nuclear force.

Adapted from WikiPedia (Atoms)

Read/Summarize Text

1. **Read the passage.**
2. **Underline key expressions in each sentence.**
3. **Re-write each word (or expression) you underlined.**
4. **Summarize the passage.**

Split and Atom …

1

2

HOW CAN ATOMS BE SPLIT?

Protons and neutrons are held together in the nucleus at the center of the atom by a strong force. But this force can be overcome by striking the nucleus with a neutron, a proton, or another particle. The nucleus may split and form new atoms. Atoms are split in this way inside nuclear reactors and during nuclear explosions.

www.factmonster.com

Re-write words you underlined

3

_____ _____ _____

_____ _____ _____

Using a complete sentence, summarize or rephrase the passage

4

Read Text for Comprehension

Read this article for deeper understanding. No summary is required, although you may want to circle, underline, or mark key ideas and words.

10 Interesting Facts About Atoms

Everything in the world consists of atoms, so it's good to know something about them. Here are 10 interesting and useful atom facts.

1. **There are three parts to an atom.** Protons have a positive electrical charge and are found together with neutrons (no electrical charge) in the nucleus of each atom. Negatively charged electrons orbit the nucleus.
2. **Atoms are the smallest particles that make up elements**. Each element contains a different number of protons.
3. **Atoms are mostly empty space**.
4. **There are over 100 different kinds of atoms.** About 92 of them occur naturally, while the remainder are made in labs.
5. **The components of an atom are held together by three forces.** Protons and neutrons are held together by the strong and weak nuclear forces. Electrical attraction holds electrons and protons.
6. **The word "atom" comes from the Greek word for "uncuttable" or "undivided".** For a long time, people believed atoms were the fundamental "uncuttable" unit of matter. While atoms are the building blocks of elements, that can be divided into still smaller particles. Also, nuclear fission and nuclear decay can break atoms into smaller atoms.
7. **Atoms are very small.** The average atom is about one tenth of a billionth of a meter across.
8. **Although atoms are the smallest unit of an element, they consist of even tinier particles called quarks and leptons.** An electron is a lepton. Protons and neutrons consist of three quarks each.
9. **The most abundant type of atom in the universe is the hydrogen atom.** Nearly 74% of the atoms in the Milky Way galaxy are hydrogen atoms.
10. **You have around 7 billion-billion-billion atoms in your body.** You replace about 98% of them every year!

https://www.thoughtco.com

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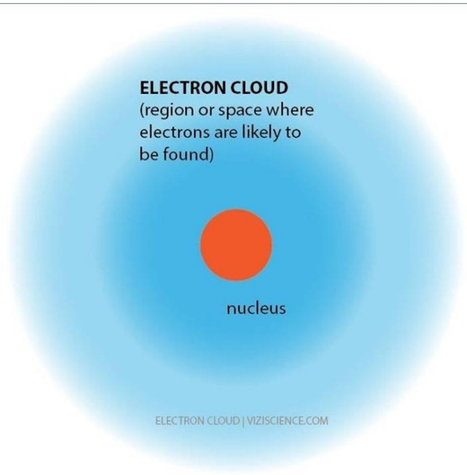

https://viziscience.com

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Write the title of the graph _____

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Bar Chart *Line Chart* *Pie Chart* *Other*

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What does the X-axis represent _____

What does the Y-axis imply _____

Summarize what this graph represents or conveys

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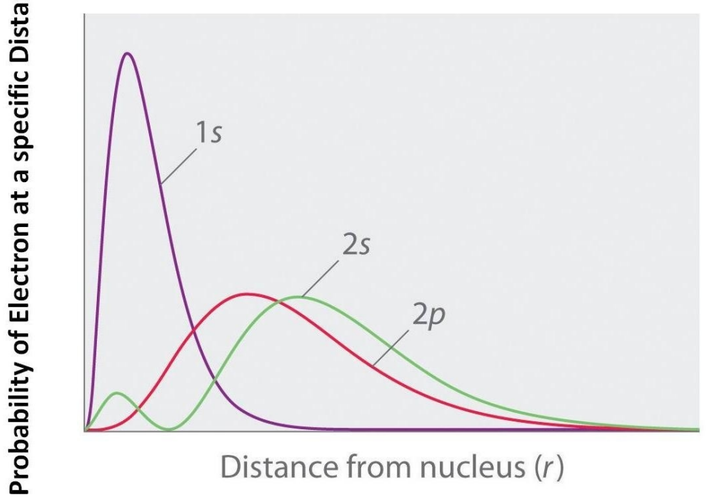
saylordotorg.github.io



15.1 The Periodic Table

Physical Science

Summarize main points from each video.

Video Title / topic _____

Video Title / topic _____

Video Title / topic _____

Topic Introduction

Summarize your understanding of each paragraph.

The periodic table of elements displays all of the known elements in the universe and their defining attributes.

There are 118 elements that have been identified, of which the first 94 occur naturally on Earth. The remaining 24 are synthetic elements.

When different elements are chemically combined, with the atoms held together by chemical bonds, they form chemical compounds. Only a minority of elements are found uncombined as relatively pure minerals.

Common native elements are copper, silver, gold, carbon (as coal, graphite, or diamonds), and sulfur. All but a few of the most inert elements, such as noble gases and noble metals, are usually found on Earth in chemically combined form, as chemical compounds.

Read/Summarize Text

1. **Read the passage.**
2. **Underline key expressions in each sentence.**
3. **Re-write each word (or expression) you underlined.**
4. **Summarize the passage.**

Where can I find pure elements around my house?

1

2

Q. My chemistry teacher is having us put together an "Element Collection" and I want to be able to make a good one. I've already got carbon from burning sugar, and my teacher said that aluminum foil is pure aluminum. He also said gold-plated or silver plated objects count as gold or silver. But he said that you can't bring him a cup of water and say "Here's pure hydrogen mixed with pure oxygen." Any suggestions of easy to find pure elements?

A. A piece of iron, not steel; A neon lamp; A piece of copper; A piece of zinc; A thermometer containing mercury; A piece of lead (the metal, not graphite from a pencil).

https://answers.yahoo.com

Re-write words you underlined

3

Using a complete sentence, summarize or rephrase the passage

4

Read Text for Comprehension

Read this article for deeper understanding. No summary is required, although you may want to circle, underline, or mark key ideas and words.

History of the Periodic Table

The periodic table is an arrangement of the chemical elements and are organized on the basis of their atomic numbers, electron configurations and recurring chemical properties. Elements are presented in order of increasing atomic number. The standard form of the table consists of a grid of elements, with rows called periods and columns called groups

The history of the periodic table reflects over a century of growth in the understanding of chemical properties. The most important event in its history occurred in 1869, when the table was published by Dmitri Mendeleev, who built upon earlier discoveries by scientists such as Antoine-Laurent de Lavoisier and John Newlands, but who is nevertheless generally given sole credit for its development.

The Russian chemist Dmitri Mendeleev was the first scientist to make a periodic table similar to the one used today. Mendeleev arranged the elements by atomic mass, corresponding to relative molar mass. Mendeleev stated that:

- The elements, if arranged according to their atomic mass, exhibit an apparent periodicity of properties.
- The elements which are the most widely diffused have small atomic weights.
- The magnitude of the atomic weight determines the character of the element, just as the magnitude of the molecule determines the character of a compound body.
- Certain characteristic properties of elements can be foretold from their atomic masses.

https://en.wikipedia.org/wiki/History_of_the_periodic_table

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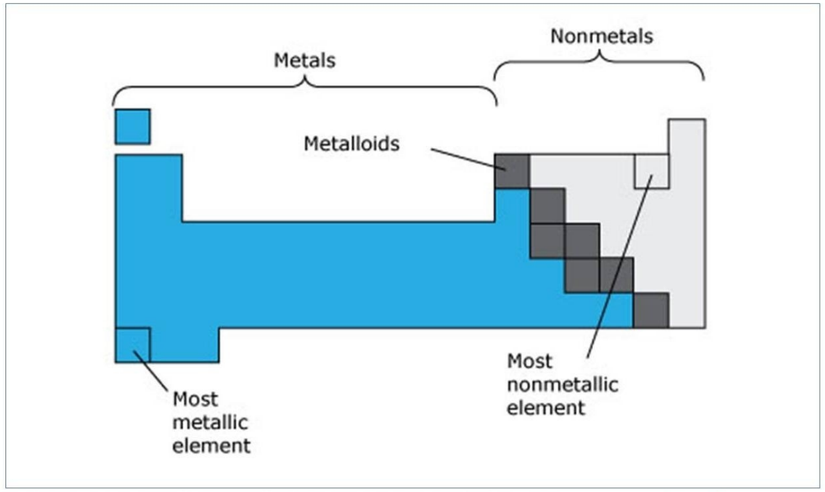

 www.sciencelearn.org.nz

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Interpret a Graph

Write the title of the graph _____

Circle the type of chart this represents

Bar Chart *Line Chart* *Pie Chart* *Other*

If applicable,

What does the X-axis represent _____

What does the Y-axis imply _____

Summarize what this graph represents or conveys

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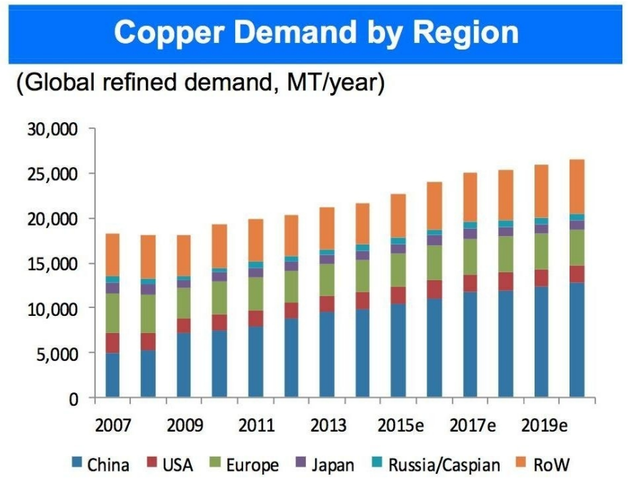
http://www.businessinsider.com



Source: WMBH, Morgan Stanley Commodity Research estimates

16.1 The Structure of Matter

Physical Science

Summarize main points from each video.

Video Title / topic _____

Video Title / topic _____

Video Title / topic _____

Topic Introduction

Summarize your understanding of each paragraph.

The word “compound” is an important word in chemistry. The word “compound” refers a combination of elements. The word “compound” refers to two or more chemically combined elements (or atoms).

Individual atoms by themselves are not compounds. Atoms of one type when combined with atoms of another type through a chemical bond are called compounds. Atoms combined with other atoms of a different type through a chemical bond are compounds.

There are several types of chemical bonds. Ionic bonds are one type of chemical bond. Ionic bonds form a “network” of atoms. Covalent bonds share electrons between atoms. Covalent bonds form molecules. Ionic bonds and covalent bonds each form compounds.

Ionic bonds do not form molecules. Ionic bonds form a network of atoms, bonded to each other through the transfer of electrons. Covalent bonds do form molecules. Covalent bonds share electrons between atoms.

Read/Summarize Text

1. **Read the passage.**
2. **Underline key expressions in each sentence.**
3. **Re-write each word (or expression) you underlined.**
4. **Summarize the passage.**

Title of Passage.

1
2

Discussions about compounds and bonds can be confusing. Several new words are used to describe the concepts.

Most students are initially unfamiliar with several words used to describe chemical compounds. Memorizing a few of these words and expressions is helpful. New students should consider memorizing the following words.

Ionic Bonds. Covalent Bonds. Metallic Bonds. Polyatomic Ions.

Memorize these words, even if you do not yet fully understand their meaning.

Re-write words you underlined

3

_____ _____ _____

_____ _____ _____

Using a complete sentence, summarize or rephrase the passage

4

Read Text for Comprehension

Read this article for deeper understanding. No summary is required, although you may want to circle, underline, or mark key ideas and words.

EXTRACT FROM WIKIPEDIA

Ionic bonding is a type of chemical bond that involves the electrostatic attraction between oppositely charged ions, and is the primary interaction occurring in ionic compounds.

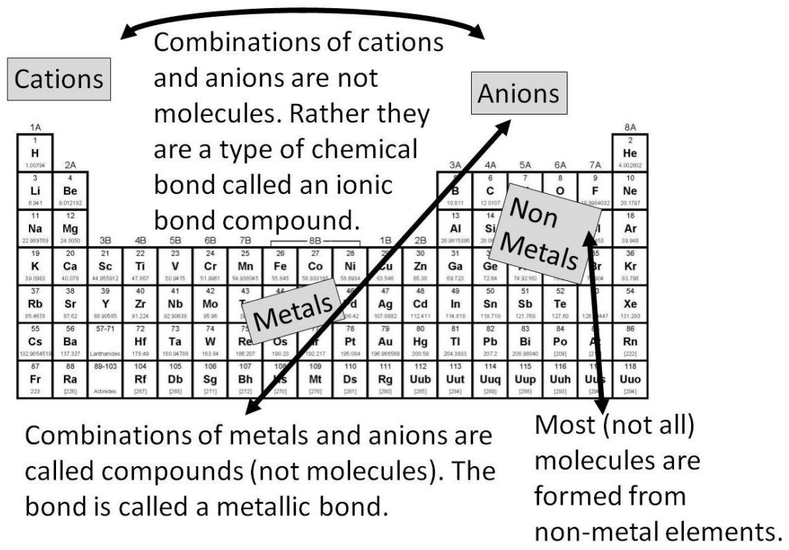
The ions are atoms that have gained one or more electrons (known as anions, which are negatively charged) and atoms that have lost one or more electrons (known as cations, which are positively charged).

This transfer of electrons is known as electrovalence in contrast to covalence. In the simplest case, the cation is a metal atom and the anion is a nonmetal atom, but these ions can be of a more complex nature, e.g. molecular ions like NH_4^+ or SO_4^{2-}.

In simpler words, an ionic bond is the transfer of electrons from a metal to a non-metal in order to obtain a full valence shell for both atoms.

EXPLANATION F ROM HONEYCUTTSCIENCE.COM

The illustration here is a generalization … it is not fully descriptive or precise.



https://en.wikipedia.org/wiki/Ionic_bonding

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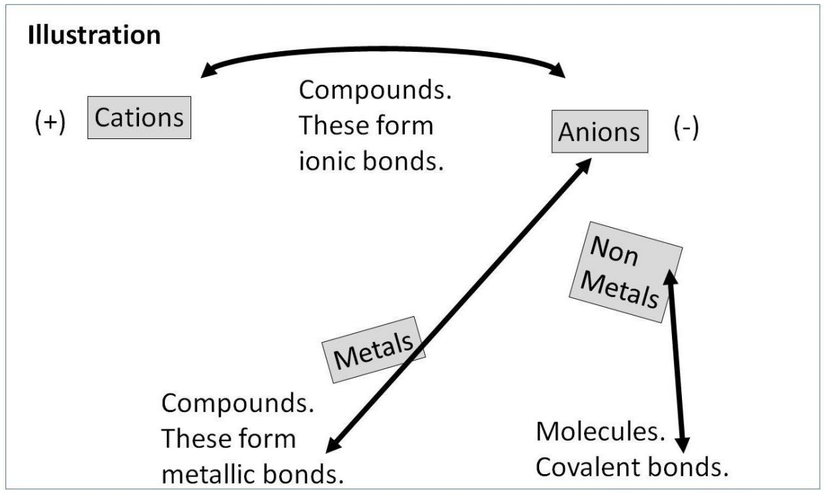

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Interpret a Graph

Write the title of the graph _____

Circle the type of chart this represents

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If applicable,

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Summarize what this graph represents or conveys

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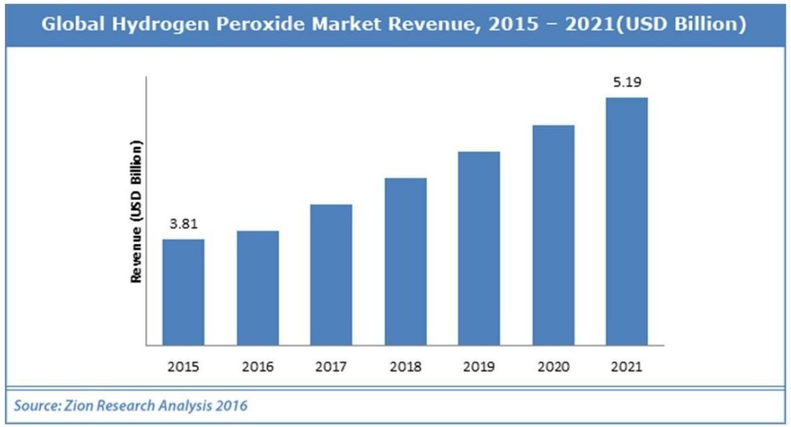
https://www.zionmarketresearch.com/news/global-hydrogen-peroxide-market

Hydrogen Peroxide Global Market Projections



Hydrogen peroxide is a chemical compound with the formula H_2O_2. In its pure form, it is a colorless liquid, slightly more viscous than water. Hydrogen peroxide is the simplest peroxide. It is used as an oxidizer, bleaching agent and disinfectant. (wikipedia.com)

17.1 Chemical Reactions

Physical Science

Summarize main points from each video.

Video Title / topic _____

Video Title / topic _____

Video Title / topic _____

Topic Introduction

Summarize your understanding of each paragraph.

Chemical reactions occur when substances go through chemical change. The substances go through change resulting in new substances. Chemical reactions are not the same thing as a physical change. Recall that physical changes are a change in state of matter.

Chemical reactions rearrange atoms. Note that energy is conserved in chemical reactions. Even though energy may APPEAR to not be conserved – the total energy of everything combined remains the same amount of energy before and after the reaction.

Chemical reactions are sometimes exothermic. Sometimes they are endothermic. You need to remember this fact, and to distinguish between the two words.

Exothermic means that energy is released to the surroundings.

Endothermic reactions need more energy to break the bonds in the reactants than is given off by forming bonds in the products.

Read/Summarize Text

1. **Read the passage.**
2. **Underline key expressions in each sentence.**
3. **Re-write each word (or expression) you underlined.**
4. **Summarize the passage.**

Describing Reactions

1
2

You can describe the reaction between atoms and molecules in several ways. One way is to write a word equation. A word equation shows the names of the products and reactants. Another way is to use molecular models, which can be used to show how the atoms are rearranged during the reaction.

The clearest way is to write a chemical equation. A chemical equation uses symbols (from the Periodic Table) to represent a chemical reaction. The equation shows the relationship between the reactants and the products of a reaction. Here is an example:

$$CH_4 + 2O_2 \Rightarrow CO_2 + 2H_2O$$

Adapted from Physical Science (Holt) Chemical Equations page 225.

Re-write words you underlined

3

_____ _____ _____

_____ _____ _____

Using a complete sentence, summarize or rephrase the passage

4

Read Text for Comprehension

Read this article for deeper understanding. No summary is required, although you may want to circle, underline, or mark key ideas and words.

Stoichiometry

Pretend you want to make chocolate chip cookies. You have a great recipe handed down from your grandmother that calls for two cups of chocolate chips, but you only have one cup of chocolate chips in the house. It's raining outside, and you don't feel like going to the store. So, what do you do? Do you make the cookies with half the chocolate chips the recipe calls for? No way! Who wants to eat cookies with only half the chocolate?

Instead, you determine the ratio of chocolate chips on hand to amount needed, which is 1:2. Then, you adjust the ratio of all the other ingredients in the recipe. Essentially, you have just performed stoichiometry, one of the fundamental aspects of chemistry. Stoichiometry is a word derived from two Greek words: 'stoicheon' meaning element, and 'metron,' meaning measure. This is pretty cool because stoichiometry is essentially the measurement of elements, or the study of chemical quantities consumed or produced in a chemical reaction.

Performing stoichiometry involves the use of a special chemical counting unit: the mole. Just to review for a moment, a mole isn't an animal. Well, it is, but not in chemistry. In chemistry, a mole is a unit of measurement, such that one mole of a substance contains $6.022*10^{23}$ particles.

In chemistry, particles can be atoms, molecules, or compounds. Conveniently, one mole of a substance has a mass that is equal to its atomic mass expressed in grams. This relationship is known as molar mass. For example, one atom of carbon has a mass of 12.011 amu, one mole of carbon has a mass of 12.011 grams.

When we do stoichiometry, we always want to speak about chemicals in terms of how many moles are present. The essence of stoichiometry involves comparing how many moles of chemicals are present. We may be simply comparing the number of moles of each reactant needed, or the number moles reactant to number of moles product.

http://study.com/academy/lesson/mole-to-mole-ratios-and-calculations-of-a-chemical-equation.html

Draw Illustration

Copy and Label the Illustration in the Space Provided

Reaction Types

Combination
Decomposition
Substitution
Double-substitution
Combustion

HoneycuttScience.com

Draw (Copy) the Illustration Here

Answer the Three Questions

Subscripts vs. Coefficients

$$3\ CuCl_2 + 2\ Al \rightarrow 2\ AlCl_3 + 3\ Cu$$

On the *reactant side* of the equation:

How many **copper (II) chloride molecules** react?

How many **total chlorine atoms** are there?

How many **aluminum atoms** are there?

http://slideplayer.com/slide/9189050/

18.1 Solutions

Physical Science

Summarize main points from each video.

Video Title / topic _____

Video Title / topic _____

Video Title / topic _____

Topic Introduction

Summarize your understanding of each paragraph.

In chemistry, a solution is a homogeneous mixture of two or more substances. The substances that are dissolved are called solutes. The substance the solutes are dissolved in is called the solvent.

Definition of homogeneous – homogeneous means of the same kind; alike. A solution then is a mixture that is of the same kind from two or more substances.

Definition of dissolve – dissolve means to become or cause to become incorporated into a liquid so as to form a solution.

Definition of solutions - in chemistry a solution exists when a gas, liquid, or solid is dispersed homogeneously in a gas, liquid, or solid without chemical change. Dissolved sugar or salt in solution. a homogeneous, molecular mixture of two or more substances.

Read/Summarize Text

1. **Read the passage.**
2. **Underline key expressions in each sentence.**
3. **Re-write each word (or expression) you underlined.**
4. **Summarize the passage.**

How do solutions differ from other mixtures?

1

2

Solutions aren't different from mixtures because they are mixtures. When you refer to a solution, you're referring to a **homogeneous mixture** in which one thing (the solvent) has dissolved another (the solute). It doesn't look much like a mixture, but it is.

Heterogeneous mixtures, on the other hand, have distinct components that are distinct from one another. Though they are different than solutions, they are also mixtures.

SO … solutions are mixtures. BUT … not all mixtures are solutions.

https://socratic.org/

Re-write words you underlined

3

_____ _____ _____

_____ _____ _____

Using a complete sentence, summarize or rephrase the passage

4

Read Text for Comprehension

Read this article for deeper understanding. No summary is required, although you may want to circle, underline, or mark key ideas and words.

Solutions in Chemistry

Solution, in chemistry, is a homogenous mixture of two or more substances in relative amounts that can be varied continuously up to what is called the limit of solubility. The term solution is commonly applied to the liquid state of matter, but solutions of gases and solids are possible. Air, for example, is a solution consisting chiefly of oxygen and nitrogen with trace amounts of several other gases, and brass is a solution composed of copper and zinc.

Life processes depend in large part on solutions. Oxygen from the lungs goes into solution in the blood plasma, unites chemically with the hemoglobin in the red blood cells, and is released to the body tissues. The products of digestion also are carried in solution to the different parts of the body. The ability of liquids to dissolve other fluids or solids has many practical applications. Chemists take advantage of differences in solubility to separate and purify materials and to carry out chemical analysis. Most chemical reactions occur in solution and are influenced by the solubilities of the reagents. Materials for chemical manufacturing equipment are selected to resist the solvent action of their contents.

The liquid in a solution is customarily designated the solvent, and the substance added is called the solute. If both components are liquids, the distinction loses significance; the one present in smaller concentration is likely to be called the solute. The concentration of any component in a solution may be expressed in units of weight or volume or in moles. These may be mixed—e.g., moles per litre and moles per kilogram.

Crystals of some salts contain lattices of ions—i.e., atoms or groups of atoms with alternating positive and negative charges. When such a crystal is to be dissolved, the attraction of the oppositely charged ions, which are largely responsible for cohesion in the crystal, must be overcome by electric charges in the solvent. These may be provided by the ions of a fused salt or by electric dipoles in the molecules of the solvent. Such solvents include water, methyl alcohol, liquid ammonia, and hydrogen fluoride. The ions of the solute, surrounded by dipolar molecules of the solvent, are detached from each other and are free to migrate to charged electrodes. Such a solution can conduct electricity, and the solute is called an electrolyte.

https://www.britannica.com

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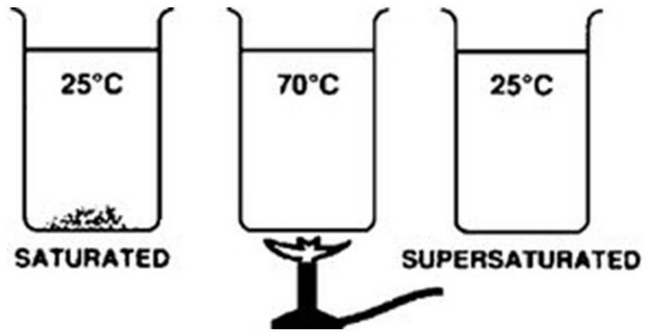


Supersaturation is a state of a solution that contains more of the dissolved material than could be dissolved by the solvent under normal circumstances.

Wikipedia.com

Draw (Copy) the Illustration Here

Interpret a Graph

Write the title of the graph _____

Circle the type of chart this represents

Bar Chart *Line Chart* *Pie Chart* *Other*

If applicable,

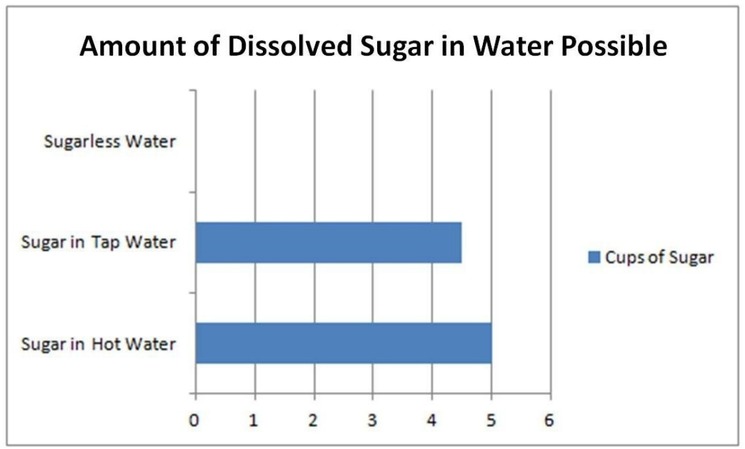
What does the X-axis represent _____

What does the Y-axis imply _____

Summarize what this graph represents or conveys

_____

HoneycuttScience.com



19.1 Acids, Bases, and Salts

Physical Science

Summarize main points from each video.

Video Title / topic _____

Video Title / topic _____

Video Title / topic _____

Topic Introduction

Summarize your understanding of each paragraph.

A neutralization reaction is the reaction between an acid and a base. For example, some people take an “antacid” (an over-the-counter medicine) when they are experiencing a condition commonly called “heartburn.”

People experience heartburn with their stomach’s solution of hydrochloric acid irritates the linking of their esophagus. Hydrochloric acid has the chemical formula of HCl. HCl reacts with antacids to reduce the acidity of the solution in their stomach.

When an acid reacts with a base, hydronium ions react with hydroxide ions to form water. The other ions form an ionic compound called a salt. The other ions are the positive ions from the base and the negative ions from the acid.

Reactions between acids and bases do not always produce neutral solutions. The pH of the final solution depends on the amounts of acid and base that are combined and on the strength of the acid and base.

Text adapted from Holt Science Spectrum Physical Science page 302.

Read/Summarize Text

1. **Read the passage.**
2. **Underline key expressions in each sentence.**
3. **Re-write each word (or expression) you underlined.**
4. **Summarize the passage.**

chemical definition of salt

1

2

In chemistry, a salt is an ionic compound that can be formed by the neutralization reaction of an acid and a base. Salts are composed of related numbers of cations (positively charged ions) and anions (negative ions) so that the product is electrically neutral (without a net charge).

There are several varieties of salts. Salts that hydrolyze to produce hydroxide ions when dissolved in water are alkali salts; those that hydrolyze to produce hydronium ions in water are acidic salts. Neutral salts are those salts that are neither acidic nor basic.

https://en.wikipedia.org/wiki/Salt_(chemistry)

Re-write words you underlined

3

_____ _____ _____

_____ _____ _____

Using a complete sentence, summarize or rephrase the passage

4

Read Text for Comprehension

Read this article for deeper understanding. No summary is required, although you may want to circle, underline, or mark key ideas and words.

How Much Salt is in the Oceans?

The amount of salt in the ocean, known as 'salinity', is a measure of the of the amount of salt dissolved in 1000 grams of water. The amount is expressed as parts per thousands (ppt).

Refractometers are a tool used to measure the amount of salinity in the ocean. The salinity in the ocean is approximately 32 to 35 ppt. Freshwater has a salinity of zero. The estuaries fluctuate their salinity level depending upon the tides. But, it's always below the open ocean. The poles have a lower salinity because the cold water does not evaporate as fast.

Answer on Reddit.com

By some estimates, if the salt in the ocean could be removed and spread evenly over the Earth's land surface it would form a layer more than 166 meters (500 feet) thick, about the height of a 40-story office building.

Explanation from USGS

You may know that the oceans cover about 70 percent of the Earth's surface, and that about 97 percent of all water on and in the Earth is saline—there's a lot of salty water on our planet. By some estimates, if the salt in the ocean could be removed and spread evenly over the Earth's land surface it would form a layer more than 500 feet (166 meters) thick, about the height of a 40-story office building (NOAA). But, where did all this salt come from? If you get into folk stories and mythology you will see that almost every culture has a story explaining how the oceans became salty. The answer is really very simple. Salt in the ocean comes from rocks on land.

Rivers and surface runoff are not the only source of dissolved salts. Hydrothermal vents are recently-discovered features on the crest of oceanic ridges that contribute dissolved minerals to the oceans. These vents are the exit point on the ocean floor from which sea water that has seeped into the rocks of the oceanic crust has become hotter, has dissolved some of the minerals from the crust, and then flows back into the ocean. With the hot water comes large amounts of dissolved minerals. Estimates of the amount of hydrothermal fluids now flowing from these vents indicate that the entire volume of the oceans could seep through the oceanic crust in about 10 million years.

Wikpedia.com
usgs.gov

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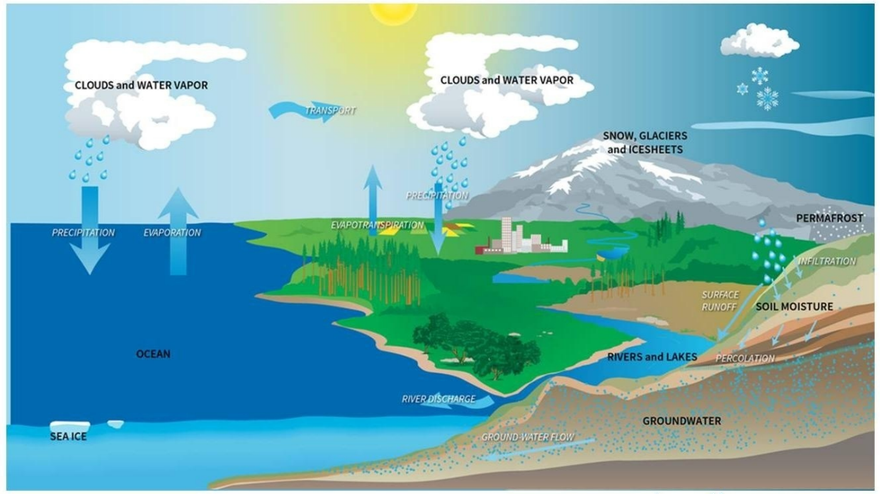

https://www.nasa.gov

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Interpret a Graph

Write the title of the graph _____

Circle the type of chart this represents

Bar Chart *Line Chart* *Pie Chart* *Other*

If applicable,

What does the X-axis represent _____

What does the Y-axis imply _____

Summarize what this graph represents or conveys

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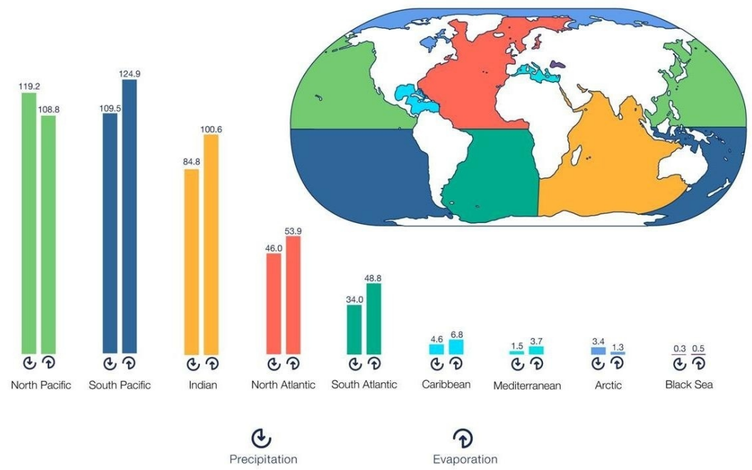
https://www.nasa.gov



22.1 Motion

Physical Science

Summarize main points from each video.

Video Title / topic _____

Video Title / topic _____

Video Title / topic _____

Topic Introduction

Summarize your understanding of each paragraph.

In physics, motion is a change in position of an object over time. Motion is described in terms of displacement, distance, velocity, acceleration, time and speed.

If the position of a body is not changing with respect to a given frame of reference, the body is said to be at rest.

Classical mechanics is fundamentally based on Newton's laws of motion. These laws describe the relationship between the forces acting on a body and the motion of that body. They were first compiled by Sir Isaac Newton .

The three Laws of Motion: (1) Every object will remain at rest unless acted upon by an external force (2) Force equals mass times acceleration (3) For every action in nature there is an equal and opposite reaction.

https://en.wikipedia.org/wiki/Motion_(physics)

Read/Summarize Text

1. **Read the passage.**
2. **Underline key expressions in each sentence.**
3. **Re-write each word (or expression) you underlined.**
4. **Summarize the passage.**

Newton's Laws of Motion

1

2

Newton's three laws of motion were the first to accurately provide a mathematical model for understanding orbiting bodies in outer space. This explanation unified the motion of celestial bodies and motion of objects on earth.

1. A body either is at rest or moves with constant velocity, until and unless an outer force is applied to it.
2. An object will travel in one direction only until an outer force changes its direction.
3. Whenever one body exerts a force F onto a second body, the second body exerts the force −F on the first body. F and −F are equal in magnitude and opposite in sense. So, the body which exerts F will go backwards.

https://www.grc.nasa.gov/www/k-12/airplane/newton.html

Re-write words you underlined

3

_____ _____ _____

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Using a complete sentence, summarize or rephrase the passage

4

Read Text for Comprehension

Read this article for deeper understanding. No summary is required, although you may want to circle, underline, or mark key ideas and words.

The motion of an aircraft through the air can be explained and described by physical principals discovered over 300 years ago by Sir Isaac Newton. Newton worked in many areas of mathematics and physics. He developed the theories of gravitation in 1666, when he was only 23 years old. Some twenty years later, in 1686, he presented his three laws of motion in the "Principia Mathematica Philosophiae Naturalis."

(1)

Newton's **first law** states that every object will remain at rest or in uniform motion in a straight line unless compelled to change its state by the action of an external force. This is normally taken as the definition of inertia. The key point here is that if there is no net force acting on an object (if all the external forces cancel each other out) then the object will maintain a constant velocity. If that velocity is zero, then the object remains at rest. If an external force is applied, the velocity will change because of the force.

(2)

The **second law** explains how the velocity of an object changes when it is subjected to an external force. The law defines a force to be equal to change in momentum (mass times velocity) per change in time. Newton also developed the calculus of mathematics, and the "changes" expressed in the second law are most accurately defined in differential forms.

$$F = m * a$$

(3)

The **third law** states that for every action (force) in nature there is an equal and opposite reaction. In other words, if object A exerts a force on object B, then object B also exerts an equal force on object A. Notice that the forces are exerted on different objects. The third law can be used to explain the generation of lift by a wing and the production of thrust by a jet engine.

https://www.grc.nasa.gov/www/k-12/airplane/newton.html

Draw Illustration

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http://www.physicsclassroom.com

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Interpret a Graph

Write the title of the graph _____

Circle the type of chart this represents

Bar Chart Line Chart Pie Chart Other

If applicable,

What does the X-axis represent _____

What does the Y-axis imply _____

Summarize what this graph represents or conveys

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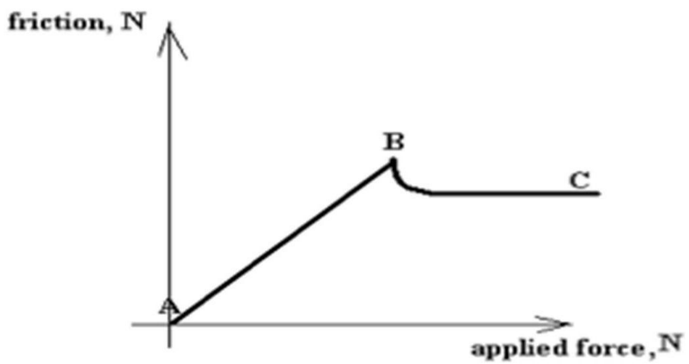
http://www.chegg.com



23.1 Force (Newton's 3 Laws of Motion)

Physical Science

Summarize main points from each video.

Video Title / topic _____

Video Title / topic _____

Video Title / topic _____

HoneycuttScience.com

Topic Introduction

Summarize your understanding of each paragraph.

Sir Isaac Newton was an English mathematician, astronomer, theologian and physicist who is widely recognized as one of the most influential scientists of all time. Newton's laws of motion are three physical laws that laid the foundation for classical mechanics.

First law: An object at rest remains at rest and an object in motion remains in motion - unless acted upon by a force.

Second law: Force equals mass multiplied by acceleration (F= ma).

Third law: When one body exerts a force on a second body, the second body simultaneously exerts a force equal in magnitude and opposite in direction on the first body.

Read/Summarize Text

1. **Read the passage.**
2. **Underline key expressions in each sentence.**
3. **Re-write each word (or expression) you underlined.**
4. **Summarize the passage.**

Oklahoma HS-PS2 1 through 4 (2015). Forces and Interactions

1

Newton's second law accurately predicts changes in the motion of macroscopic objects.

2

Momentum is defined for a particular frame of reference; it is the mass times the velocity of the object. If a system interacts with objects outside itself, the total momentum of the system can change; however, any such change is balanced by changes in the momentum of objects outside the system.

If a system interacts with objects outside itself, the total momentum of the system can change; however, any such change is balanced by changes in the momentum of objects outside the system.

Beginning page 140.

Re-write words you underlined

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_____ _____ _____

_____ _____ _____

Using a complete sentence, summarize or rephrase the passage

4

Read Text for Comprehension

Read this article for deeper understanding. No summary is required, although you may want to circle, underline, or mark key ideas and words.

Newton's Principia formulated the **laws of motion** and **universal gravitation** that dominated scientists' view of the physical universe for the next three centuries. By deriving Kepler's laws of planetary motion from his mathematical description of gravity, and using the same principles to account for the trajectories of comets, the tides, the precession of the equinoxes, and other phenomena, Newton removed the last doubts about the validity of the heliocentric model of the Solar System and demonstrated that the motion of objects on Earth and of celestial bodies could be accounted for by the same principles. Newton's theoretical prediction that the Earth is shaped as an oblate spheroid was later vindicated by the geodetic measurements of Maupertuis, La Condamine, and others, thus convincing most Continental European scientists of the superiority of Newtonian mechanics over the earlier system of Descartes.

Newton also built the first practical **reflecting telescope** and developed a sophisticated **theory of color** based on the observation that a prism decomposes white light into the colors of the visible spectrum. Newton's work on light was collected in his highly influential book Opticks, first published in 1704. He also formulated an empirical **law of cooling**, made the first theoretical calculation of the **speed of sound**, and introduced the notion of a **Newtonian fluid**. In addition to his work on calculus, as a mathematician Newton contributed to the study of **power series**, generalized the **binomial theorem** to non-integer exponents, developed a method for approximating the **roots of a function**, and classified most of the **cubic plane curves**.

Physics: *laws of motion; universal gravitation; reflecting telescope, theory of color; law of cooling; speed of sound; Newtonian fluid.*

Math: *power series; binomial theorem; roots of a function; cubic plane curves.*

https://en.wikipedia.org/wiki/Isaac_Newton

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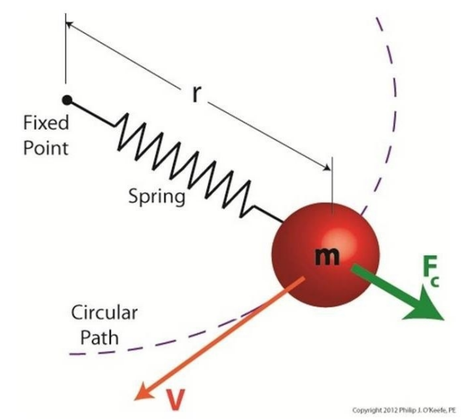

http://www.engineeringexpert.net/Engineering-Expert-Witness-Blog/tag/sir-isaac-newton

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Interpret a Graph

Write the title of the graph _____

Circle the type of chart this represents

Bar Chart *Line Chart* *Pie Chart* *Other*

If applicable,

What does the X-axis represent _____

What does the Y-axis imply _____

Summarize what this graph represents or conveys

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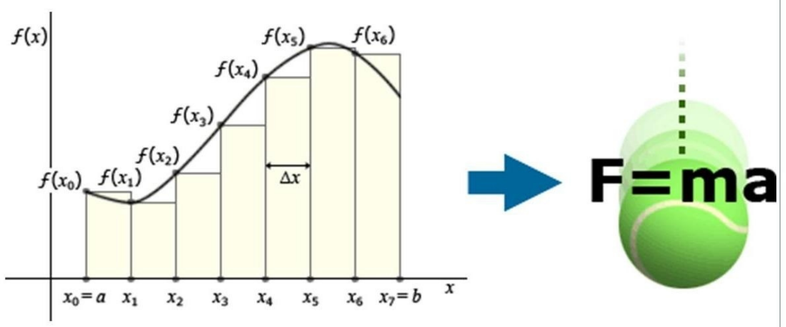
https://undsci.berkeley.edu/article/mathematics

Advances in calculus helped Isaac Newton formulate a new understanding of how objects in the natural world move.



24.1 Work and Energy (Part I)

Physical Science

Summarize main points from each video.

Video Title / topic _____

Video Title / topic _____

Video Title / topic _____

Topic Introduction

Summarize your understanding of each paragraph.

The expression “work” is used in every-day language to convey several meanings. The expression “work” when used in science (physics, in particular) has a specific meaning. When this topic refers to *work,* the science definition is intended (work=force * distance).

Work is done only when force is applied to an object and the object moves in the same direction as the applied force. Work is calculated by multiplying the force by the distance over which the force is applied.

Take a look at the math formula of *W=fd* which translates to work equals force multiplied by distance. Notice that if the force is zero, or if the distance is zero, then the work would also be zero.

As an example, if you try to move a very heavy stone and apply a lot of force toward the effort, but the stone never moves – then according to physics, no work is done. This would be W = (big force) times (zero distance). Anything multiplied by zero is zero … so … zero.

Read/Summarize Text

1. **Read the passage.**
2. **Underline key expressions in each sentence.**
3. **Re-write each word (or expression) you underlined.**
4. **Summarize the passage.**

What is Power? …. Or, as a science pun: Watt is Power?

1
2

Power is another interesting word in physics. Power has a very specific meaning.

Power is calculated by dividing work by time.

$$\text{Power} = \frac{\text{work}}{\text{time}} \qquad P = \frac{W}{t}$$

Whereas work is measured in joules (J), power is measured in watts. The amount of power needed to do one joule of work in one second is called a watt (W).

Re-write words you underlined

3

_____ _____ _____

_____ _____ _____

Using a complete sentence, summarize or rephrase the passage

4

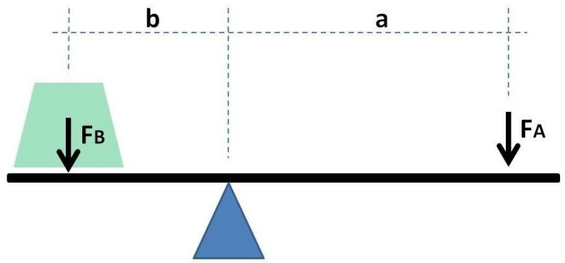
Read Text for Comprehension

Read this article for deeper understanding. No summary is required, although you may want to circle, underline, or mark key ideas and words.

Mechanical advantage is a measure of the force amplification achieved by using a tool, mechanical device or machine system. The device preserves the input power and simply trades off forces against movement to obtain a desired amplification in the output force.

The lever is a movable bar that pivots on a fulcrum attached to or positioned on or across a fixed point. The lever operates by applying forces at different distances from the fulcrum, or pivot.

As the lever pivots on the fulcrum, points farther from this pivot move faster than points closer to the pivot. The power into and out of the lever is the same, so must come out the same when calculations are being done. Power is the product of force and velocity, so forces applied to points farther from the pivot must be less than when applied to points closer in.



https://en.wikipedia.org/wiki/Mechanical_advantage

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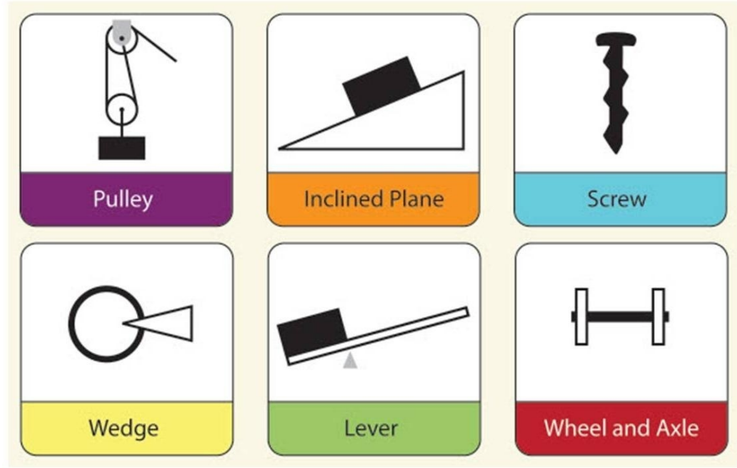

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Interpret a Graph

Write the title of the graph _____

Circle the type of chart this represents

Bar Chart Line Chart Pie Chart Other

If applicable,

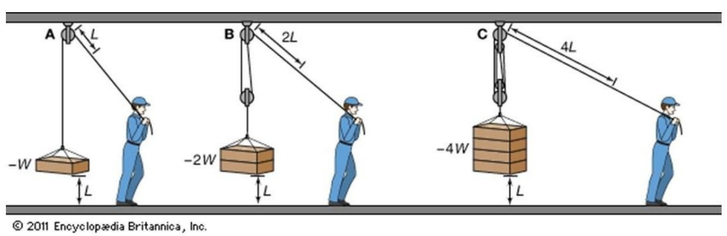
What does the X-axis represent _____

What does the Y-axis imply _____

Summarize what this graph represents or conveys

_____

https://kids.britannica.com/students/assembly/view/53665



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References

Web Sites

abcnews.go.com
acs.org
answers.yahoo.com
astronomynotes.org
berkeley.edu
britannica.com
businessinsider.com
chegg.com
chem4kids.com
concord.org
engineeringexpert.net
factmonster.com
github.io
nap.edu
nasa.gov
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physicsclassroom.com
sciencelearn.org.nc
zionmarketresearch.com
diffen.com
slideplayer.com
socratic.org
study.com
usgs.gov
viziscience.com
wikibooks.org
wikipedia.com
wikipedia.org

Text Books

Allison, M. A. (2010). Austin, TX: Holt McDougal.

Zumdahl, S. S. (2007). Belmont, CA: Brooks/Cole.

Nowiki, S. (2012). Orlando, FL: Houghton Mifflin Harcourt Publishing Company.

Dobson, K. (2008). Austin, TX: Holt, Rinehart and Winston.

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