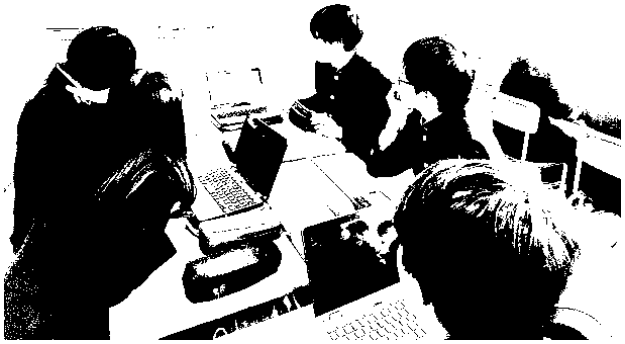
Super Science English 2024

Visual Dictionary

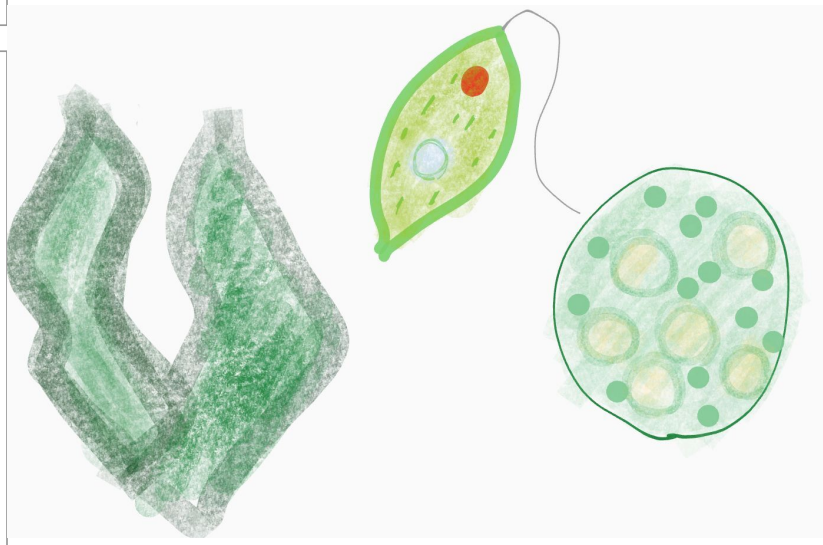
Biology & Physics

By Class 3-6, Tsuyama High School



Algae

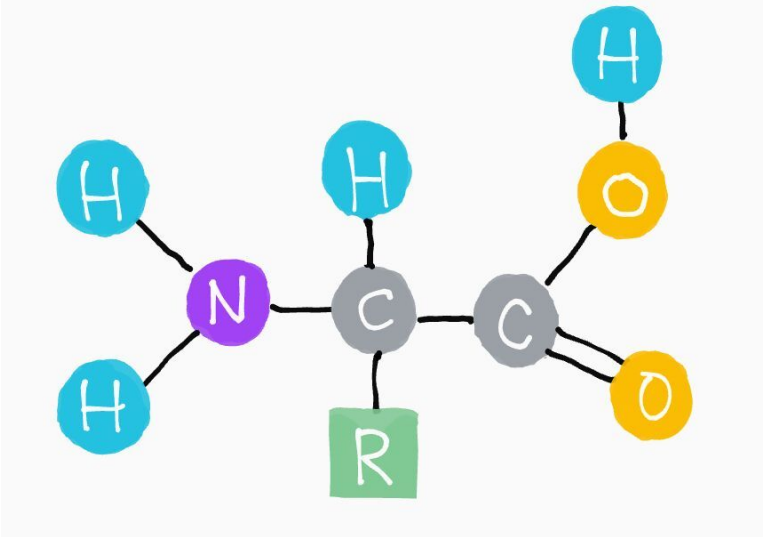
They are very simple, usually small plants that grow in or near water and do not have ordinary leaves or roots. Some examples are seaweed (wakame, kombu), volvox, spirogyra, euglena and so on. They are neither bacteria nor plants. They emerged three billion years ago.They are generally harmless to human. So they are used as a material of medicine and cosmetics.



3-6,No.(26) Name(Nakamura Kanon)

Amino Acid

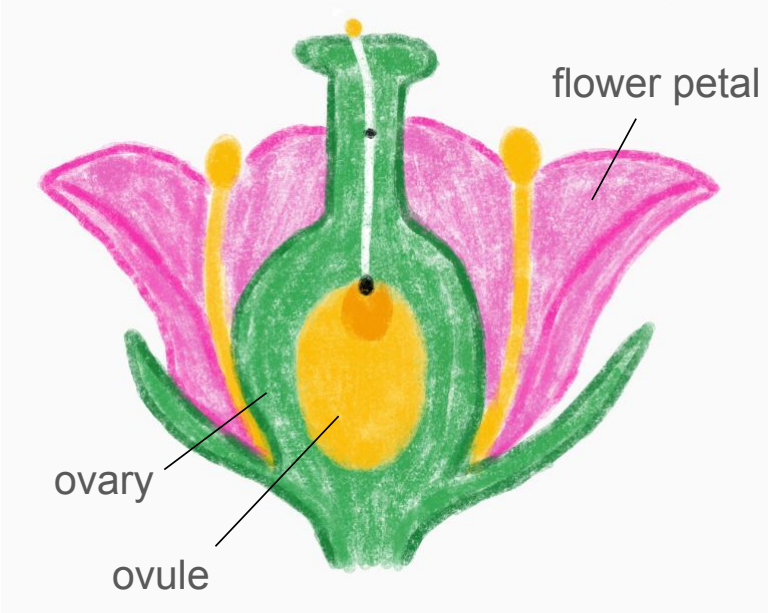
It is a generic term for compounds with an acidic carboxyl group and a basic amino group in the molecule. About 500 types have been found in nature, and four of them were found in meteorites in 1969. Twenty-two of all of them make up proteins, and in humans they are composed of 20 species.



3-6,No.(19) Name(Sasaki Yui)

Angiosperm

This is a group of plants whose ovules are covered by the ovaries.
This is also included in the spermatophytes.
They have blooming flowers. These flowers make fruit through pollination.
This is the most advanced plant group. It emerged in the Jurassic Period.
We can see these plants anywhere, of course, we can see them at school on the roadside and in gardens and so on.



3-6,No.(6) Name(Hanano Irie)

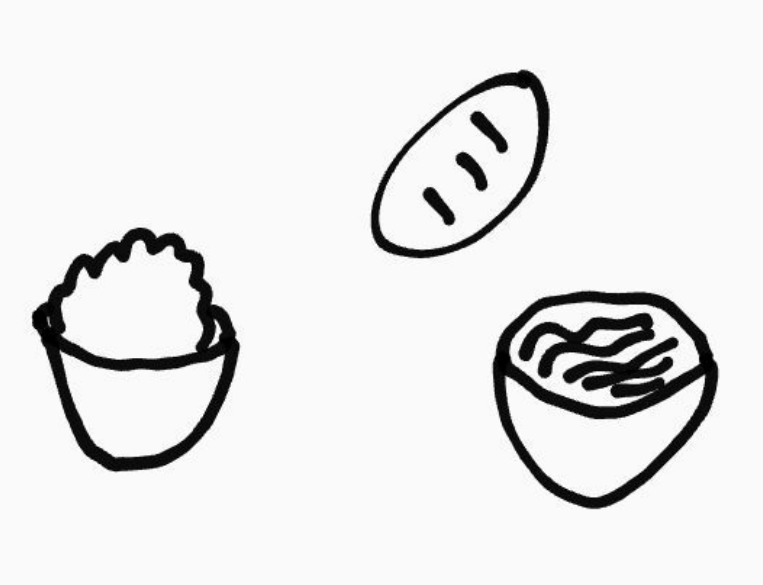
Biodiversity

The word means the connections between many living things on the earth.
They are classified into three, variation of Environment, species, and genetics.

3-6,No.(16) Name(小林 歩夢)

Carbohydrates

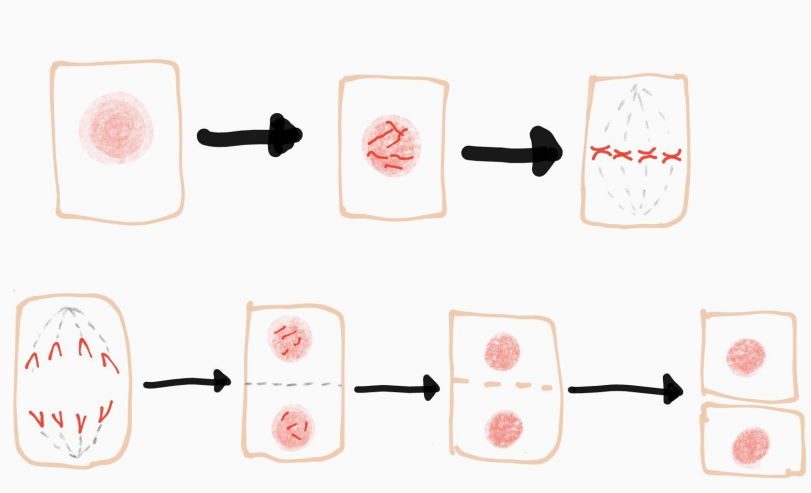
It is one of the three main types of nutrients. It provides glucose which is the main energy source for our body tissue. When we take in this nutrient, it is broken down in our mouth by the enzyme amylase. We mainly get this nutrient from rice, bread, or noodles. It is essential to the body, but the amount of intake must be controlled because eating too much of this can make us gain weight.



3-6,No.(9) Name(Otani Ayumu)

Cell Division

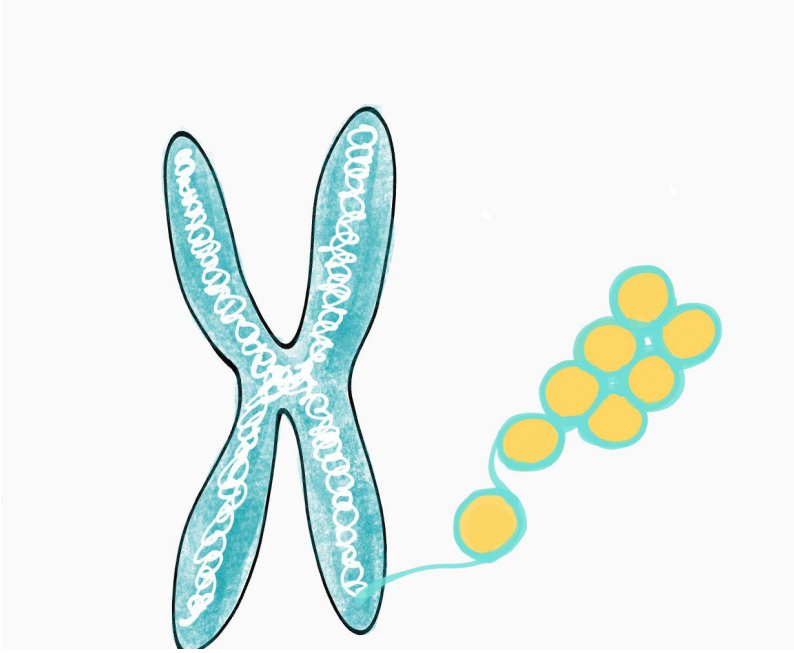
In unicellular organisms, it is the means of the reproduction. There are two types. One cell splits into two, each of which grows larger before splitting again. The four phases G1,S,G2 and M make up this cycle. It lasts between 10 and 20 hours. Microtubules act as spindle threads to split the chromosome in two, which causes this phenomenon. Sometimes some things fall outside this cycle. It is called G0. For example muscle, heart and nervus. We've been doing it since we were born.



3-6,No.(26) Name(Nakamura Kanon)

Chromosome

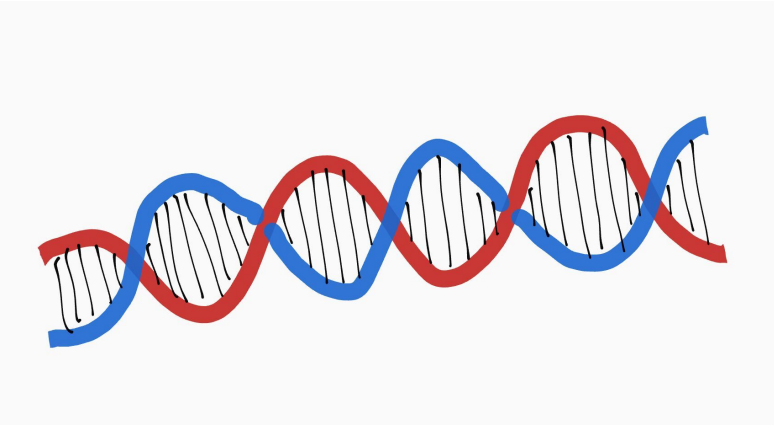
This is in the nucleus of the cell.
We can see this when cells divide, and look like long string. Responsible for the expression and transmission of genetic information.This is a structure in which DNA is wrapped around histones. One human cell has this 46.



3-6,No.(5) Name(China Ishio)

DNA

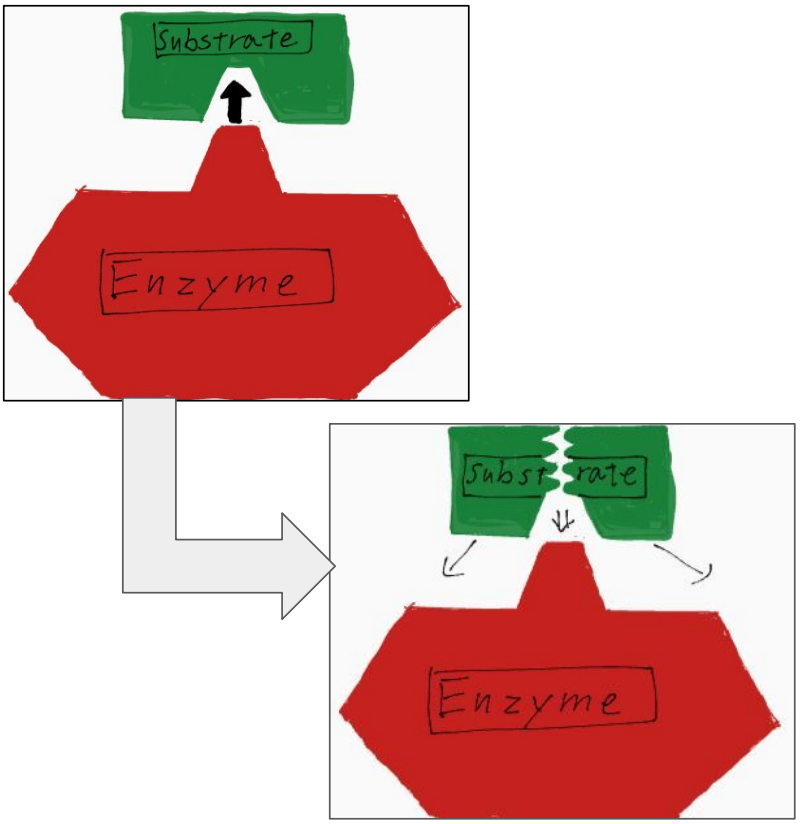
The molecule that can be found in the cells of living things and many viruses. It determines the structure and function of each cell. It carries genetic information and plays a central role in protein synthesis. It consists of two polynucleotide strands in the form of a double helix, containing phosphate, sugar, and one of four bases(A,T,G,C).
It is also called “deoxyribonucleic acid”.



3-6,No.(13) Name(Mao Kamiya)

Enzyme

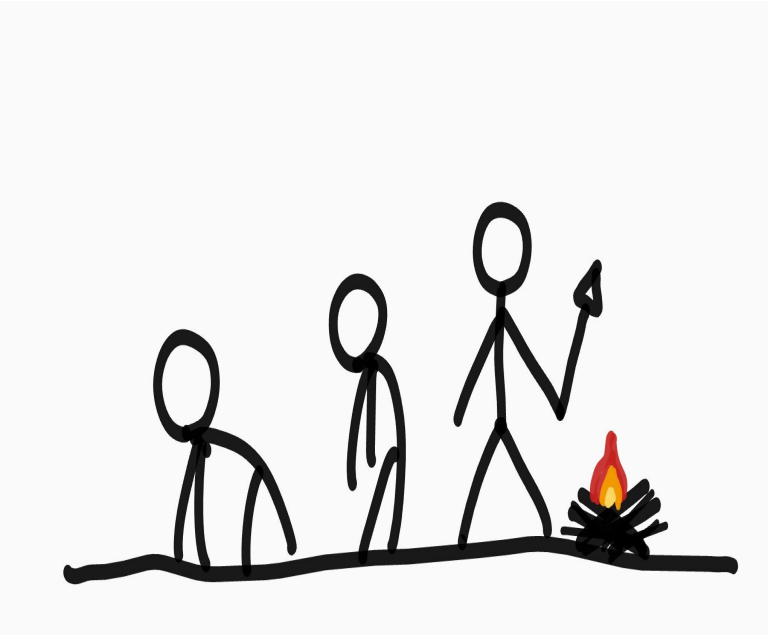
It's a catalyst in the living body. It is composed of protein. It has an active site. This gives it substrate specificity so that it only connects to the specific materials. For example, catalase is what breaks down hydrogen peroxide into the oxygen and water. Another example, amylase is what breaks down starch into glucose. We can't live without this.



3-6,No.(8) Name(Osako Shota)

Evolution

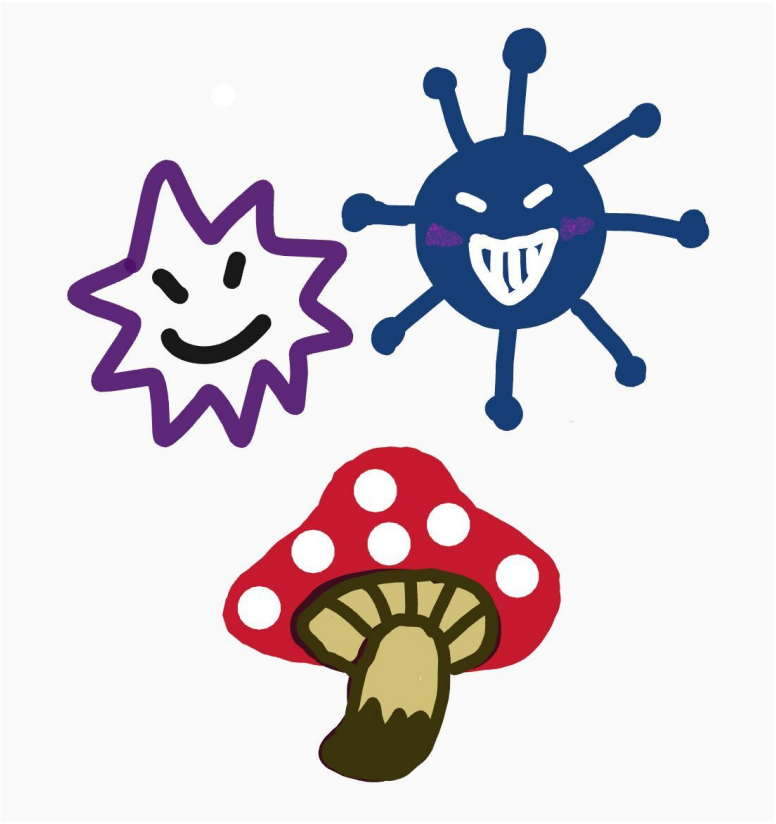
Living things change over a long period of time. The form of living things transform to fit their own environment.
There are evidences that life changed from simple to complicated and all living things have a common ancestor.



3-6,No.(5) Name(China Ishio)

Fungus

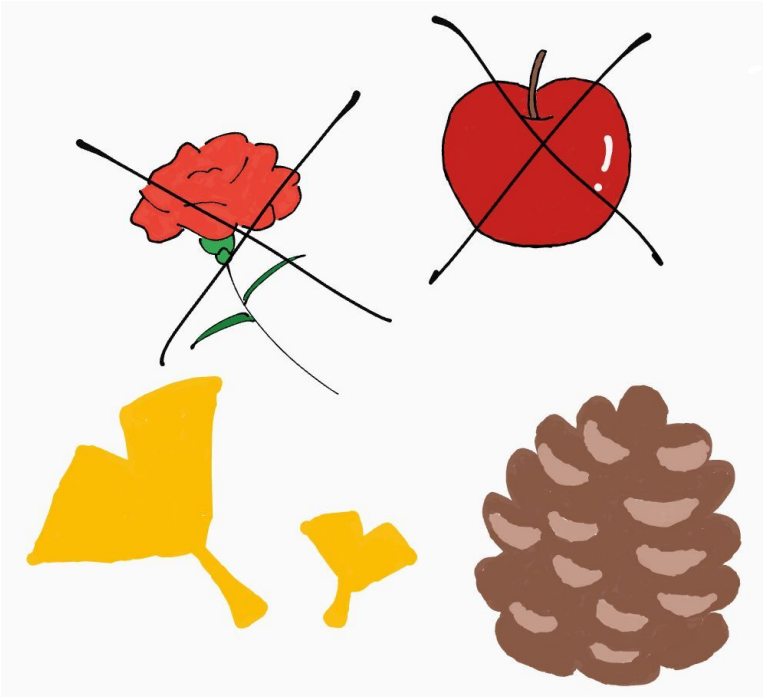
These are eukaryotes.
This is a group which has a nucleus and cell wall, but doesn’t have chloroplast, which is a green organelle.
This doesn't photosynthesize.
This decomposes organic matter on the outside of the body.
This includes mushrooms, yeast, and mold.



3-6,No.(6) Name(Hanano Irie)

Gymnosperms

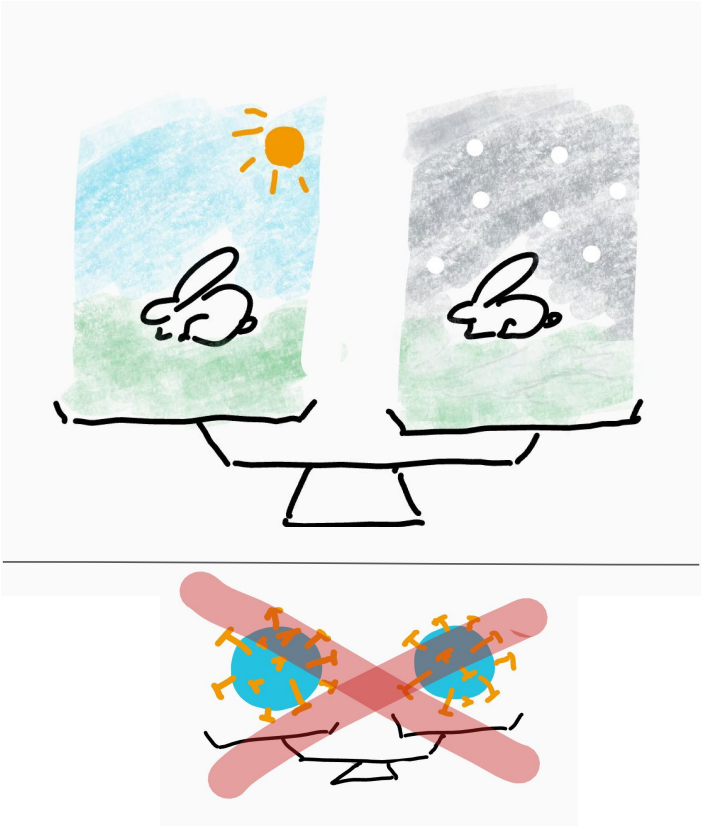
It is a seed plant in which the seed is not encased by the pericarp and is exposed.
It appeared 380 million years ago during the Middle Devonian period and has characteristics from the ancestors of seed plants.
Examples include pine trees, ginkgo trees, and cycads.



3-6,No.(19) Name(Sasaki Yui)

Homeostasis

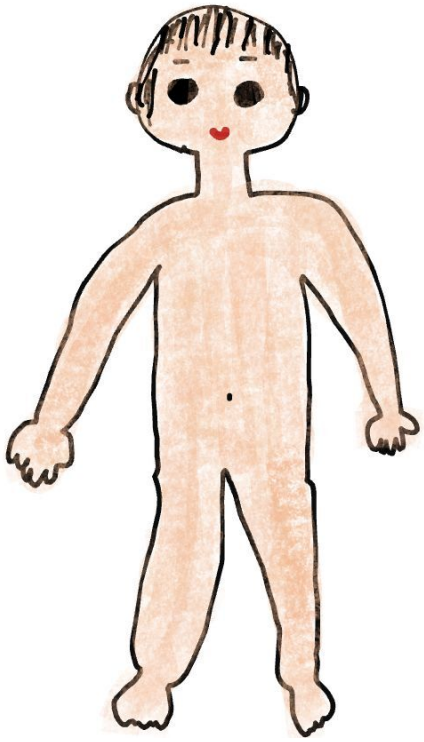
This is the system that maintains the stability in our body. This is necessary in our life. The term was created by Walter B. Cannon. We learned this in the first year of high school. Also, we learn this in English. Here are some examples. ex.1) In summer, you sweat. In winter, you get goosebumps. This maintains your body temperature. ex.2) We want to water when we are thirsty. This maintains our blood concentration.
These reactions are caused by this.



3-6,No.(21) Name(Takahashi Haruhi)

Homo Sapiens

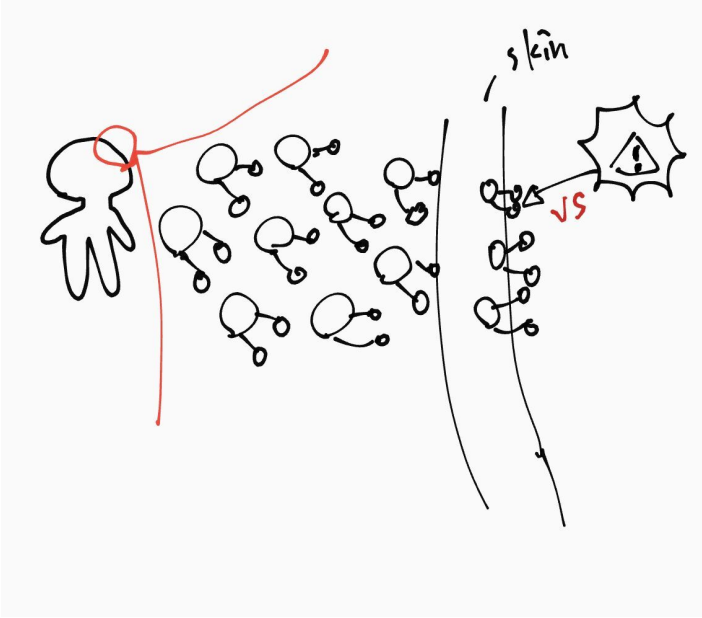
This is a scientific name.
They are living now.
We are classified as this species.It is said that the first of them were born in Africa about one-fifth billion years ago.They had come to Japan from the Eurasian Continent many many millennia ago.
They use erect bipedalism.



3-6,No.(28) Name(Hino Runa)

Immunity

It's a system to defend our body by removing bad things that come into our body.There are two kinds.
One is a non-specific response.
White blood cells kill something bad like a virus.
The other is a specific response.
It is done by helper t cells, killer t cells and b cells.They make antibodies and kill each pathogen.



3-6,No.(28) Name(Hino Runa)

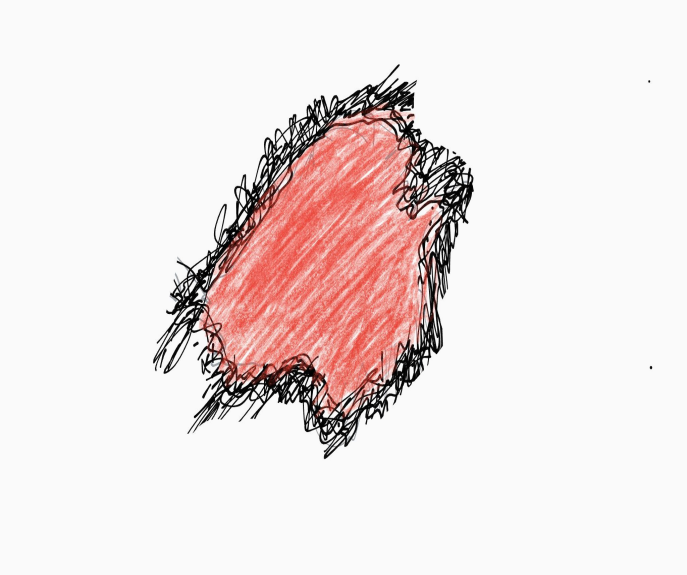
Invertebrate

It is a genetic term for animals without a spine. It accounts for more than 90% of all animals. They often have exoskeletons, and well-developed muscles. It includes arthropods and mollusks. Most of them, other than insects, live in the sea. For example, there are butterflies spiders, cuttlefish, crabs, and grasshoppers.

3-6,No.(8) Name(Osako Shota)

Macrophage

This is one of the most important thing that works as part of the body barrier.It eats bacteria
foreign object which disturb our immune system.
It works everywhere in our body and protects our health.
The data shows that one way we can increase our macrophage is laughing.
So, you should laugh out loud every day for your body.



3-6,No.(10　) Name(Ozaki Masataka
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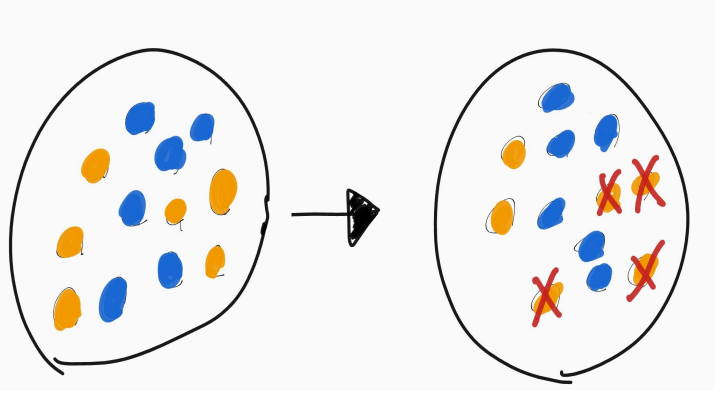
Natural Selection

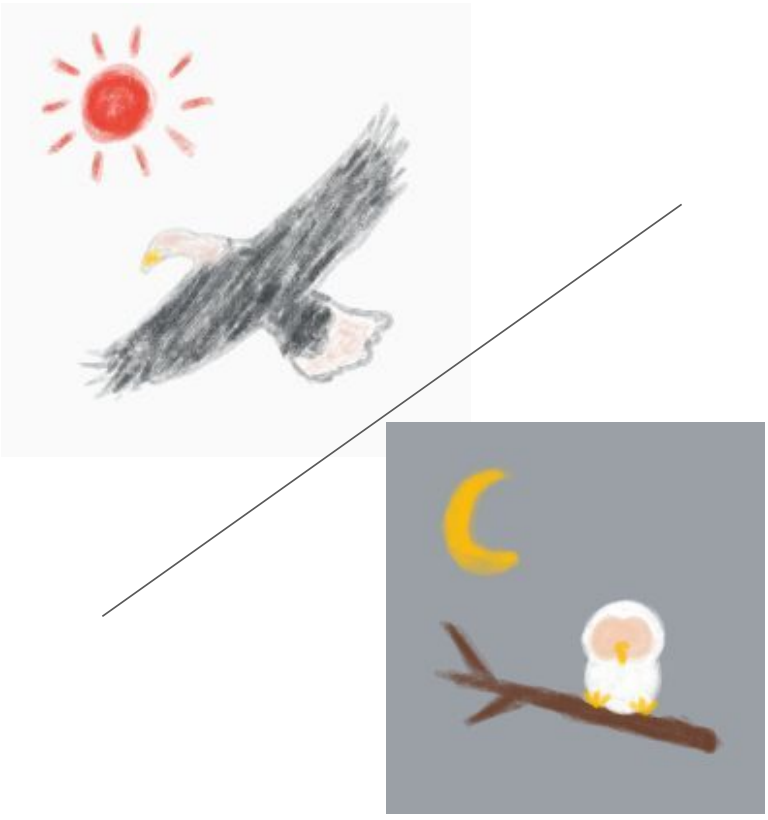
Selection that occurs in nature in response to genetic variation among individuals, when the variation is inherited and furthermore, under certain circumstances, there are differences in fertility and survival rates in response to the variation.



3-6,No.(34) Name(　三谷介晟　)

Niche

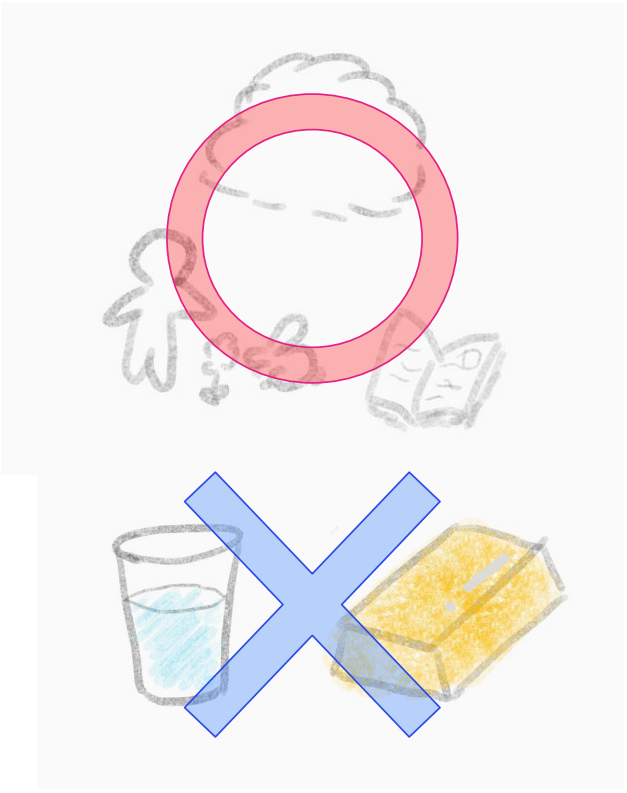
A position or role taken by a kind of living thing within its community. It refers to the environmental factors like food, space, activity time, and so on. Living things try to behave differently from other species so that they don't have to compete with each other. The coexistence of eagles and owls is one example of this. Although eagles and owls feed on the same creatures, eagles are usually active during the day, while owls are active at night.



3-6,No.(13) Name(Mao Kamiya)

Organic Matter

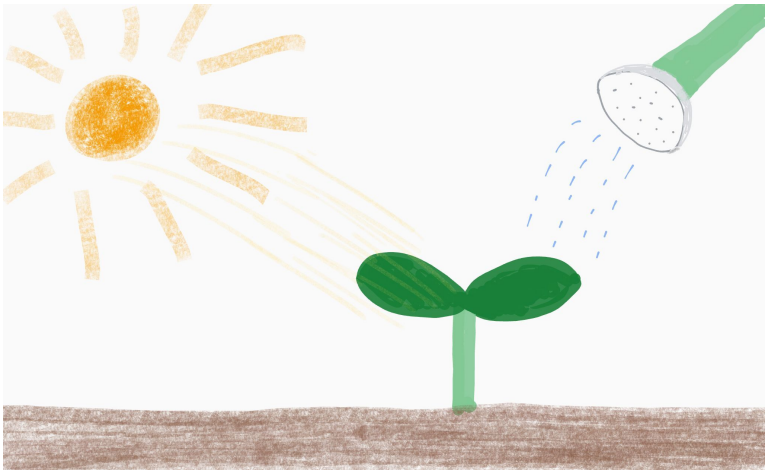
It is compound containing carbon. When this is burnt, carbon dioxide and water are formed. It starts as carbon dioxide in the atmosphere.This is generated in an organism's body. Plants produce it through photosynthesis. Herbivore make it in their bodies by eating plants. Carnivores make it by eating herbivores. Examples of things made of this are humans, rabbits, books, and so on. Glass and metal are not.



3-6,No.(21) Name(Takahashi Haruhi)

Photosynthesis

It is an essential function of plants. All plants and some small creatures produce oxygen with this function by using carbon dioxide and water. In the function, ATP is produced by using the energy from the sun. It can be separated two stages. In the first step, plants synthesize ATP and NADPH in the thylakoids. In the second one, plants reduce carbon dioxide and produce organic material in the stroma.



3-6,No.(18) Name(Sakamoto Suzuka)

Platelet

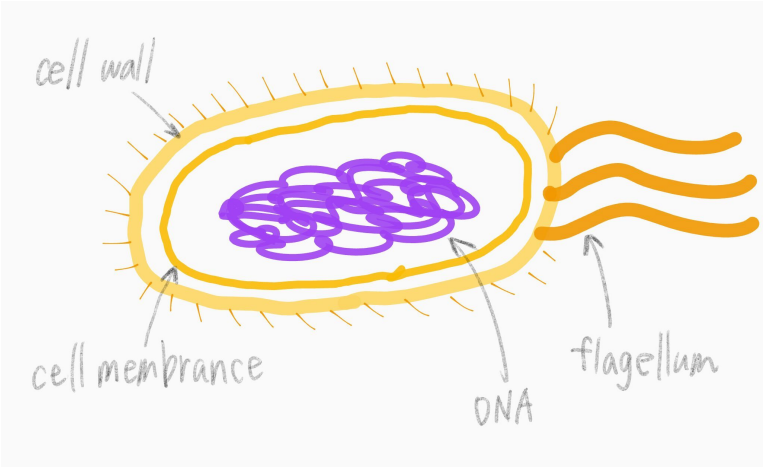
It is created in our bone marrow and drifts in the blood. When you are injured and bleed, it helps you stop bleeding.

It is not an independent cell. It is made from a fragment of a megakaryocyte. So it does not have its own cell nucleus.

3-6,No.(10) Name(Kobayashi Ayumu)

Prokaryote

It is said that it came into being about 3.8 billion years ago. It doesn't have organelles such as a nucleus inside its cell. The size of it is 1~10 μm. People classify it into Bacteria and Archaea. Some people say eukaryote was born by its intracellular symbiosis.
Some representative example of it are Escherichia coli and methanogens.



3-6,No.(18) Name(Sakamoto Suzuka)

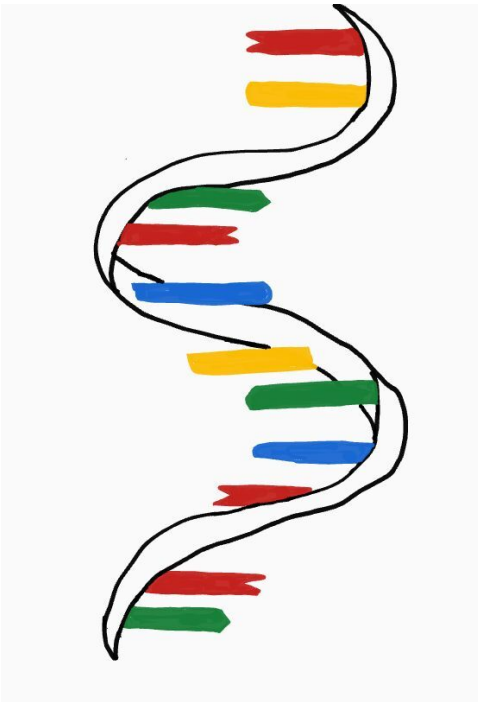
Respiration

All living organisms are doing it. It’s reaction that oxygen to disassemble organic matter to synthesize ATP. It uses place in the lungs, gills and skin, depending on the type of organism.

3-6,No.(4) Name(Ando Saki)

RNA

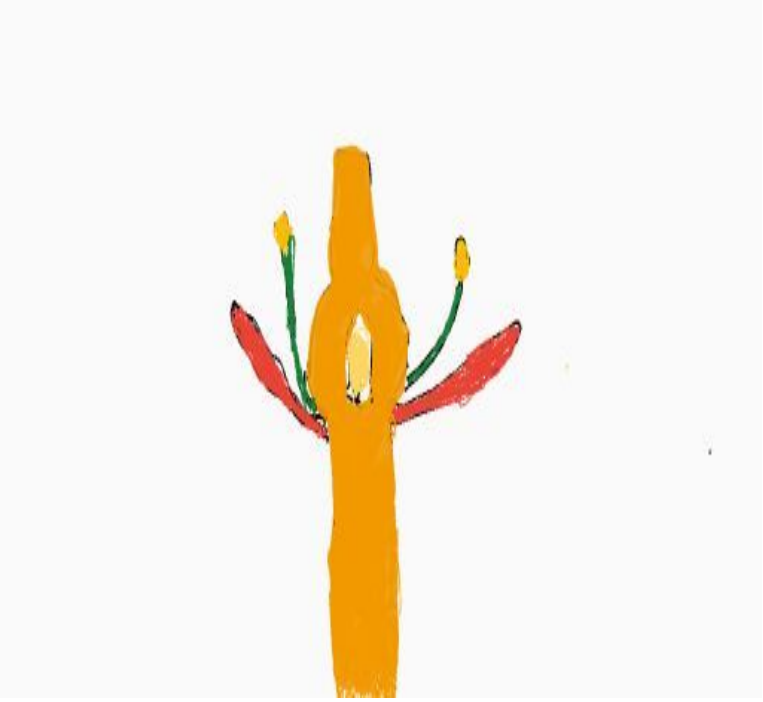
It is a single strand and unstable molecule needed for life. There are many kinds of it and they work differently. For example, some of them participate in making of protein. And there are creatures that have it as genetic information. Influenza virus or HIV are classified in this category. It is similar to DNA, but with different types of sugars or bases.



3-6,No.(9) Name(Otani Ayumu)

Spermatophytes

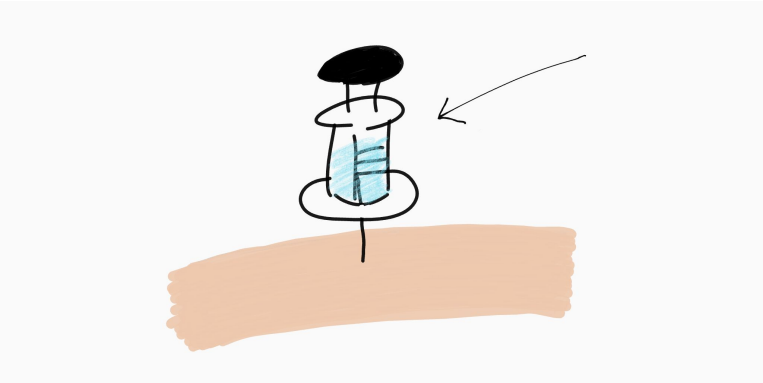
Seed plants are the most evolved plants in the world. They account for 80% of all plants. They conduct sexual reproduction and form flowers and seeds. Examples include rice, wheat, soybean, and corn.
For angiosperms, the ovule, which becomes the seed, is covered and protected by the ovary,
which becomes the fruit.
While for gymnosperms the ovules are visible from the outside.



3-6,No.(10) Name(Ozaki masataka)

Vaccine

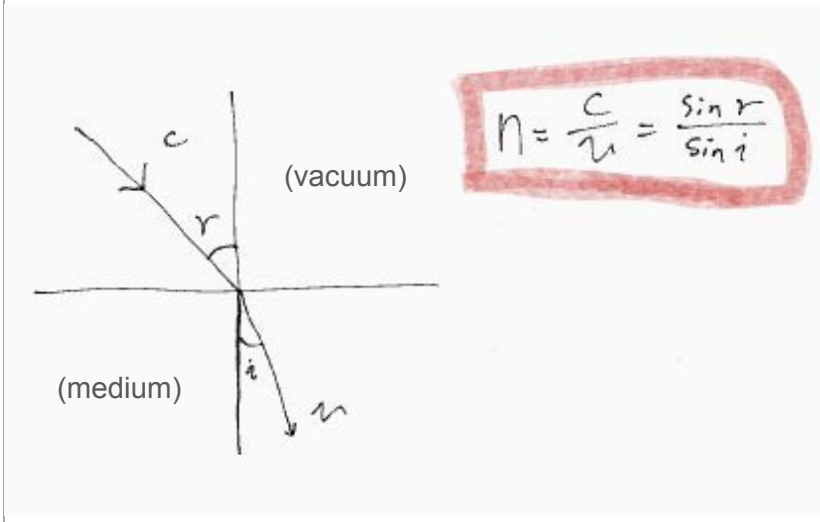
A type of inoculation in which a weakened pathogen or its product is injected to cause an immune response and artificially give immunological memory.



3-6,No.(34) Name(Mitani Kaisei)

Absolute Refractive Index

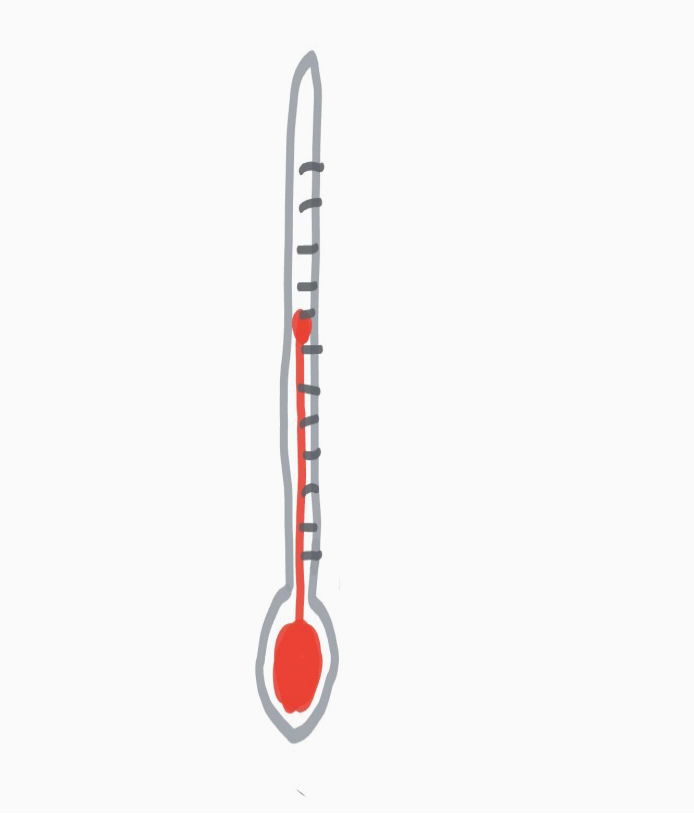
The refractive index of light incident from a vacuum into a medium at its boundary.
It is the ratio of the sine of the angle of incidence r to the sine of the angle of refraction i and is equal to c/v, the ratio of the speed of light in vacuum c to the speed of light in the medium v. The way light travels is shown in the illustration on the right.



3-6,No.(20) Name(Zenmoto Kazuma)

Absolute Temperature

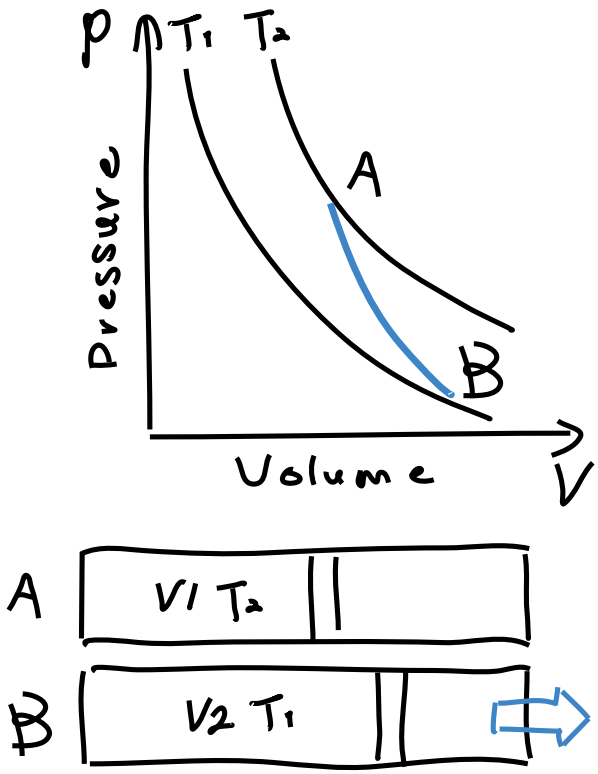
This is measured in Kelvin. This is the temperature at which thermal motion of molecules and atoms almost disappears. Zero degrees on it is expressed as -273.2 degrees Celsius. So,the temperature on this scale is calculated by adding 273.2 to a temperature on the Celsius scale. We learned this in Chemistry or Physics classes.We often see this in gas and thermodynamics calculations.



3-6,No.(29) Name(Sakura Fukushima)

Adiabatic Process

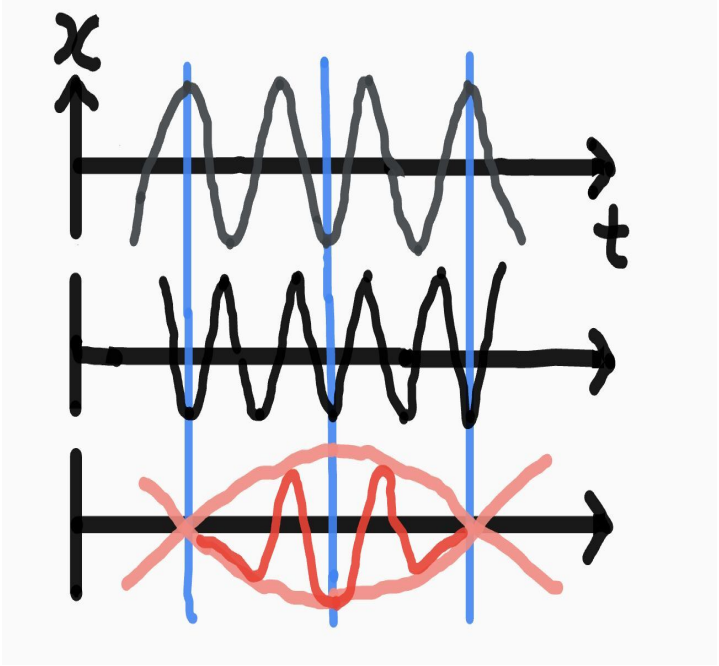
The thermodynamic process in which there is no exchange of heat from the system to its surroundings neither during expansion nor during compression.
The system must be perfectly insulated from the surroundings.
The process must be carried out quickly so that there isn't a sufficient amount of time for heat transfer to take place.
「Q=0, W=-ΔU」
Heat (Q) Work (W)
Thermal energy (U)



3-6,No.(11) Name(Kaga Kanta)

Beat

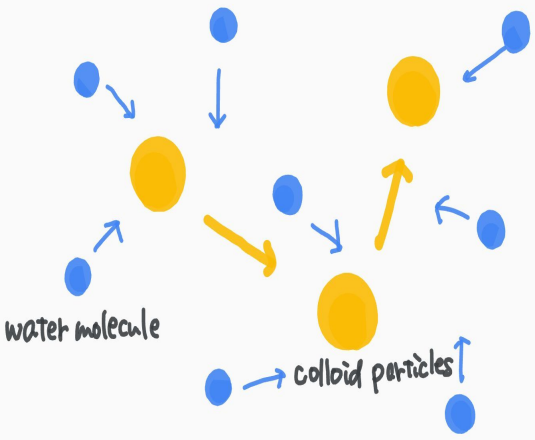
A phenomenon that occurs when two tones with slightly different frequencies are played at the same time, resulting in a louder or quieter sound. Sound vibrates the air and is transmitted as waves, and when sounds of slightly different frequencies overlap, some parts of the waves cancel each other out and others strengthen each other. As a result the intensity of the sound sounds like a wave.



3-6,No.(29) Name(Sakura Fukushima)

Brownian Motion

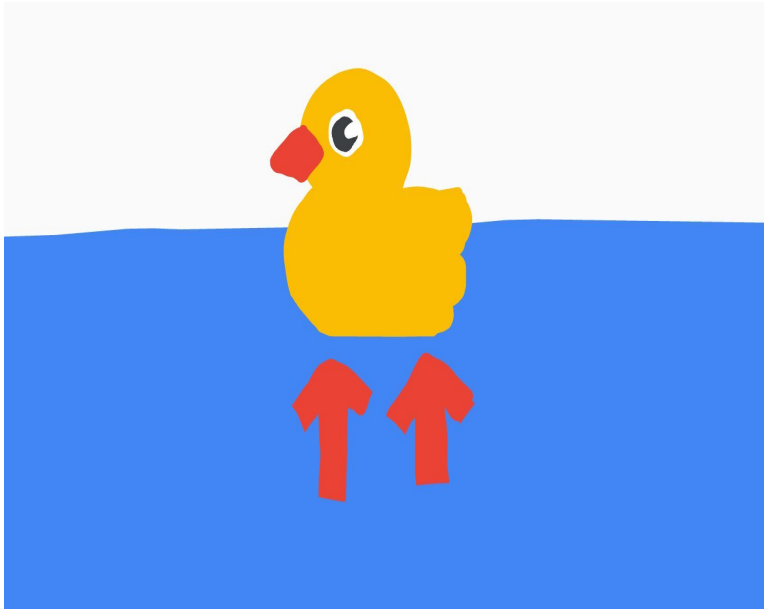
It is a phenomenon in which fine particles suspended in a liquid or gas move irregularly.
In 1827, Robert Brown discovered, while observing under a microscope, particles that had leaked into the water and floated from pollen that had been ruptured by the osmotic pressure of water.



3-6,No.(31) Name(Matsuoka Ayumi)

Buoyancy

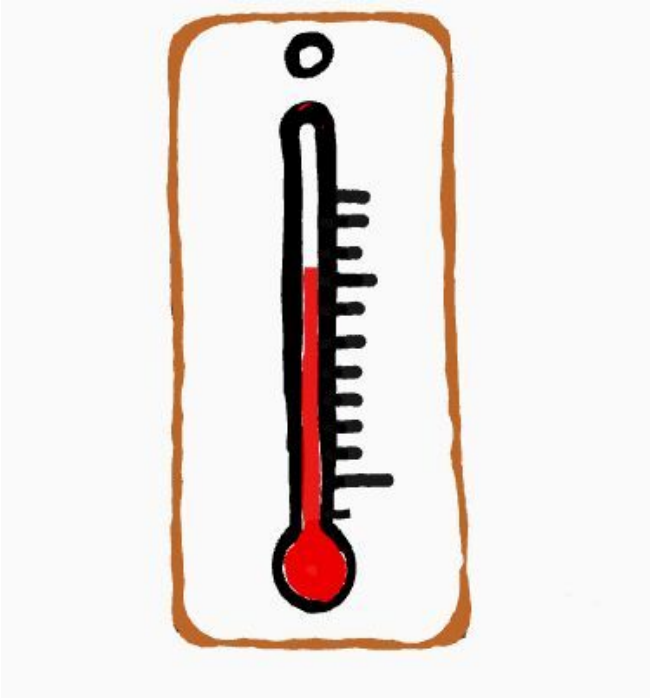
this is the power.
this power works only into the water.
this power to take up objects out of the water.
This is proportional to the volume of the object.so,The more larger this objects volume, the more greater the magnitude of this force.
This force allows us to swim, float in water, and even dive in water without sinking.



3-6,No.(25) Name(中野望羽)

Celsius Temperature

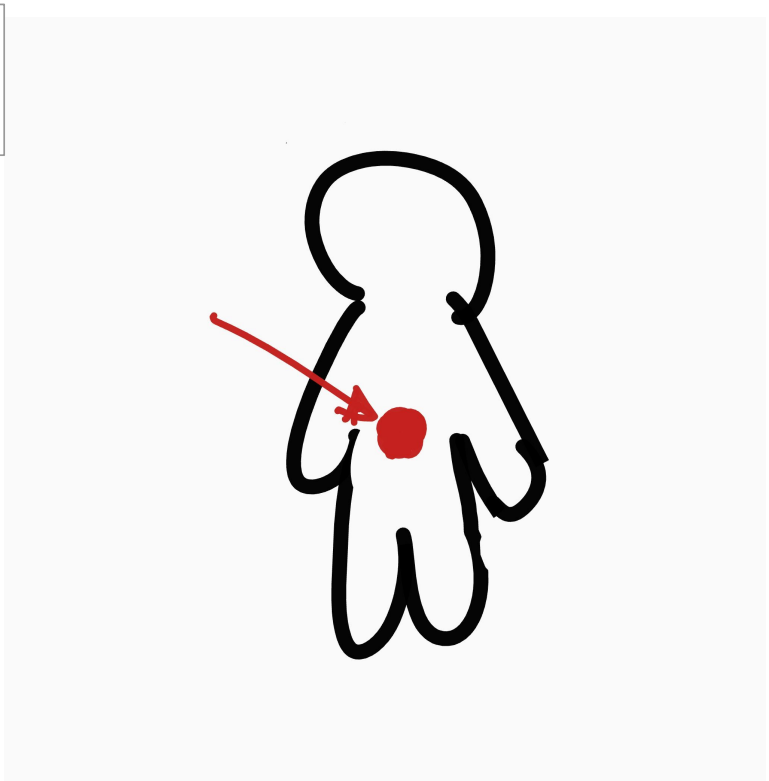
It is mainly used to indicate how hot or cold it is. Some countries use this scale, some countries don't. For example,the United States does not use this scale. You can often see this in the chemistry class about the three phases of water change.
The temperature at which ice melts at 1 atmospheric pressure is defined as 0 degrees on this scale, and the temperature at which water boils is defined as 100 degrees on it.
What is this？



3-6,No.(14) Name(Rikuto kuroishi)

Center of Gravity

This is defined in physics "In a system where mass is distributed over a spatial extent, the point defined as the point of action of the resultant force of universal gravitation acting on that mass from other object." It is important to stand. Also if you don't have it, you won't be able to run well. It is learned not only in physics but also in mathematics. We call it 'g' in math class. .

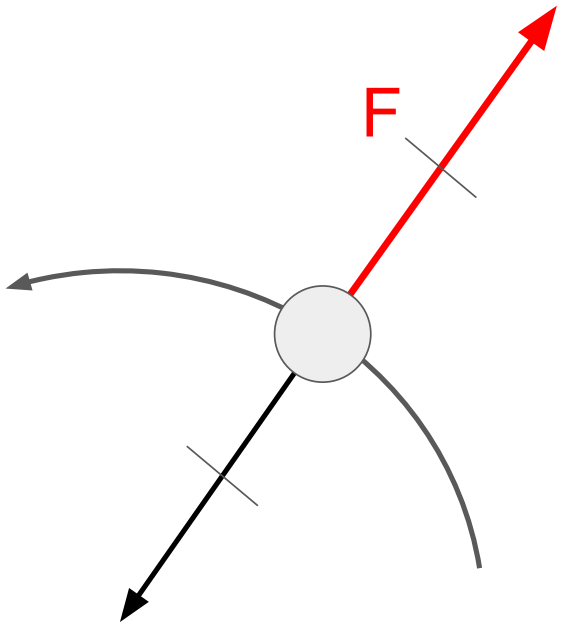


3-6,No.(7) Name(Ueda Taisei)

Centrifugal Force

Centrifugal force is a force that appears to be applied to an object in circular motion. When the object is observed in the rotating frame of reference, this force must be considered. The magnitude of centrifugal force F is proportional to mass m of the object, the distance r from the axis of rotation, and the angular velocity ω squared:

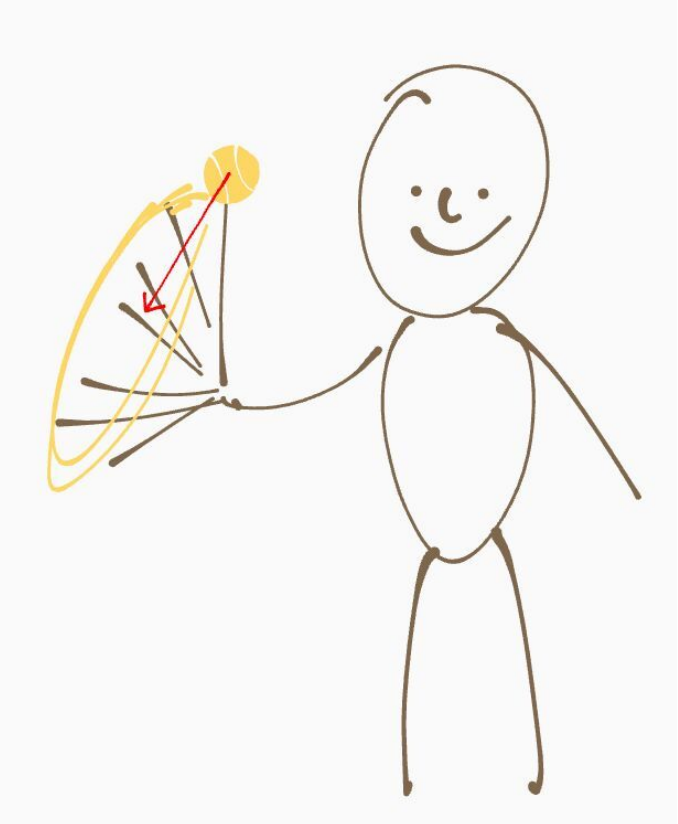
$$F = mr\omega^2$$



3-6,No.(32) Name(松野 隼達)

Centripetal Force

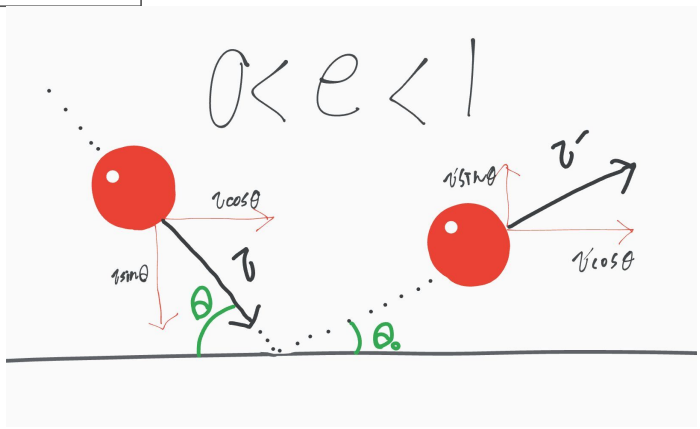
This is the force required to move an object in a curve path. Its direction is always perpendicular to the object's movement.
This is the force in the direction of the center when the total force acting on an object at a certain point in its orbit delete is decomposed.
It constantly changes the direction of the object's velocity, pulling it away from its linear motion and causing it to rotate around its center.



3-6,No.(12) Name(Kagawa Tamae)

Coefficient of Restitution

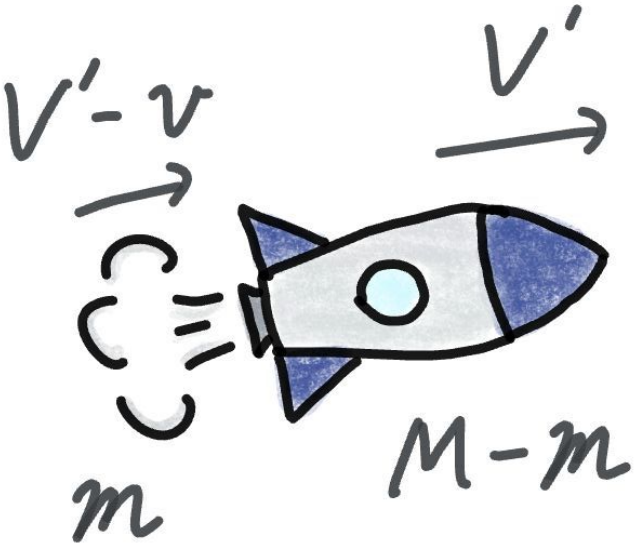
The ratio of velocity v' after collision to velocity v before collision.
For example, if a ball with velocity V impacts a smooth floor at an angle of θ, and the ball bounces back with velocity V' and angle θo, we can say that this ratio value of the collision is greater than 0 and less than 1. In addition, this ratio value never exceeds 1.
This is expressed as e.
When this value is 1, it is an elastic collision,When the value of e is 0, it is called an inelastic collision.



3-6,No.(25) Name(Miu Nakano)

Conservation of Momentum

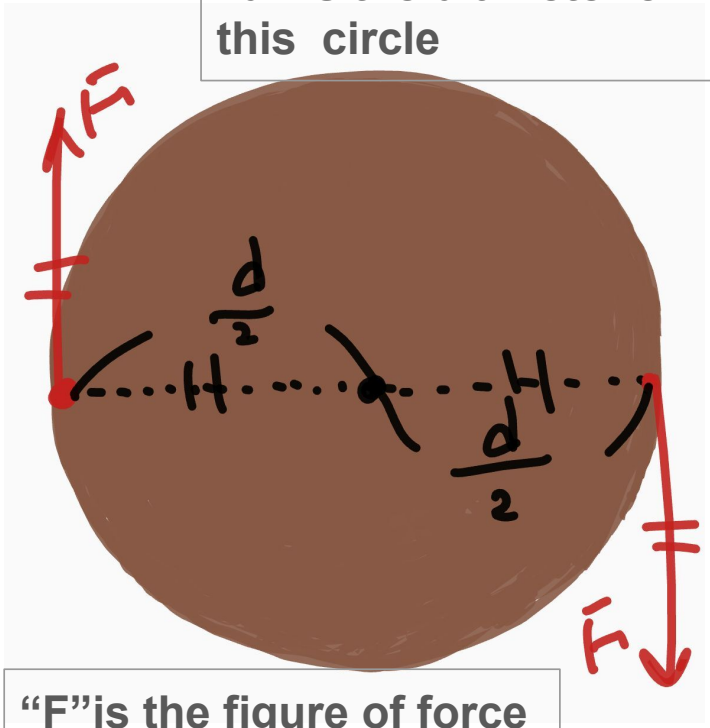
When two or more objects collide in an isolated system, their total momentum after the collision is equal to the total momentum before the collision unless an external force is applied. This is the principle by which rockets travel.



3-6,No.(24) Name(Terasaka Mei)

Couple

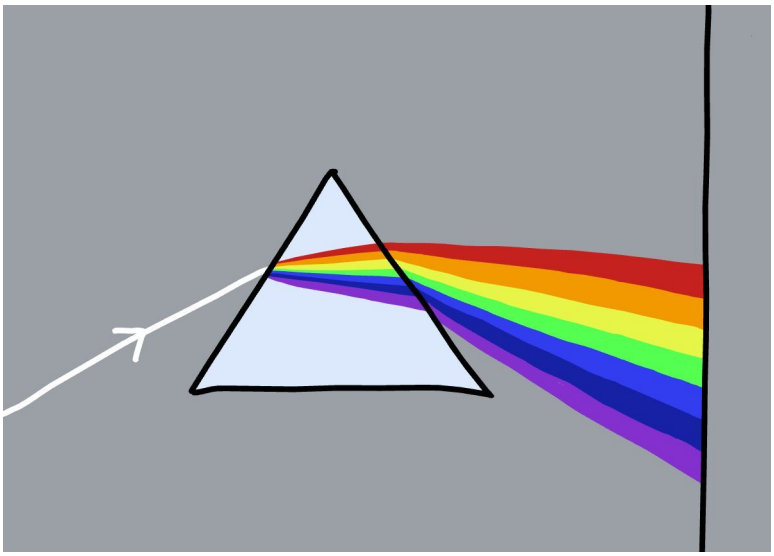
A system of forces applied to an object, especially a rigid body, for which the sum is 0 and the moment of the force is not 0. You can express this force with two antiparallel and same-magnitude forces. This idea is often used in mechanical engineering, such as in the drag force of a rotating propeller, the reaction force controller of spaceships and so on.
In the figure at right, “d” is the diameter of the circle. “F” is the figure of force.



3-6,No.(35) Name(Mimura Yuya)

Dispersion

This is a phenomenon in which incident rays of light are separated individually by wavelength.
Sunlight and white light passing through the prism is divided into various colors, and a series of rainbow-like bands of color are projected.
It is caused by the refractive index of the medium varying with wavelength.
The red refractive index is the largest and the purple refractive index is the smallest.



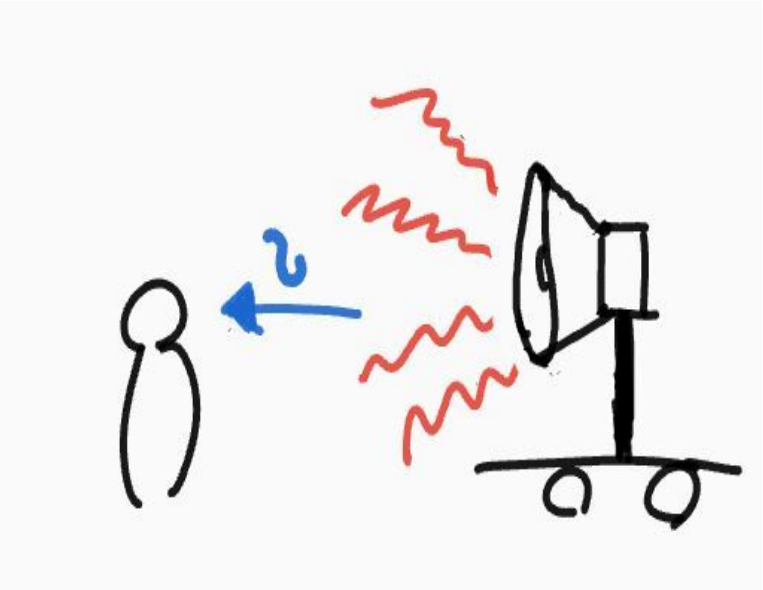
3-6,No.(30) Name(Honda Maya)

Doppler Effect

The frequency of the sound received by the observer is determined by the relative velocity of the source and the observer.

For example, when a sound source moves in the direction of the observer, the frequency of the sound received by the observer is greater than the frequency of the original source.

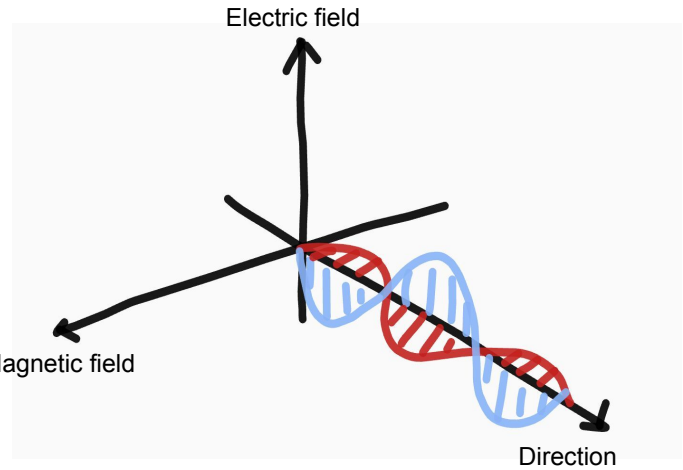
That's why the sound gets higher as the ambulance approaches.



3-6,No.(6) Name(Miyaji Saishiro)

Electromagnetic waves

Various types of light are emitted from matter. They are a type of energy. They are waves that propagate through space as a result of the interaction and combination of electric fields and magnetic fields.
Wherever electricity flows or radio waves fly, there is always some kind of them.They have nature of waves.



3-6,No.(17) Name(Rintaro Kobayashi)

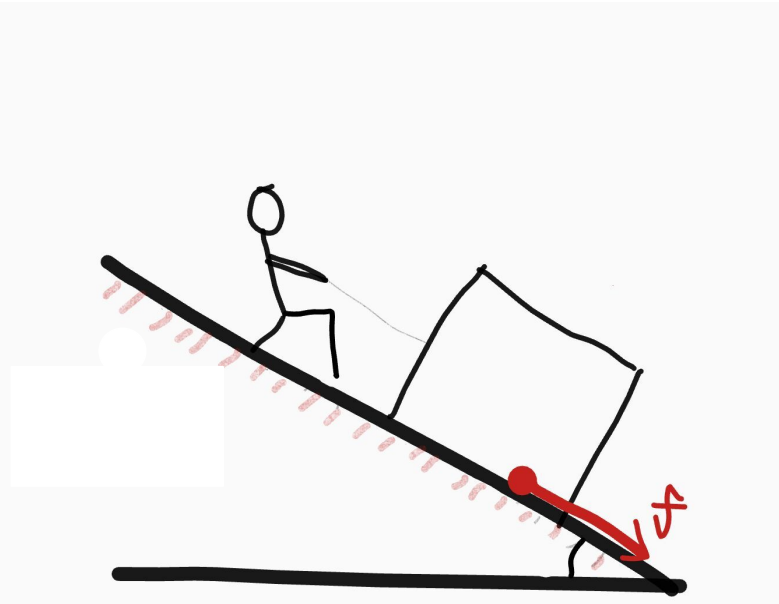
First Cosmic Velocity

One of the speeds that characterize space flight and set certain standards. This is the minimum speed at which the flying object becomes a satellite, assuming no air, and is equal to the speed of a satellite flying in orbit just above the ground.
7.9 kilometers per second (28800 km/h), which is about 30 times faster than the speed of a jumbo jet

3-6,No.(2) Name(Asakura Syuta)

Frictional Force

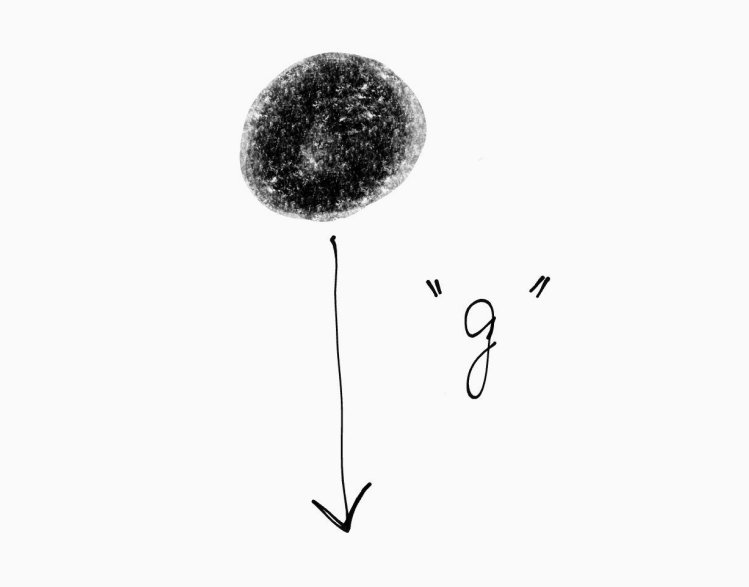
This is the resistive force produced between two solid surfaces.
For example, the value is small for ice and large for rubber.
It is a force that normally acts on two objects in all cases on earth.



3-6,No.(23) Name(Rikuto Tsuneto)

Gravitational Acceleration

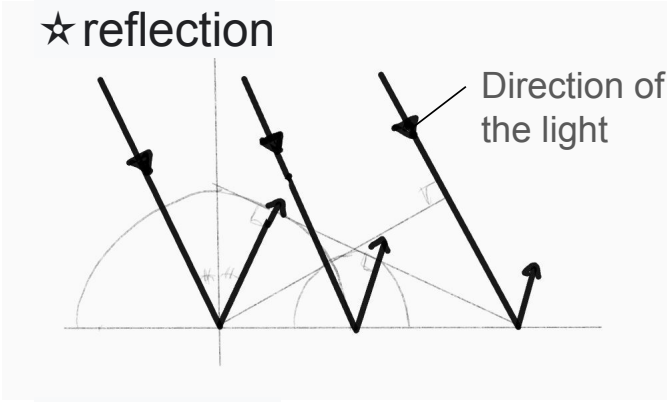
This is the sum of the vectors of universal gravitation and centrifugal force. This term often be expressed “g”. “g” is a name that takes out the first letter of gravitation.
In high school, we often learn that for Earth it is roughly 9.8 meters per second squared. The for the moon it is roughly 1.62 meters per second squared. It’s about one-sixth of that of earth’s surface. It doesn’t change with the weight of object.
It was discovered by Galileo Galilei. He concluded this through lots of experiments.

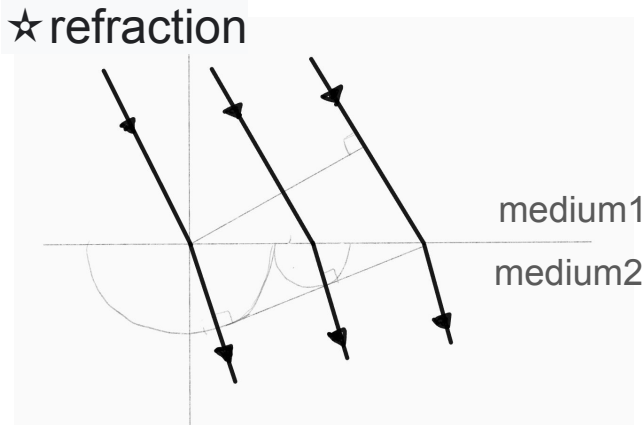


3-6,No.(37) Name(Ayu Moriyasu)

Huygens’ Principle

We consider that there are innumerable points which act as wave sources on a wavefront at a certain time, and that spherical waves emanate from each point at the next instant.
These waves are called elementary waves, and the wavefront at the next instant is the envelope of the innumerable elementary waves.

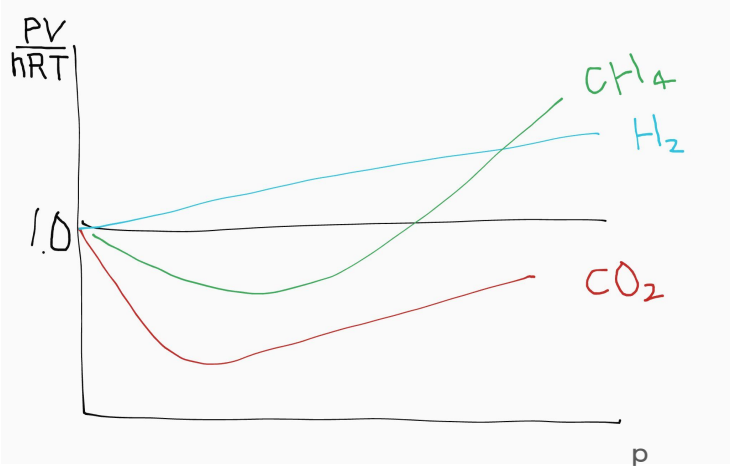




3-6,No.(39) Name(Wada Yusa)

Ideal Gas

It is an imaginary gas whose pressure is proportional to temperature and density and whose internal energy is independent of density. It is the most basic theoretical model for gases, and all other more rigorous theoretical models for gases asymptotically approach this model at low densities. It is well represented by the gas volume 1 mol = 22.4L at standard temperature and pressure 0°C and 1013hPa



PV=NRT

3-6,No.(3) Name(Abe ryunosuke)

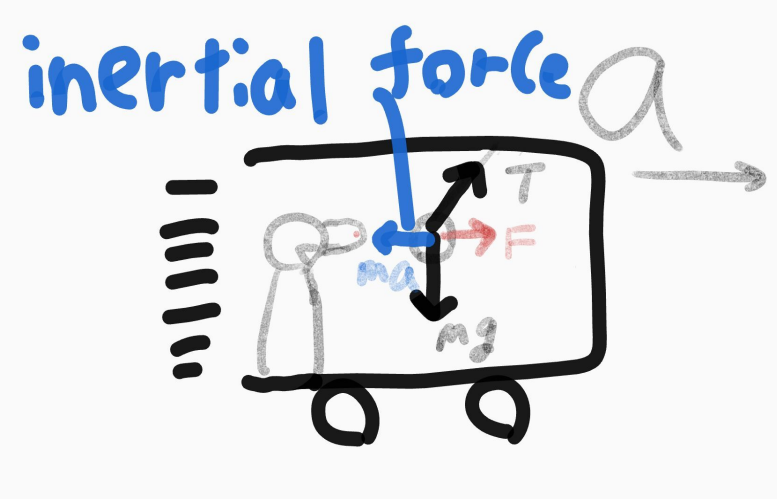
Inertial Force

A fictitious force in the opposite direction of the acceleration.

This force is equal to the product of the acceleration and mass of the object.

Also,the centrifugal force is an example of this force.

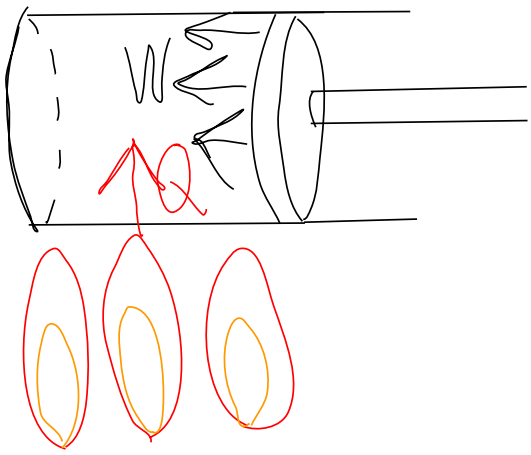
The centrifugal force is generated when the observer is in the circular motion.



3-6,No.(20) Name(Zenmoto Kazuma)

Internal energy

The inside of an object, that is, the molecules and atoms that make up the object, have kinetic energy due to thermal motion and potential energy due to forces acting between molecules. Consists of the sum of kinetic energy and potential energy (mechanical energy) inside an object



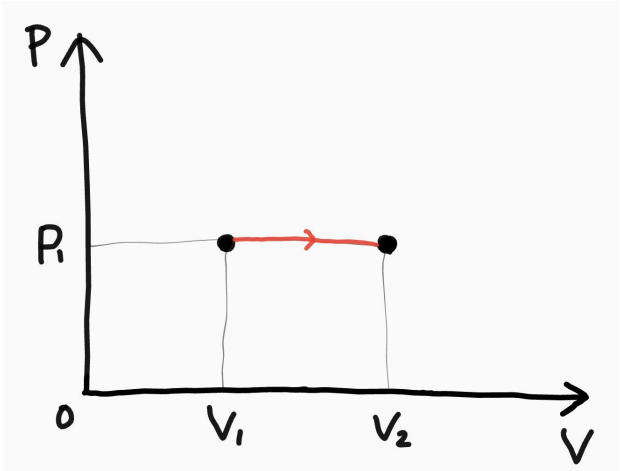
$$\Delta U = Q + W$$

ΔU Changes in internal energy
Q Heat received by an outside
W The work done by the object

3-6,No.(3) Name(阿部龍之介)

Isobaric process

It is one of the four physical processes.
It is a change of state performed with constant pressure.
Pressure is constant, but temperature and volume can be vary.
The work exerted by a gas externally can be expressed in terms of the change in volume multiplied by pressure.
The pressure is constant, so Charles' law can be used.

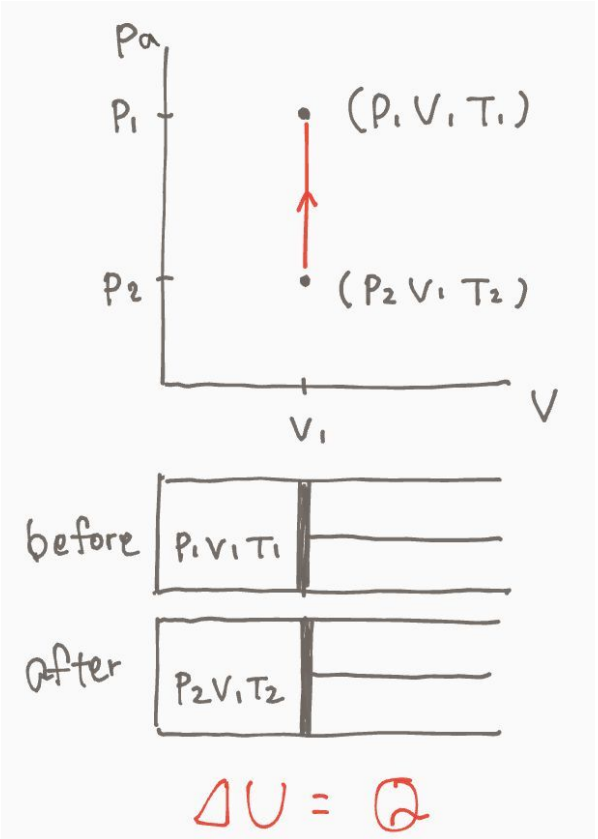


$$W = -p\Delta V$$

3-6,No.(30) Name(Honda Maya)

Isometric Process

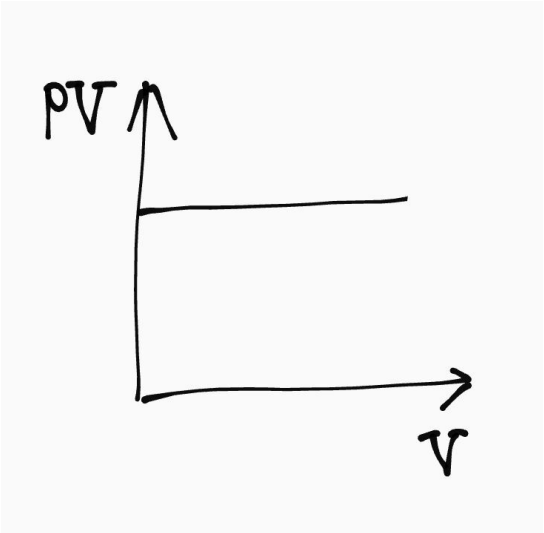
It is one of the changes of state. In the change, the volume is always kept constant.So the amount of work is always 0J, and change of internal energy is equal to the amount of heat received by the gas.



3-6,No.(12) Name(Kagawa Tamae)

Isothermal process

It means that the system changes without changes of temperature. So there are no changes of internal energy.
In case of ideal gas, figure of PV is stable. In other words, Boyle's law is a practical example of this.



3-6,No.(1) Name(Yuto Asaki)

Joule Heating

When an electric current flows through a conductor with resistance, heat is generated. A physicist named Joule studied this phenomenon of heat generation in detail and found.

$voltage\ V[V]$ $current\ I[A]$

$resistance\ R[\Omega]$ $Time\ for\ current\ to\ flow\ t[s]$

then the $heating\ value\ Q[J]$s the following equation of

$$Q = Ivt = I^2Rt = \frac{V^2t}{R}$$

He then named the heat as Joule heat.

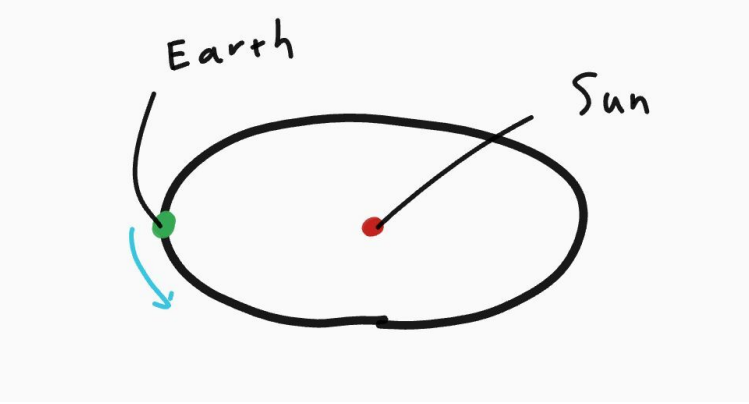
3-6,No.(15) Name(黒川龍之介)

Kepler's Laws of Planetary Motion

The first law is that the planets move around the sun in elliptical orbits.

The second law is that the areal velocity per unit of time of the line segment connecting the planet and the sun is always the same.

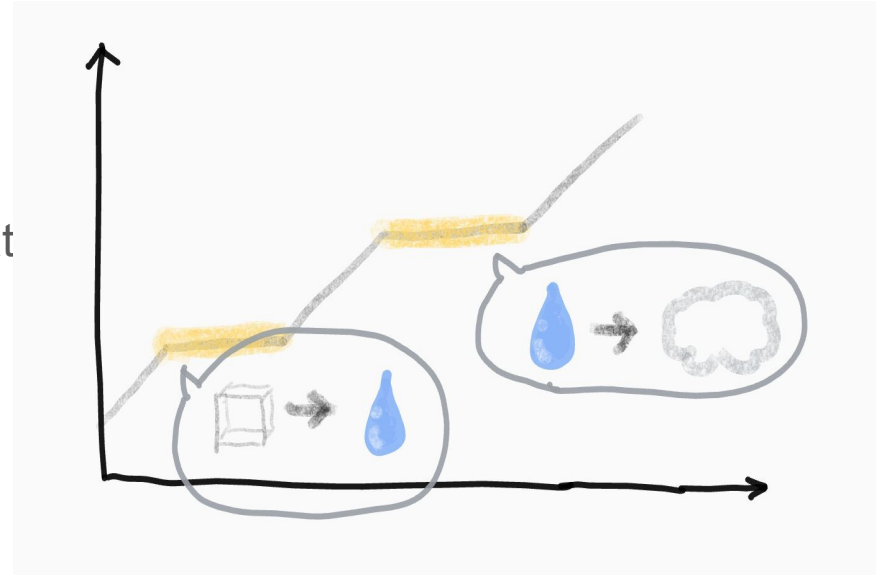
The third law is that square of the revolution period ‘T’ is proportional to the cube of the semi-major axis ‘A’.



3-6,No.(17) Name(Rintaro Kobayashi)

Latent Heat

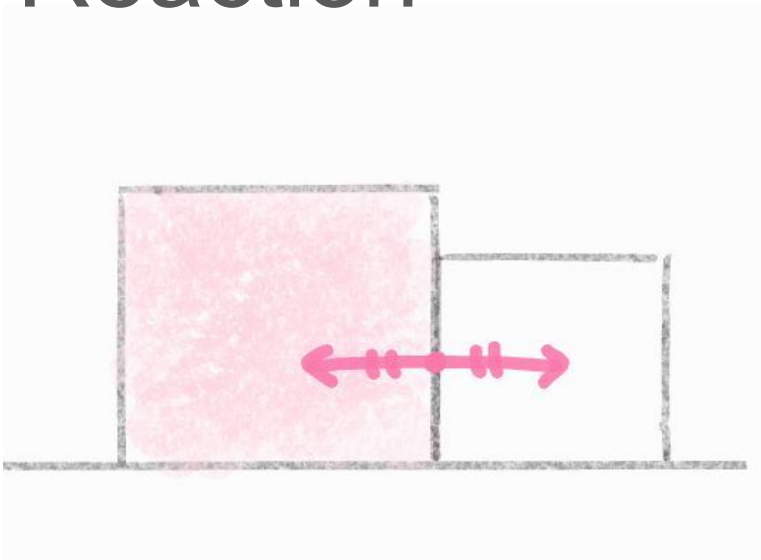
The amount of heat required to change the state of a substance.
Usually refers to the heat of fusion associated with melting and the heat of evaporation associated with evaporation.
When the state of a substance changes, the temperature does not change, only the state.
For example, evaporation, melting, condensation, solidification, etc.



3-6,No.(39) Name(　Wada Yusa　)

Law of Action and Reaction

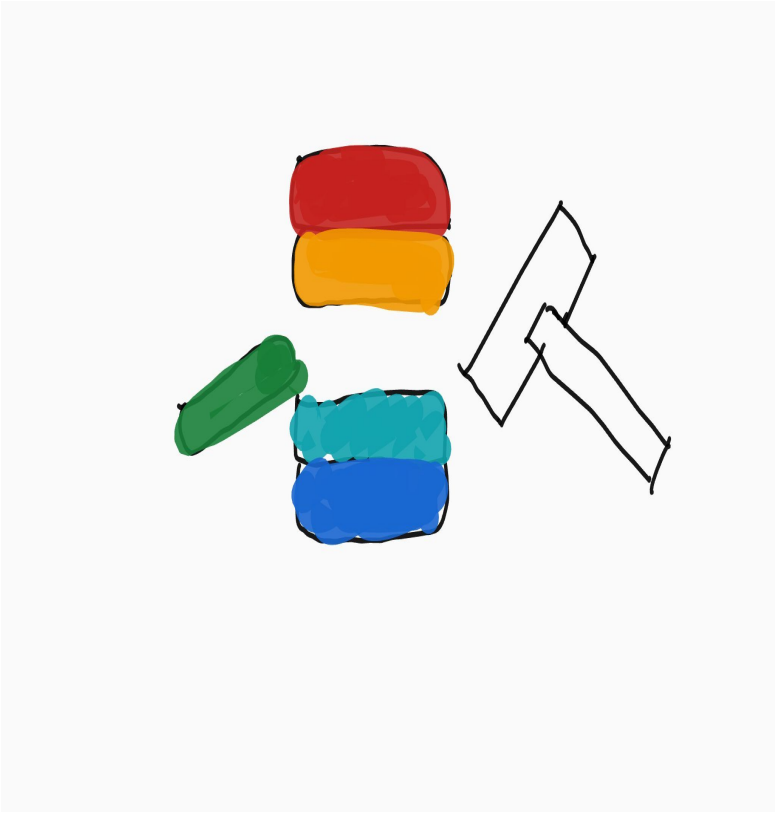
When one object exerts a force on another object in one direction, the other object must exerts an equal and opposite force back on the first object.
It is known as one of Newton's laws of motion discovered by Isaac Newton, along with the law of inertia and the law of acceleration.



3-6,No.(24) Name(　Terasaka Mei　)

Law of Inertia

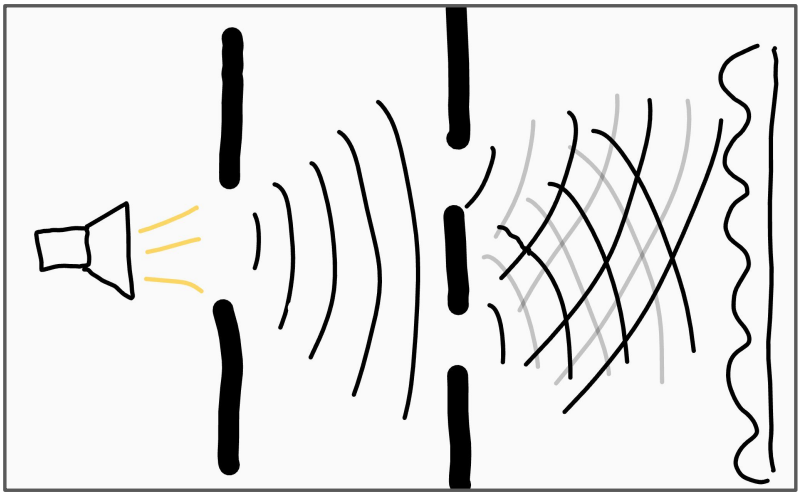
When there is no external force or the external force is balanced, a stationary object remains stationary indefinitely and an object in motion continues to move in a constant velocity linear motion.



3-6,No.(27) Name(春木佑介)

Light Interference

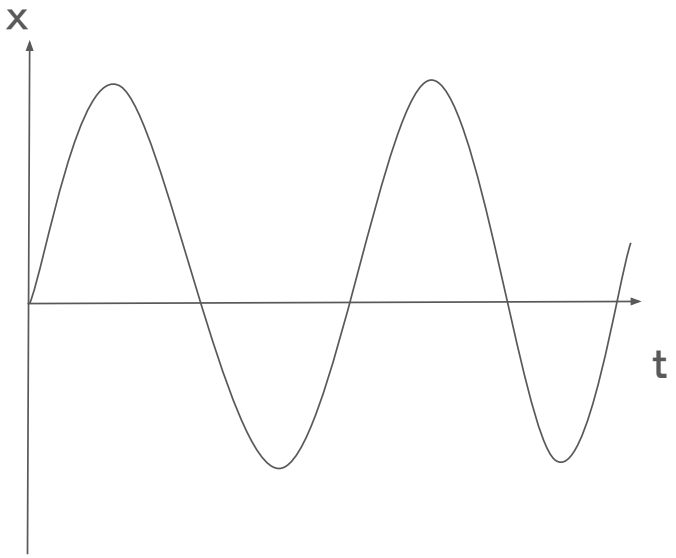
Light has the property of a wave, and when two waves overlap, their amplitude (the heights of the waves) are added together, making each other stronger or weaker. This makes a pattern of light and dark on the screen. Soap bubbles and the back of CDs appear to be rainbow-colored because of this phenomenon.



3-6,No.(33) Name(Sota Matoba)

Phase

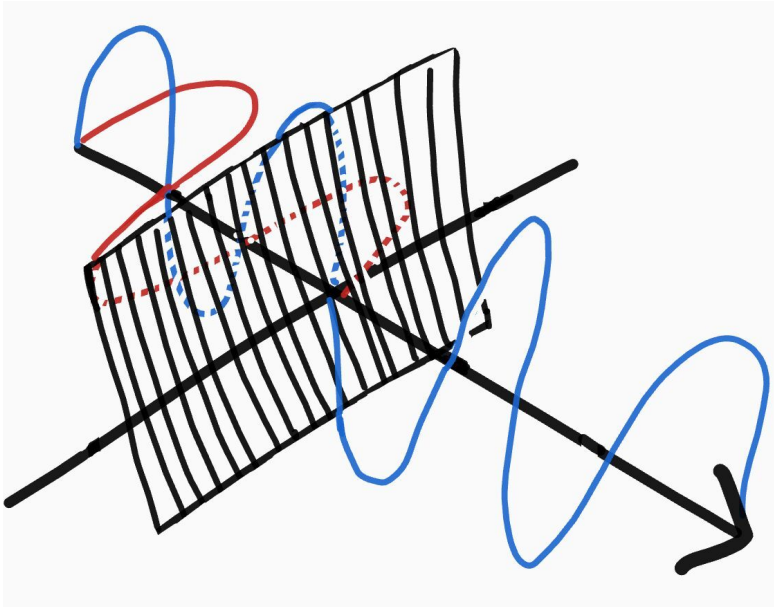
It is a quantity that indicates at what point in a cycle something in periodic motion is.
It is expressed as $\omega t + \varphi$.
For a sin wave it can also be expressed as $2\pi(t/T-x/\lambda)$



3-6,No.(27) Name(春木佑介)

Polarization

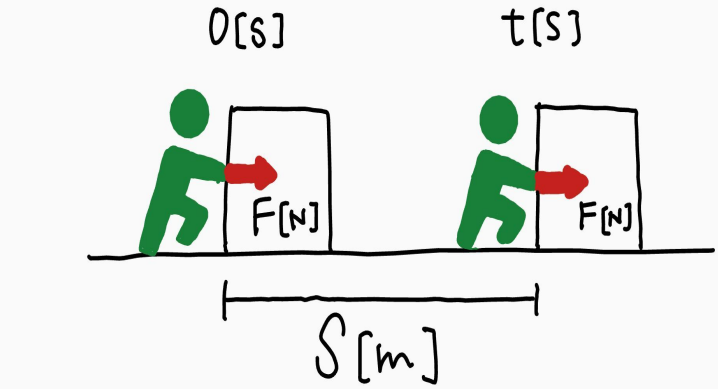
It makes a light that is composed only of light that vibrates in a specific direction.There are different types of this light.
・straight type: Light whose vibrations are linear
・circle type: Light that vibrates while drawing a circle
Using this phenomenon you could see the bottom of water more clearly and cut off the strong sunlight.



3-6,No.(33) Name(Sota Matoba)

Power

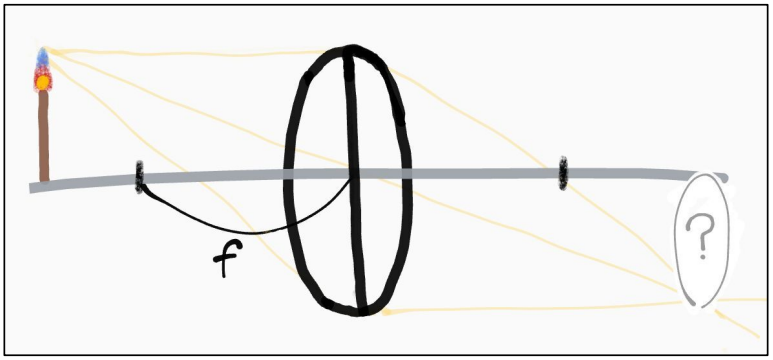
It is the amount of work done per second.
You use [W] as the unit.
It can be calculated by dividing the work by the time spent on the work.
If velocity is given, it can also be found by multiplying force and velocity.



3-6,No.(31) Name(Ayumi Matsuoka)

Real Image

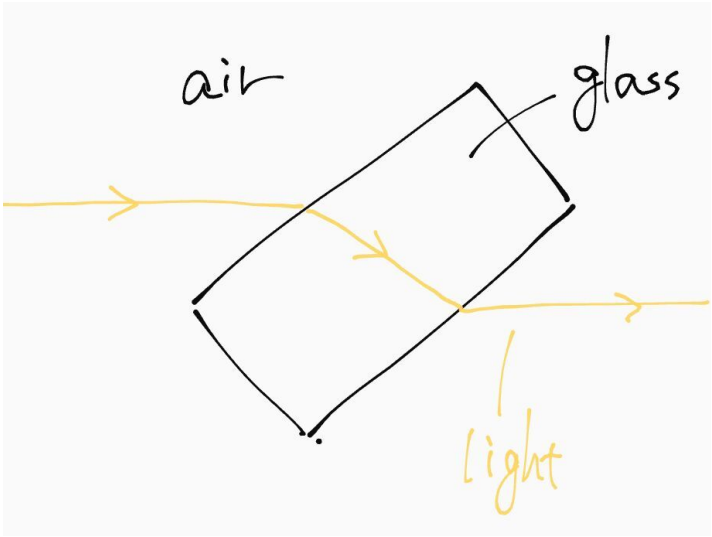
This phenomena is often seen with convex mirrors. When an object is beyond the focus point (f) of the mirror, it looks like we can see the object on the other side of the mirror. This phenomenon is useful in our lives. Without this phenomena, we wouldn't be able to see movies in theaters.



3-6,No.(14) Name(rikuto kuroishi)

Refraction

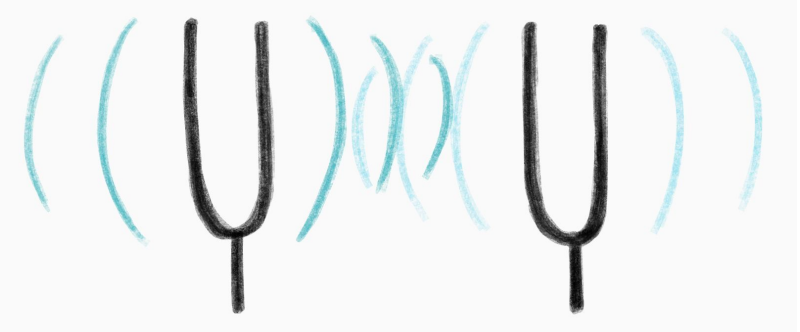
We can see a lot of interesting natural phenomenon because of this principle. It occurs when waves travel through other substances, or even hotter or colder air. Mirage, heat haze, and rainbows are famous examples you probably know. It can even explain why some kinds of birds sing early in the morning rather than in the afternoon.



3-6,No.(1) Name(Yuto Asaki)

Resonance

In physics, it is the relatively large selective response of an object or system that oscillates in a stepwise or phasic manner due to externally applied vibratory forces. It was first studied in acoustic systems such as musical instruments and the human voice. An example is the induction of vibrations in the strings of a violin or piano at a certain pitch when musical notes of the same pitch are sung or played nearby.



3-6,No.(22) Name(Yumi Tanaka)

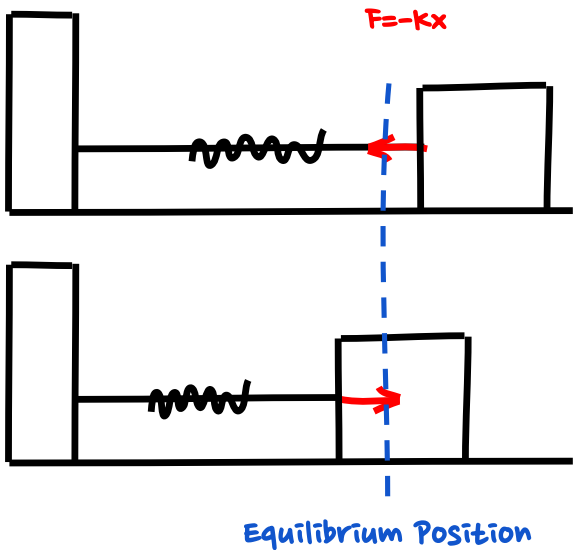
Restoring Force

This is a force that acts to bring a body to its equilibrium position. This is a function only of position of the mass or particle, and it is always directed back toward the equilibrium position of the system.
This is often referred to in simple harmonic motion.

F=-Kx
K:constant
x:distance from Equilibrium Position

What is F?

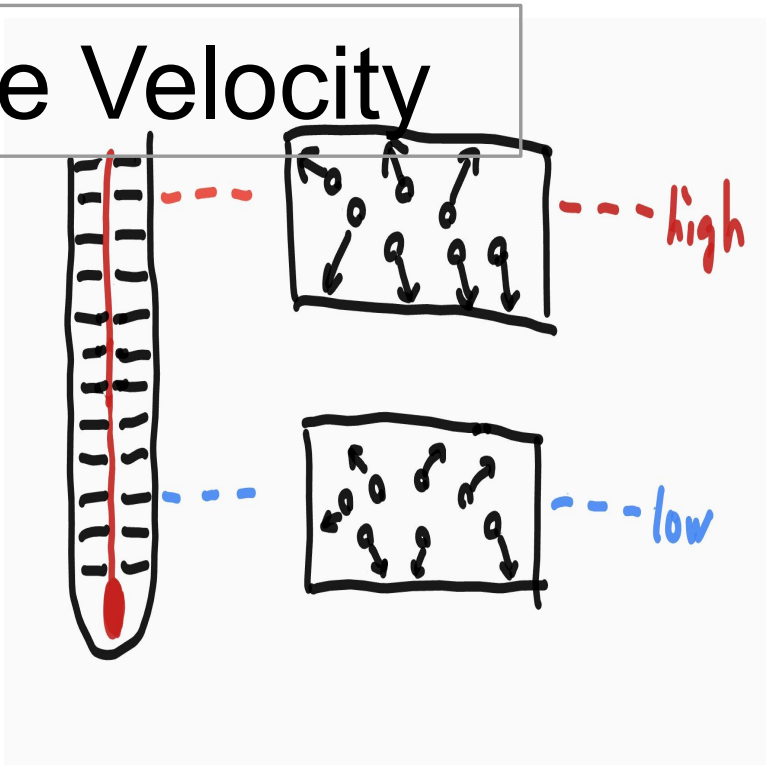
K:constant F:???? Force
x:distance from Equilibrium Position



3-6,No.(11) Name(Kaga Kanta)

Root Mean Square Velocity

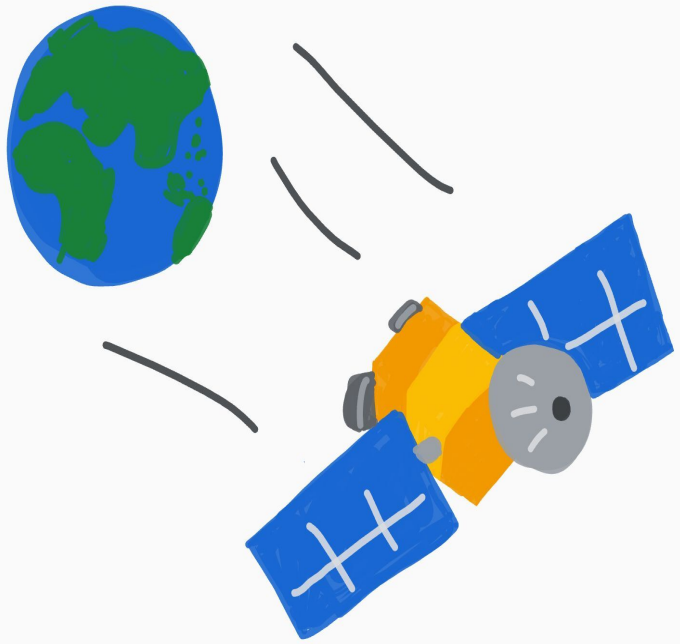
The average velocity of an ideal gas is determined by the mass and absolute temperature of the gas molecules.
(From gas molecular kinetics and equation of state,PV=nRT=Nmv^2 / 3
Solving this for v^2 yields,
v^2=3RT/M *M=the amount of substance of gas molecules)
The greater the amount of substance of gas molecules, the slower the speed of gas molecules.
The higher the absolute temperature of gas molecules, the faster they move.



3-6,No.(36) Name (Miyaji Saishiro)

Second Cosmic Velocity

This is initial velocity at earth's surface to escape from gravity of the earth. The velocity is about 11.2 km/s(40,300 km/h).
When objects accelerate more than this velocity, they will be able to continue to getting away from the earth eternally. For example, the artificial satellites that survey the sun have to reach this velocity.
Because it is the velocity needed to escape earth's gravity, it is also called “earth exit velocity”.



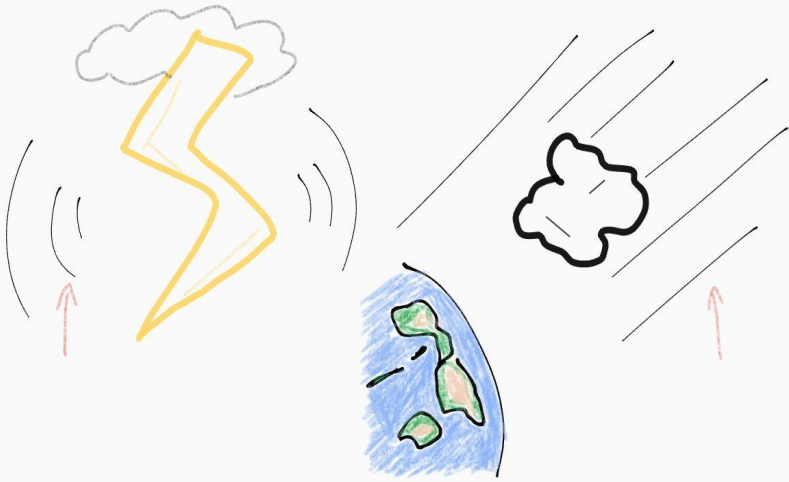
3-6,No.(35) Name(Mimura Yuya)

Shock Wave

It is generated when an object moving at a high speed pushes away the gas or liquid in front of it, creating a region of high density and pressure that is transmitted as a wave.

Familiar examples include lightning and volcanic eruptions.

“high speed”:Faster than the speed of sound or surrounding gas

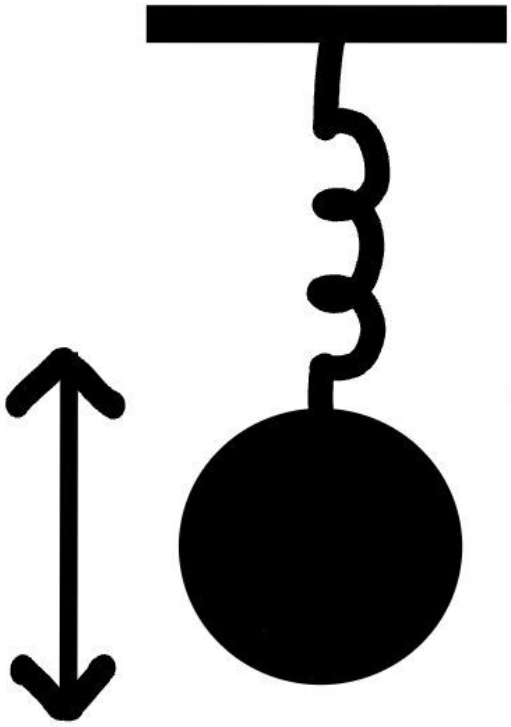


Hint:
Mach speed(In Japanese:”*mahha*”)
sonic boom

3-6,No.23 Name: Rikuto Tsuneto

Simple Harmonic Motion

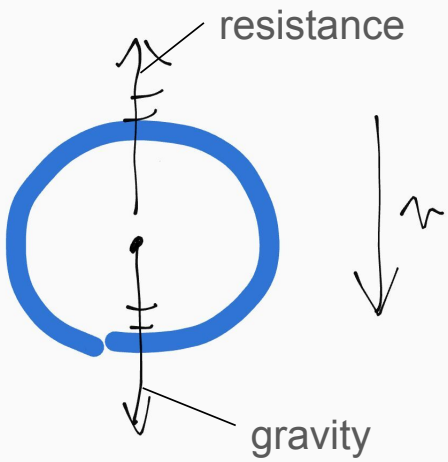
This term indicates the motion of uniform circular motion viewd from the side. Its period and frequency are the same as uniform circular motion. The graph which shows the relation of time and displacement shows the sine curve. On the other hand, the graph which shows the relation of time and speed shows the cosine curve. You can often see this motion when you use a spring or a pendulum.



3-6,No.(38) Name (Yuasa Shion)

Terminal Velocity

As an object falls through the air, the resistance force it receives from the air increases as its speed increases, and finally, when the resistance force matches the gravitational force, the object falls at a constant speed.



3-6,No.(40) Name(watanabe kenya)

Thermal Efficiency

A heat engine absorbs heat from a hot source, converts some of it to work, and releases the remaining heat to a cold source. This is the percentage of heat absorbed from the hot object in this one cycle that is

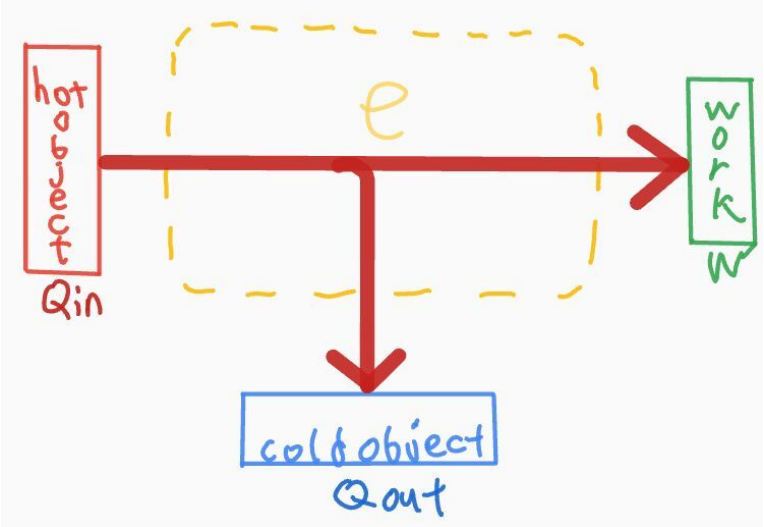
$Work\ done\ by\ heat\ engine\ :\ W'$

$Heat\ absorbed\ from\ a\ hot\ object\ :\ Qin$

$Heat\ given\ off\ to\ low\ temp\ object\ :\ Qout$

Defined in this way, the formula becomes

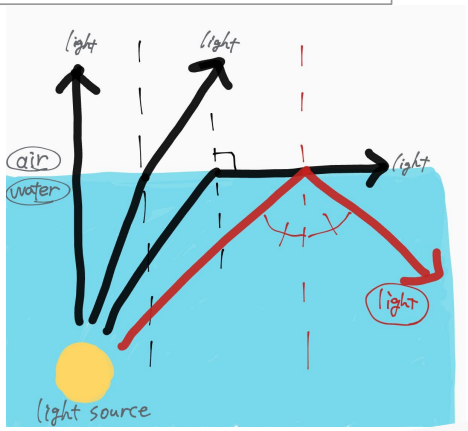
$$e = \frac{W'}{Qin} = \frac{Qin - Qout}{Qin}$$

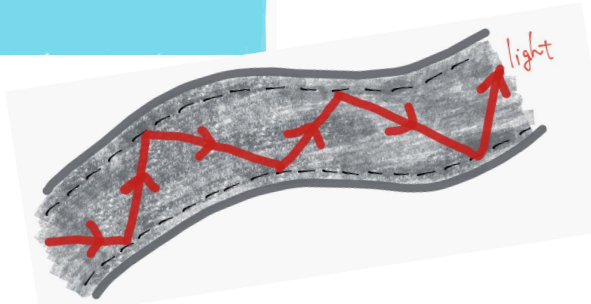


3-6,No.(15) Name(Ryunosuke Kurokawa)

Total Internal Reflection

If the lights travel from a medium with a higher refractive index to one with a lower refractive index and the angle of incidence becomes large, the light will no longer go out into the air. Instead, all of the light reflects back into the first medium. This phenomenon is applied in a lot of ways. The most famous application of this is ‘optical-fiber cable’. It can carry light even if it is crooked. The cable-like material is used for internet connections and other applications.

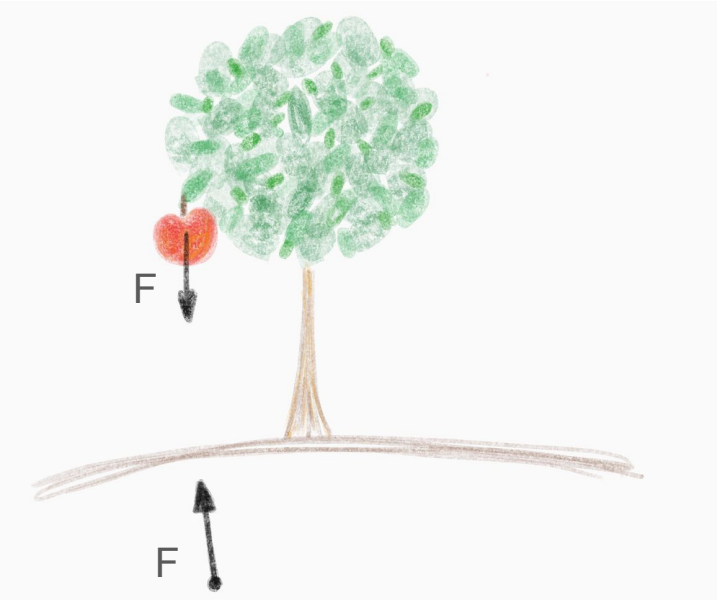




3-6,No.(37) Name(Moriyasu Ayu)

Universal Graviation

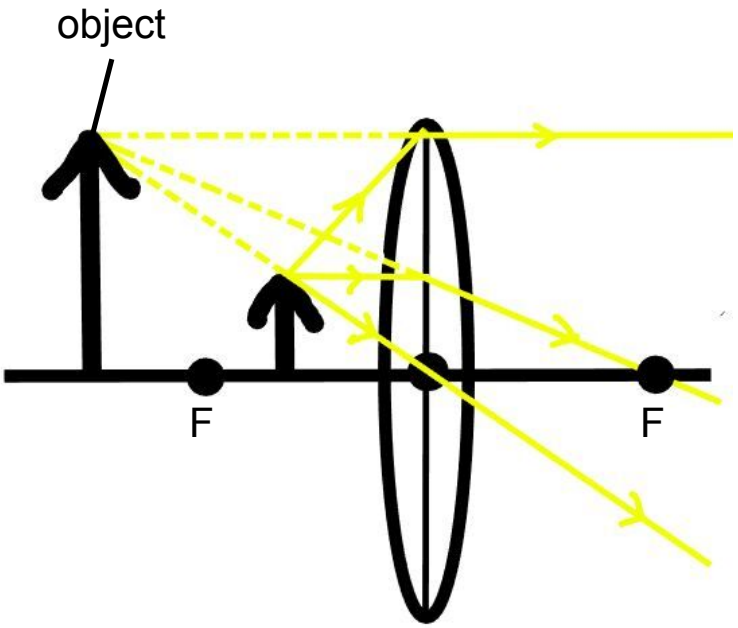
It is the gravitational force that works between all objects.
The force is proportional to the product of the masses of both objects and inversely proportional to the square of the distance between them.
Newton put forward the law in 1687 and used it to explain the observed motions of the planets and their moons.



3-6,No.(22) Name(Yumi Tanaka)

Virtual Image

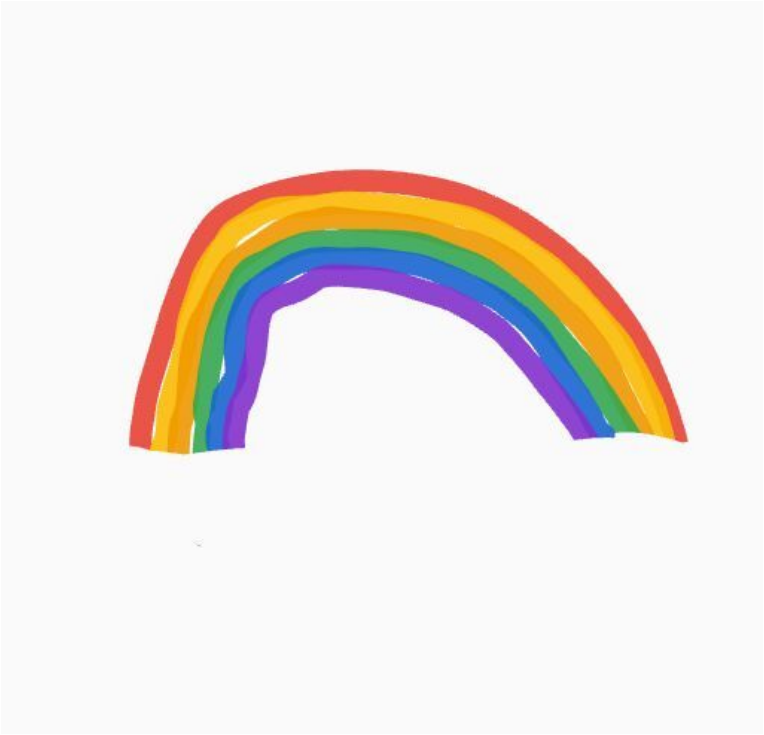
This is the image which you can see when an object is placed closer than the focal point of a convex lens. The light diverges, so you can't project the image onto a screen. This image is not upside down, so it is also called an erect image. This image is bigger than the original object. In other words, the magnification is greater than 1.



3-6,No.(38) Name(Yuasa Shion)

Visible Spectrum

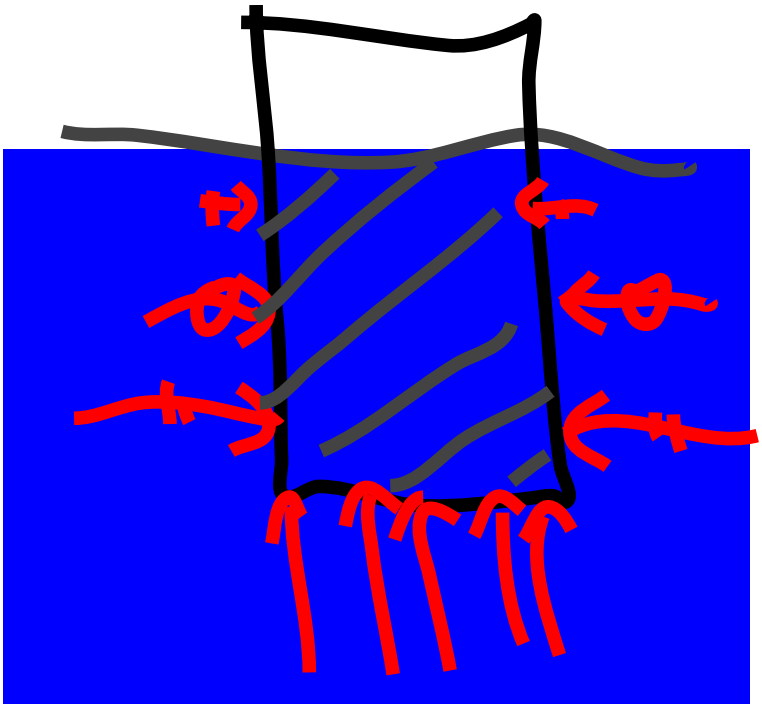
It is light that people can see. There are various colors of light such as red or purple. Also, the light has different colors and wavelengths, ranging from 360 nm to 830 nm. The light is widely used in daily life, for example traffic lights and car headlamps. The light is the reason why a rainbow appears to have seven colors.



3-6,No.(7) Name(ueda taisei)

Water Pressure

Pressure which water exerts on an object in the water. Points at the same depth receive the same pressure. The deeper a point is, the greater the pressure is. This pressure makes buoyancy. The buoyancy an object receives is proportional to the weight of the liquid the object removes, so the force become greater in the sea water than that in the pure water. In liquid gold, almost all things would float.



3-6,No.(32) Name(Matsuno Shunta)

Wave Diffraction

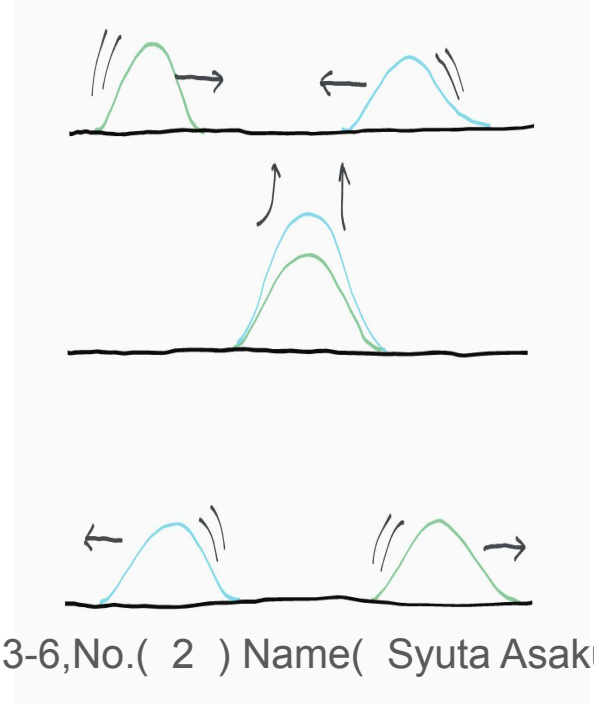
It's phenomenon where waves do not travel straight through gaps in obstacles, they spread out from the gap in obstacles. When the wavelength is short, it’s not noticeable ,but it becomes more noticeable when the wavelength is equal to or greater than the gap.
Diffraction occurs for radio waves, for example.

3-6,No.(40) Name(Watanabe kenya)

Wave Superposition

The property that waves traveling in opposite directions overlap and then proceed without being affected by each other, maintaining their direction, speed, and waveform.
A familiar example is a chord in music.(it’s called waon in japanese)

When a large wave and a small wave overlap, the two waves are just added together!



3-6,No.(2) Name(Syuta Asakura)