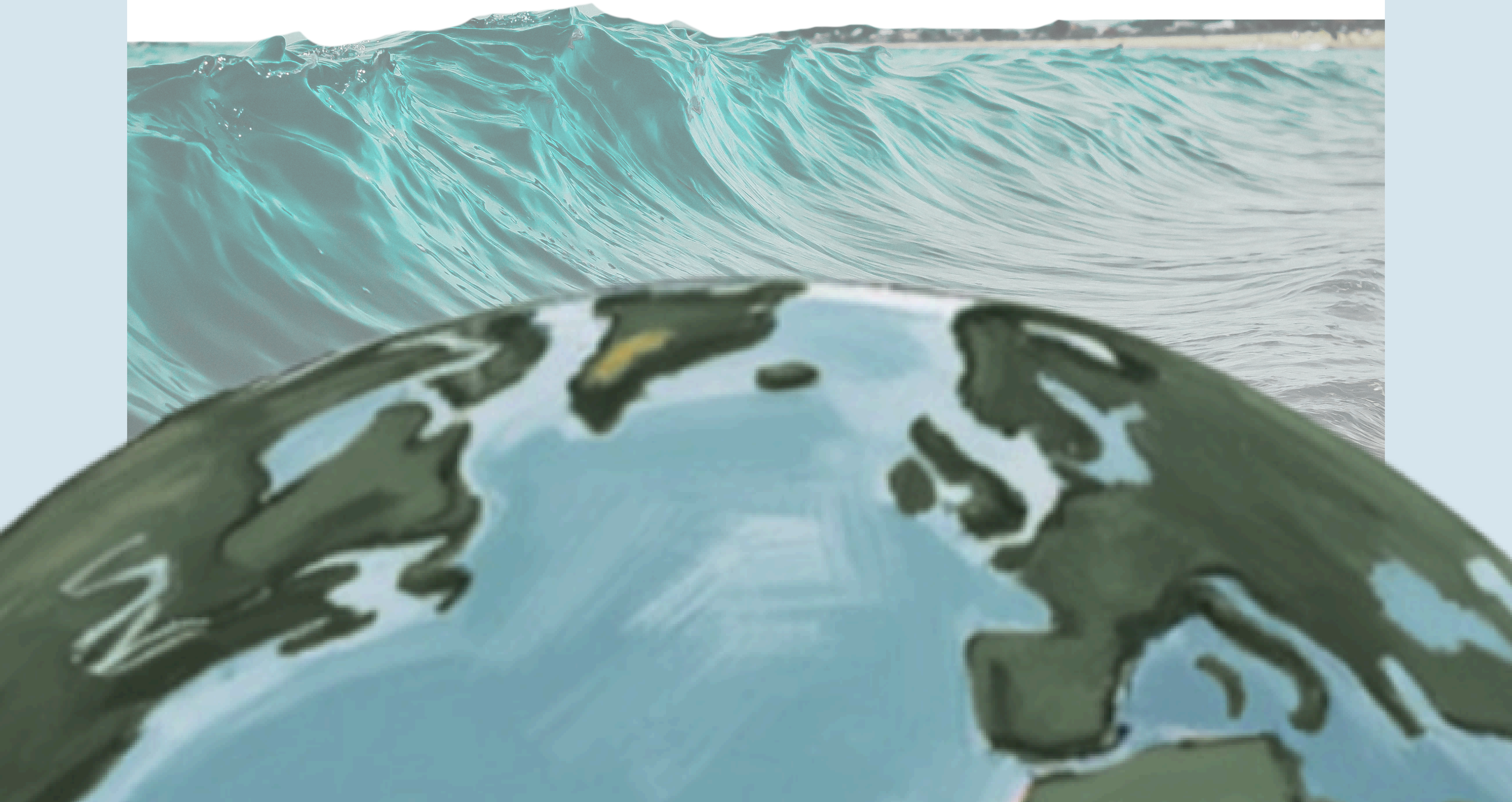
SCIENCE FAIR

2026

Hydrosphere & Atmosphere



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Volcano Experiment

The volcano science experiment showcases an acid-base reaction. Baking soda acts as the base, while vinegar serves as the acid. When these two are mixed, they react to produce carbon dioxide gas (CO_2). The swift release of this gas generates pressure, pushing the frothy mixture out of the volcano structure and mimicking a real eruption.

$NaHCO_3$ (baking soda) + CH_3COOH (vinegar) → CO_2 (gas) + H_2O (water) + CH_3COONa (sodium acetate)

The addition of dish soap captures the carbon dioxide gas in bubbles, enhancing the visual impact.

Elephant Toothpaste

Put the hydrogen peroxide into a cup. Add dish soap to make the reaction foamy (like toothpaste). Then add food coloring just for color purposes. Then add the catalyst to speed up the reaction. That's it!

Elephant toothpaste is a rapid exothermic reaction where hydrogen peroxide is forced to decompose into water and oxygen gas at high speed. While this breakdown usually takes years, adding a catalyst–like the enzyme catalase in dry yeast or the chemical potassium iodide–strips the oxygen away instantly. Mixing in dish soap, that rushing oxygen becomes trapped in millions of tiny bubbles, creating a massive, steaming pillar of foam that releases heat as its chemical bonds break.

Why did we use dish soap?
Adding a little dish soap provides additional surface tension, allowing the bubbles to get trapped and creating lots of foam.

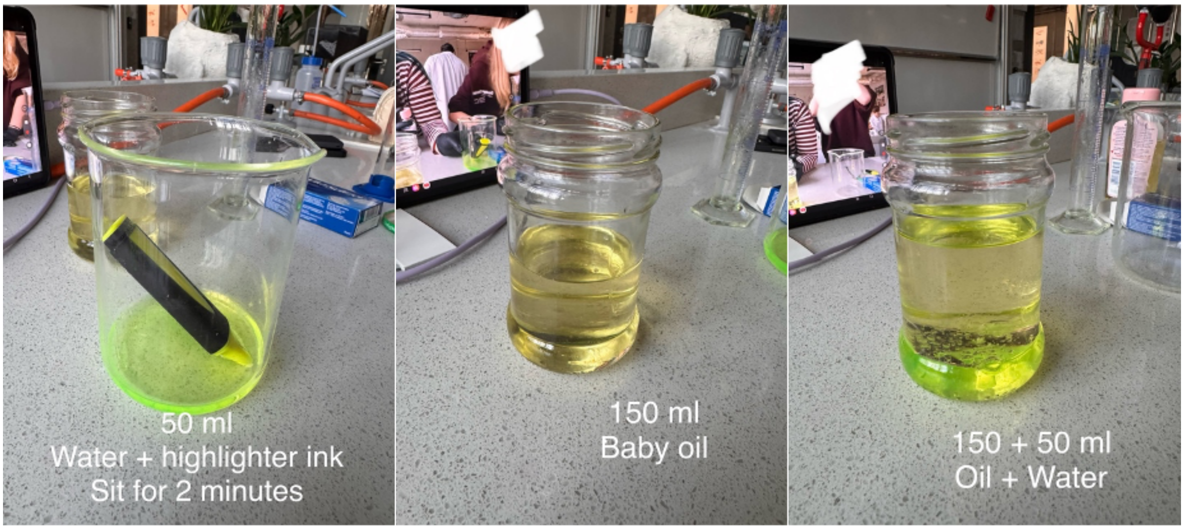
Why did we use hydrogen peroxide?
Because it is a source of oxygen gas, which is released rapidly when a catalyst is added.

Why did we use potassium oxide?
This is another effective catalyst that is often used in larger-scale or more powerful demonstrations.

What is the reaction behind the elephant toothpaste experiment?
Where hydrogen peroxide is broken down into water, oxygen, and gas. This decomposition is sped up by a catalyst, such as yeast or potassium iodide, causing the reaction to happen very quickly. The oxygen gas gets trapped in the dish soap, creating a large number of foamy bubbles that erupt from the container.

What is the best catalyst?
Potassium Iodide.

Oil Lamp



Video QR code:

The science behind lava lamp experiments

- Oil is hydrophobic, not mixing with water, instead pushing it away.
- Food coloring has the same density as water, being water soluble.
- When the Alka-Seltzer tablet dissolves in the water, it releases carbon dioxide gases.
- Gas is lighter than oil and water, rising to the top. While rising upward, the carbon dioxide bubbles carry some colored water along with it.
- Once the carbon dioxide bubbles reach the top and get released in the air, the water sinks back down again.

Why do Alka-Seltzer tablets fizz/release carbon dioxide in water?

- Alka-Seltzer tablets contain citric acid and sodium bicarbonate (baking soda).
- Once the tablet is dropped in the water, the acid and sodium bicarbonate react, and produces the fizz.
- Citric acid: Molecular formula: C6H8O7
- Sodium bicarbonate: Molecular formula: NaHCO3
- In the presence of water, citric acid and baking soda conducts an endothermic reaction to create sodium citrate, water, and carbon dioxide.
- Chemical equation:

$$C_6H_8O_7 + 3NaHCO_3 \rightarrow Na_3C_6H_5O_7 + 3CO_2 + 3H_2O$$

Summary

The lava lamp experiment demonstrates an endothermic chemical reaction, as well as performing as a visual representation of density. The oil floats above the colored water, and once the Alka-Seltzer tablet is dissolved in the water, a chemical reaction happens, releasing carbon dioxide bubbles which carries some of the water to the surface of the oil, creating the lava lamp's falling water droplets.

Titration

The science behind titration

- Process of chemical analysis, measuring the acidity or alkalinity of a substance through the addition of a titrant.
- Once the 'equivalence point' is reached, the addition stops.
- When the sample is balanced, a signal called the 'end point' will be shown. Could be a change in color or electrical property.
- Is a different concept from the 'equivalence point' as the difference between these two points should be kept as small as possible.

Why are not all titration base to acid ratio 1:1?

- The exact moment enough titrant is added to completely neutralize.
- When the amount of acid moles match with the base moles, and vice versa.
- This ratio is not always 1:1, as different substances can donate one or more proton or accept one or more proton, creating an imbalanced ratio.
- Monoprotic acids can only donate one proton (H^+ ion), while polyprotic acids can donate more than one proton per molecule. Monoprotic and polyprotic bases are the same, except they accept and react with the donated protons.

- Monoprotic acids examples: Hydrochloric acid (HCl), Nitric acid (HNO_3), Hydrobromic acid (HBr)
- Monoprotic bases examples: Sodium hydroxide ($NaOH$), Potassium hydroxide (KOH), Ammonia (NH_3)
- Polyprotic acids examples: Sulfuric acid (H_2SO_4), Carbonic acid (H_2CO_3), Phosphoric acid (H_3PO_4), Citric acid ($C_6H_8O_7$)
- Polyprotic bases examples: Barium hydroxide ($Ba(OH)_2$)

Fire Bubbles

Science behind fire bubbles

- In a spray bottle there are often two liquids mixed.
- The product and the propellant.
- The propellant is originally a gas at room temperature, but condenses into a liquid due to high pressure.
- When sprayed, the product is atomized into small droplets, and the propellant evaporates due to the change in pressure.
- Spray bottles are often labeled flammable due to highly flammable propellants such as propane or butane, mixed with flammable products such as alcohol.
- When sprayed within soap water, bubbles form.
- Bubbles are soap bubbles consisting of a layer of water surrounded by a layer of soap.

- These bubbles do not contain air, but instead contains the propellants of the spray bottle, which are extremely flammable.
- When the fire encounters the soap bubbles, the gas within the bubbles heat up and burn.
- Butane and propane react with oxygen and create water and carbon dioxide.
- Butane: $2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 4H_2O$
- Propane: $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$
- These reactions are exothermic, releasing energy in the form of radiant and thermal energy.

How does my hand not burn when holding the fire bubbles?

- **T**he water on your hand and within the soap bubbles absorb most of the energy released in the exothermic reaction.
- The topmost layer of the water (surface) evaporates, and naturally cools off the heat, preventing any burns.
- Since the propellant gases have relatively low boiling points, the flames are gone within a few seconds, which is faster than the speed of heat transferring to your skin.

Dry Ice Experiment

Materials:

- Dry ice
- Kettle (hot water)
- Spatula
- Box / container

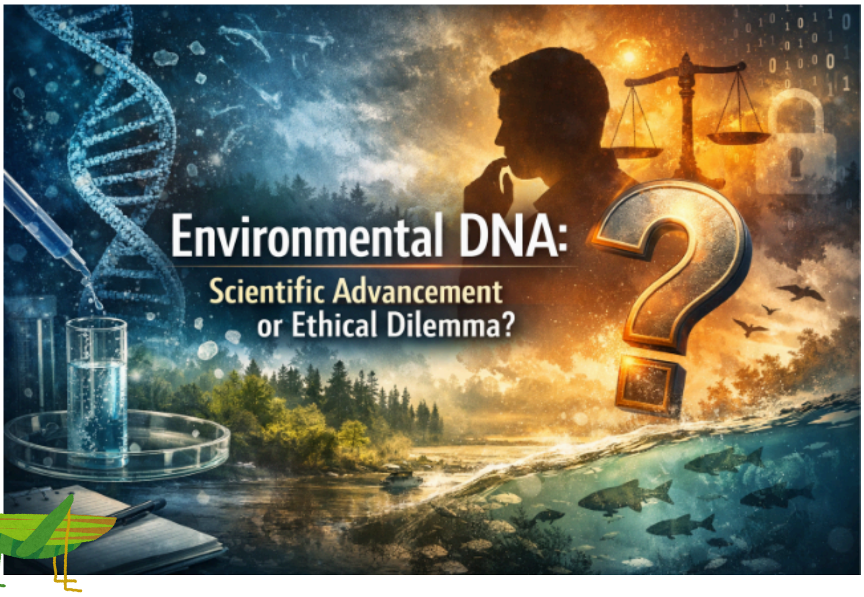
Procedure:

1. Put the dry ice into the box using a spatula.
2. Carefully pour hot water into the box.
3. Observe what happens.

Scientific Explanation

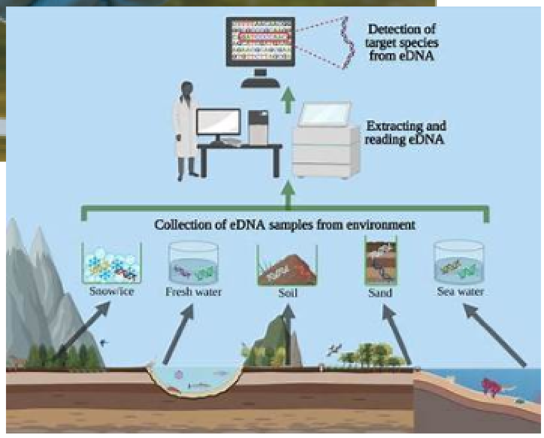
- Dry ice is solid carbon dioxide (CO_2).
- Dry ice does not melt like normal ice. It sublimates, which means it changes directly from solid into gas.
- When hot water is added, the dry ice sublimates much faster.
- The white “smoke” is not real smoke.
- It is a fog made of tiny water droplets formed when cold CO_2 gas cools the warm air.
- Carbon dioxide gas is heavier than air, so the fog falls down instead of rising.

ETHICAL SCIENCE DEBATES - WHATS YOUR OWN OPINION?



To what extent does environmental DNA collection pose a risk to genetic privacy?

Before considering the ethical implications of environmental DNA, it is necessary to first establish what environmental DNA, or eDNA, actually is. DNA is found within the nucleus of cells and carries the genetic information of all known organisms. It is inherited from parents, determines biological traits, and is permanent. Throughout their lives, organisms continuously shed DNA in various forms, including skin and hair cells, bodily fluids such as sweat, blood, and urine, as well as saliva. Once released, this genetic material enters the environment, particularly the hydrosphere through lakes, rivers, and oceans, and the atmosphere through dust and aerosols. That is where environmental DNA comes from; it is DNA that can be collected without sampling an organism, obtained solely through the environment. Scientists collect eDNA using methods such as water filtration or soil sampling, after which it is analysed using molecular techniques, most commonly Polymerase Chain Reaction (PCR). PCR acts as a molecular photocopier for DNA, allowing scientists to amplify small fragments of genetic material into billions of copies, enabling detailed analysis for applications such as disease testing, forensic science, and genetic research.



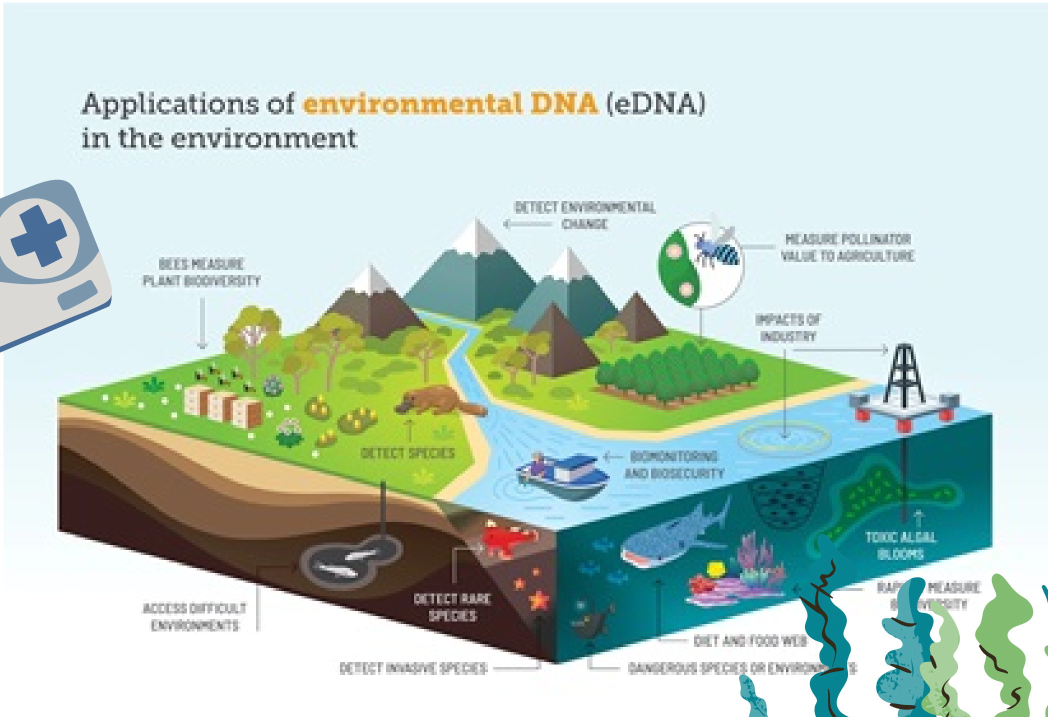
Once environmental DNA has been collected and analysed, it can be used in a range of scientific and medical contexts. In medicine and public health, eDNA is generally used to study populations rather than individuals. It allows researchers to detect the presence of pathogens - such as bacteria or viruses, in water systems - monitor the spread of infectious diseases and track antimicrobial resistance genes. These applications enable scientists and healthcare professionals to identify potential health risks early and respond before outbreaks become widespread. Environmental DNA can also be used to investigate how environmental factors, such as pollution or water quality, influence patterns of human health.

The use of environmental DNA offers several significant advantages. Because eDNA collection is non-invasive, it allows large-scale monitoring without direct contact with people or wildlife, making it efficient and ethically preferable in many situations. In medical research, early detection of pathogens through environmental sampling can improve public health responses and support preventative medicine. More broadly, environmental DNA contributes to monitoring ecosystems, which is closely linked to human wellbeing, as changes in biodiversity and water systems can directly affect disease transmission, food security, and access to clean water.

Despite these benefits, the collection and use of environmental DNA raises concerns surrounding genetic privacy. Genetic privacy refers to an individual's right to control access to their genetic information. DNA differs from other forms of personal data because it is permanent, uniquely identifying, and shared among biological relatives. Although environmental DNA is usually collected for ecological or medical research, human DNA is often captured unintentionally alongside animal and microbial genetic material. Even when this data is anonymised, advances in technology mean that genetic information may still be traceable to individuals or groups, leading some to argue that environmental DNA collection could represent a breach of genetic privacy.

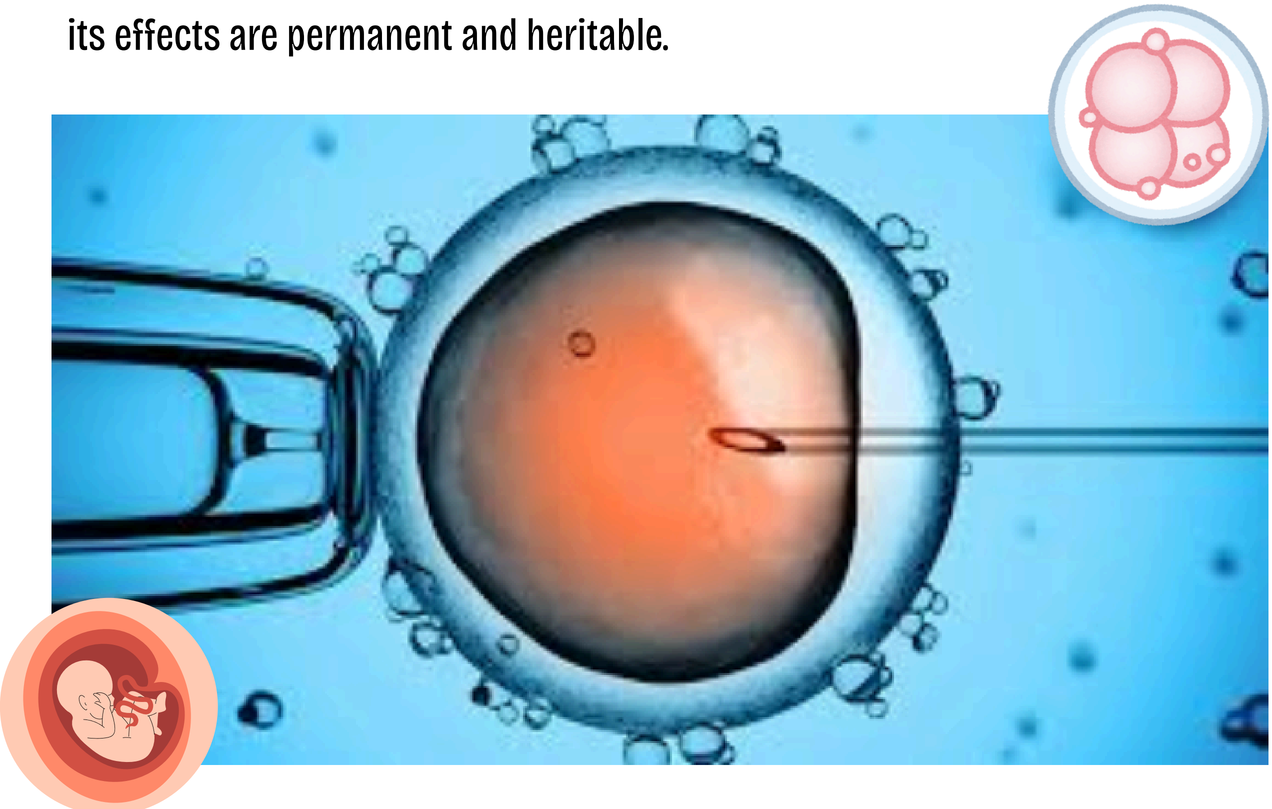
Genetic privacy is particularly important because DNA can reveal sensitive information beyond basic identification. Genetic data may indicate the presence of certain diseases, ancestry, or familial relationships, meaning that the use of one person's DNA can have implications for others who share similar genetic traits. The issue of consent is especially complex in environmental DNA research, as individuals cannot control the DNA they naturally shed into the environment, nor can they easily opt out of its collection. This challenges traditional ethical principles in medical research, which rely on informed consent and transparency. Without clear regulation, genetic data collected today could potentially be reused in the future for purposes that were not originally intended.

Rather than reaching a definitive conclusion, this discussion invites reflection on how scientific progress should be balanced with individual rights. Should the collection and use of environmental DNA be more strictly regulated to protect genetic privacy, or do its benefits to medicine and public health justify its continued use? Can informed consent exist when DNA is collected indirectly from the environment? Who should control genetic databases, and how should future uses of genetic information be limited?



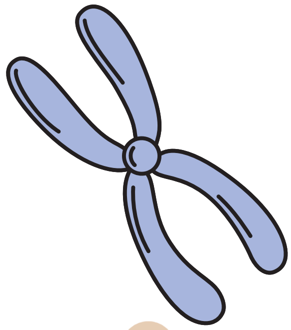
Human Embryo Gene Editing: Progress or Ethical Risk?

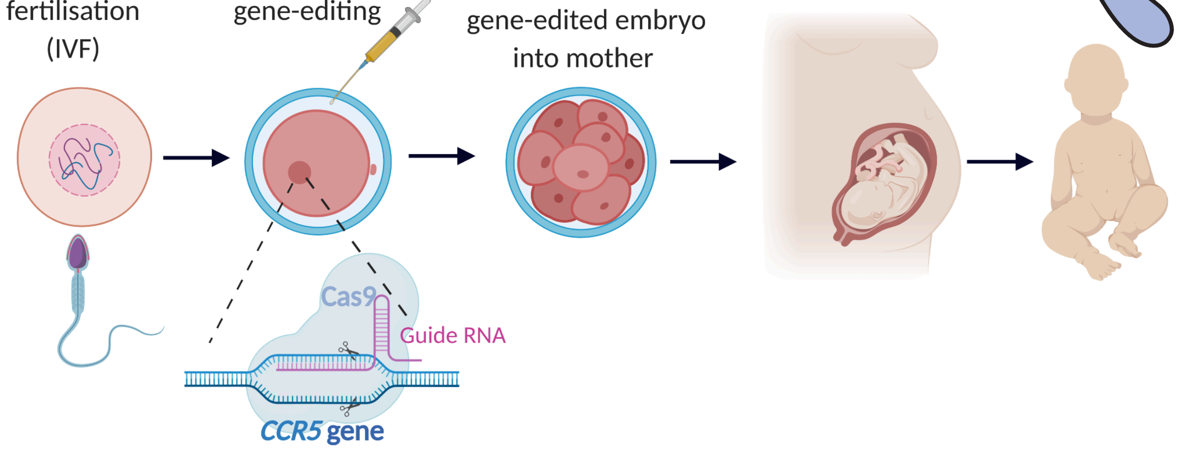
Before forming opinions on the ethics of embryo gene editing, it is important to understand what the process involves. Embryo gene editing refers to the modification of DNA at the earliest stages of human development, usually using a technology known as CRISPR-Cas9. This technique allows scientists to cut and alter specific sections of DNA with a high degree of precision. Because these changes occur in an embryo, any genetic modification would be present in every cell of the individual and could be passed on to future generations. This makes embryo gene editing fundamentally different from other medical treatments, as its effects are permanent and heritable.



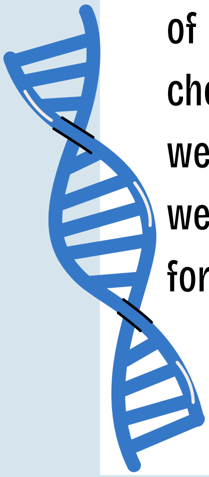
One of the main scientific motivations for embryo gene editing is the prevention of inherited genetic diseases. Certain conditions, such as cystic fibrosis or Huntington's disease, are caused by specific genetic mutations that can be passed from parents to their children. In theory, editing these faulty genes at the embryo stage could prevent individuals from developing serious, lifelong illnesses. This could reduce suffering, improve quality of life, and lower long-term healthcare costs. From a medical perspective, embryo gene editing has the potential to move healthcare from treating disease to preventing it entirely.

However, the technology also carries significant scientific risks. Although CRISPR is highly advanced, it is not perfectly precise. There is a possibility of "off-target" mutations, where unintended sections of DNA are altered, potentially causing new health problems. Because embryo gene editing affects future generations, any mistakes could be passed down permanently. The long-term effects of altering the human genome are not yet fully understood, as the technology is still relatively new. This uncertainty raises concerns about whether it is safe to apply such irreversible changes before their consequences are fully known.



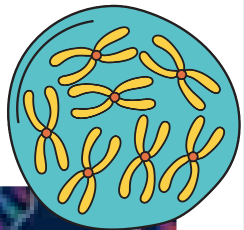


Beyond safety concerns, embryo gene editing raises important ethical questions. One major issue is consent, as an embryo cannot agree to having its genetic code altered. Decisions are made by parents or scientists on behalf of a future individual, whose life may be shaped by changes they did not choose. Another concern is the potential for inequality. If embryo gene editing were expensive or limited to certain countries, access might be restricted to wealthy families, increasing social divisions and creating genetic advantages for some groups over others.



There is also debate surrounding the difference between medical treatment and genetic enhancement. While preventing serious diseases may be widely supported, editing embryos to enhance traits such as intelligence, appearance, or physical ability is far more controversial. Many scientists argue that using gene editing for non-medical purposes could lead to unrealistic expectations, discrimination, and pressure to “optimise” future children. This raises questions about parental responsibility and whether unconditional acceptance of a child should outweigh the desire to control genetic outcomes.

Rather than reaching a definitive conclusion, embryo gene editing invites careful reflection on how far science should go in altering human biology. Should gene editing be limited strictly to preventing serious genetic diseases? Who should decide what conditions justify intervention? How can society ensure that such powerful technology is used safely, fairly, and ethically? As scientific capabilities continue to advance, these questions remain central to shaping responsible genetic research.



Would you like to share your thoughts? Answer here:

🧬 **Environmental DNA (eDNA) – Reflection Questions**

To what extent should environmental DNA collection be regulated to protect genetic privacy?

Can genetic privacy exist when DNA is naturally shed into the environment?

Do the medical and environmental benefits of eDNA outweigh the potential risks to personal privacy?

Should scientists be required to remove or ignore human DNA found in environmental samples?

Who should have control over genetic data collected from the environment: scientists, governments, or the public?

How might future advances in technology change the risks associated with environmental DNA?

Should consent be required for the use of genetic material even when it is collected indirectly?

🧪 Human Embryo Gene Editing – Reflection Questions

1. Should embryo gene editing be limited only to preventing serious genetic diseases? Why or why not?
2. Is it ethical to make permanent genetic changes to a person before they are born?
3. Who should be responsible for deciding when embryo gene editing is acceptable: parents, scientists, governments, or society as a whole?
4. How does the possibility of genetic inequality affect the ethics of embryo gene editing?
5. Where should the line be drawn between medical treatment and genetic enhancement?
6. Should future generations have a say in decisions that permanently alter the human genome?
7. Does the potential to reduce suffering justify the scientific risks involved in embryo gene editing?

MARIA SŁODOWSKA CURIE

- Maria Skłodowska Curie was a Polish scientist born in 1867 who studied physics and chemistry in France.
- She discovered two new elements, polonium and radium, which helped create the new science of radioactivity.
- Maria was the first woman to win a Nobel Prize and the only person to win two Nobel Prizes in different sciences: physics (1903) and chemistry (1911).
- Her research on radioactivity led to the development of X-ray technology, which is important in medicine for diagnosing illnesses.
- She worked in difficult and dangerous conditions, handling radioactive materials with little protection, showing great courage and dedication.
- Maria's discoveries helped develop cancer treatments using radiation, saving many lives.
- She founded the Curie Institutes in Paris and Warsaw, which became important centers for medical and scientific research.
- Maria broke many barriers for women in science, inspiring future generations of scientists worldwide.
- Her work had a lasting impact on chemistry, physics, and medicine, influencing how we understand atoms and use radiation today.

History of Science

Science is the study of how the world works. It began thousands of years ago when people first started to observe nature and ask questions. Ancient civilizations like the Egyptians, Greeks, and Chinese made early discoveries about medicine, astronomy, and mathematics. For example, Greek thinkers like Aristotle and Archimedes studied motion, shapes, and how things float.

During the Middle Ages, Islamic scholars preserved and improved ancient scientific ideas, developing algebra and early chemistry. Then, in the 16th and 17th centuries, the Scientific Revolution began in Europe. Scientists like Galileo, Newton, and Kepler used experiments and mathematics to understand motion, gravity, and the solar system.

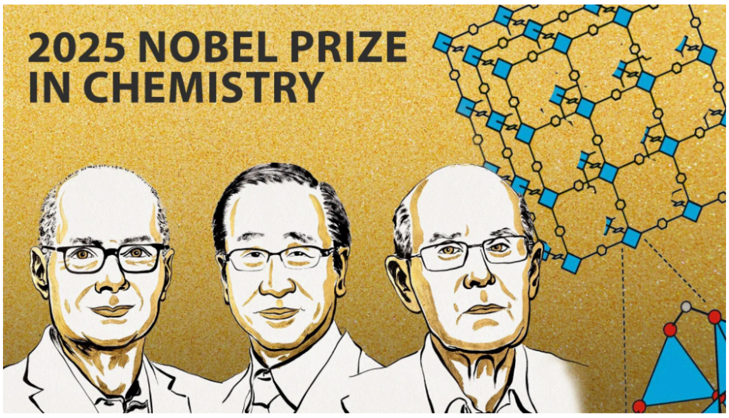
In the 19th and 20th centuries, science advanced rapidly. Darwin explained evolution, Pasteur discovered germs, and Einstein developed the theory of relativity. These discoveries changed how we see life, health, and the universe. Today, science continues to shape our world through technology, medicine, and space exploration, helping us solve problems and imagine the future.

Science began with ancient civilizations observing nature, grew through Greek rational inquiry, and advanced in the Islamic Golden Age, where scholars preserved and expanded knowledge. The Renaissance revived empirical study, leading to the scientific revolution and modern methods. Subsequent centuries saw rapid specialization, technological innovation, and global collaboration, shaping contemporary understanding of the universe in profound and enduring ways today.

Nobel Prize Winner: Alexander Fleming

Alexander Fleming is a famous scientist who ldiscovered a life-saving antibiotic called penicillin. Alexander was born on August 6^{th} 1881 in Scoland and died on March 11 1955 from a Heart attack. He studied at St. Mary's Hospital Medical School in London where he got his medical degree after attending some schools earlier in Scotland. His greatest invention was Penicillin which he discovered on September 28, 1928which he discovered by accident. He noticed mold (a Penicillium fungus) growing on a contaminated Stephylococcus bacteria pate, killing the bacteria around it. After that ground breaking discovery penicillin saved millions of lives.

Alexander Fleming discovered penicillin by accident, he was reaserching Staphylococcus bacteria at his lab which was in London. When he was leaving for holiday he accidentally left some Petri dishes with the bacteria cultures on his desk. When he returned home he noticed that one dish had been contaminated with a mold, but instead of throwing it out he decided to inspect and around the mold the bacteria had been killed or could not grow. Alexander Fleming then realised that the mold was releasing a substance that prevented bacterial growth. He named this substance penicillin. He realised the potential it had but Alexander couldn't purify or mass produce it. In 1940 thanks to Howard Florey and Ernst Boris Chain that became possible. That is the way the life saving antibiotic was discovered.

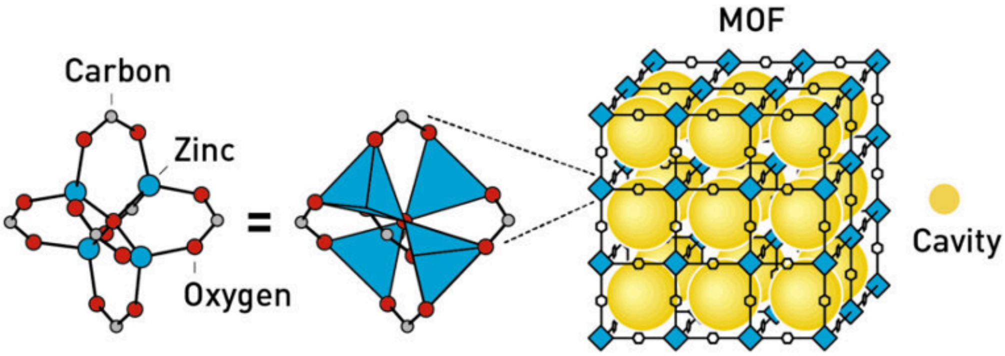


2025 Nobel Prize Winners

Last year, the Nobel Prize in Chemistry was awarded to Susumu Kitagawa, Richard Robson, and Omar M. Yaghi for their work on metal-organic frameworks (MOFs). They were recognized for developing a new type of porous material that has a wide range of applications, including gas storage.

Metal-organic frameworks (MOFs) are three-dimensional, crystalline coordination polymers that combine metal ions or clusters with organic ligands, creating highly porous structures. Their key characteristics include high porosity and crystallinity, which allows for applications in gas storage and separation, catalysis, drug delivery, sensors, and energy storage.

New porous materials with wide-ranging applications include metal-organic frameworks (MOFs), covalent organic frameworks (COFs), porous organic polymers (POPs), and porous boron nitride. These advanced materials are being developed for uses such as capturing carbon dioxide, treating water, and storing energy, thanks to their tunable pore sizes, high surface areas, and specific adsorption properties.



Nobel Prize Winner: Svante Pääbo

- Swedish geneticist born in April 20, 1955.
- Won the Nobel Prize for physiology or medicine in 2022.
- Specializes in the research of DNA from ancient specimens.
- Figured out the ancient moas were closely related to emus, compared to kiwis.
- Showed that cell nuclei in Egyptian mummies included DNA sequences and developed methods to extract & copy & analyze the DNA.
- First to determine the precise order of a portion of the nucleoid bases in Neanderthal genomes, from its mitochondria.
- Discovered that humans and Neanderthals are distinct species that share a common ancestor from over 500,000 years ago.
- Later sequenced the entirety of the Neanderthal genome and compared it to a modern human genome.
- Showed around 4% of overlap between Neanderthals and European and Asian descendants, backing up the claim that the two species interbred.
- Also sequenced the mtDNA (DNA from the mitochondria) from a 40,000 year old finger bone, found in Denisova Cave, Russia, and appeared to be so distinct that it revealed an unknown species.

Nobel Prize Winner: Svante Pääbo

- The Denisovans, which existed with humans and Neanderthals, all interbred.
- Up to 6% of modern Southeast Asians and Melanesians share DNA with Denisovans.

ELEMENTS & COMPOUNDS

O	X	N	E	G	O	R	D	Y	H	N	E	G	Y	X	O	I	R	N	N	Y	E	L	P
C	A	R	B	O	N	Y	M	A	G	N	E	S	I	U	M	C	F	E	E	L	P	X	U
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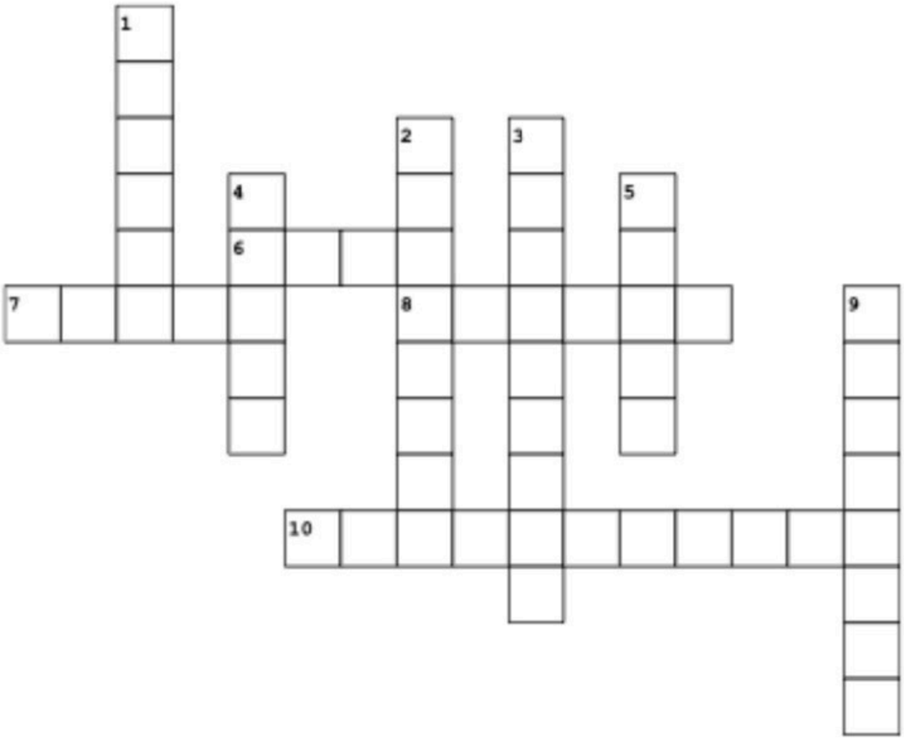
L	A	U	D	C	Y	H	Q	U	M	A	L	L	E	A	B	L	E	N	F	D	E	N	C

SUBATOMICPARTICLES	ATOMICNUMBER	NONMETALLIC	MASSNUMBER	SUBSTANCES
PHOSPHORUS	MOLECULAR	MONATOMIC	MALLEABLE	COMPOUNDS
POTASSIUM	MAGNESIUM	BERYLLIUM	ELECTRON	MIXTURES
LATTICES	METALLIC	CHLORINE	ALUMINUM	NITROGEN
HYDROGEN	NEUTRON	BRITTLE	DUCTILE	CALCIUM
SILICON	FLURINE	LITHIUM	ELEMENT	SHELLS
PROTON	ALLOYS	SULFUR	SODIUM	OXYGEN
CARBON	HELIUM	ATOMS	ARGON	BORON
NEON				

PDS Science Fair Chemistry



Across

6. smallest unit of an element

7. Substances with a pH less than 7.

8. indicates the number of electron shells on the periodic table

10. Adjective used to describe substances that do not mix with water.

Down

1. Substances with a pH greater than 7 and can dissolve in water.

2. two or more atoms chemically bonded together

3. Process of chemical analysis, measuring the acidi or alkalinity of a substance through the addition c titrant.

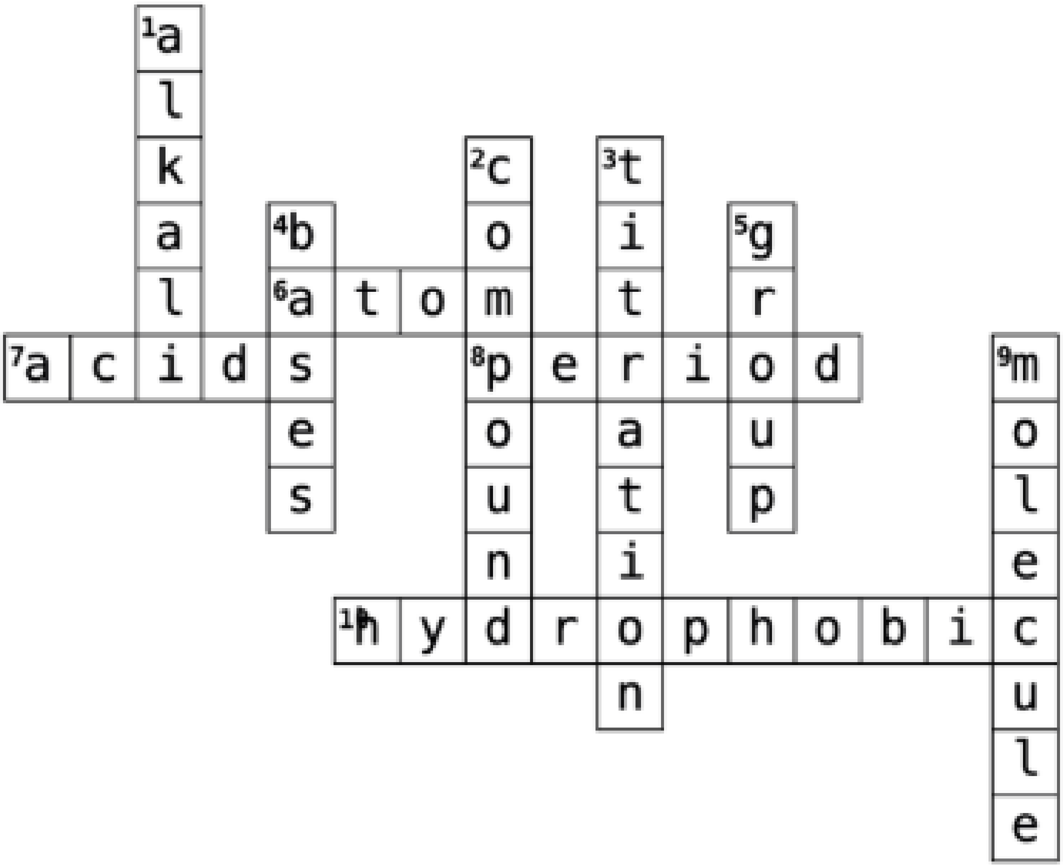
4. Substances with a pH greater than 7.

5. indicates the number of electrons in the outermos shell on the periodic table

9. pure substance made of one element

ENTERTAINMENT

Answers



1 alkali
2 compound
3 titration
4 bases
5 group
6 atom
7 acids
8 period
9 molecule
10 hydrophobic

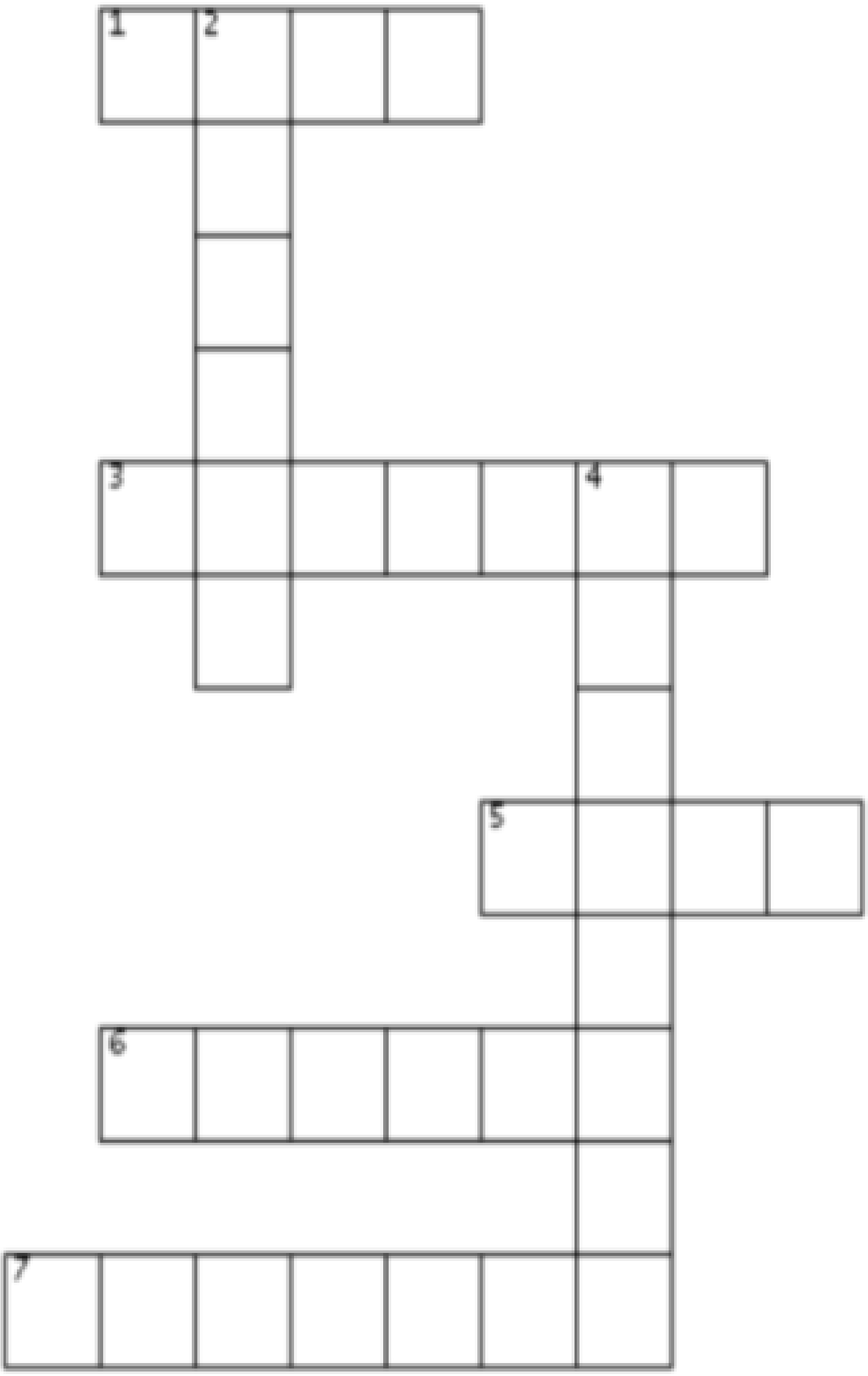
Z	A	E	H	A	e	Z	r	r	v	a	A	H	A	C
l	a	L	E	F	D	Q	w	r	Y	I	P	W	N	H
v	o	T	A	w	Y	A	V	M	R	O	V	w	D	L
i	D	u	R	k	Q	n	P	D	R	Y	P	w	A	O
P	H	O	T	O	S	Y	N	T	H	E	S	I	S	R
D	B	V	C	L	v	O	O	o	A	D	m	l	g	O
m	w	k	U	U	H	T	Y	N	O	T	q	E	O	P
q	c	N	W	C	U	R	Z	p	U	X	I	x	T	H
N	G	H	O	A	U	m	M	s	W	C	Y	O	U	Y
S	I	T	R	I	B	O	S	O	M	E	L	G	N	L
t	I	A	h	D	H	C	A	M	O	T	S	E	E	L
M	i	n	R	p	O	M	I	T	O	S	I	S	U	N
r	b	C	y	B	N	O	I	T	U	L	O	V	E	S
E	M	Y	Z	N	E	h	L	V	A	C	C	I	N	E
b	d	p	v	L	L	E	C	B	V	I	x	c	J	S

ADAPTATION
AUTOTROPH
BLOOD
BRAIN
CELL
CHLOROPHYLL
DNA
ENZYME
EVOLUTION
HEART
LUNGS
MITOCHONDRIA
MITOSIS
NUCLEUS
OXYGEN
PHOTOSYNTHESIS
RIBOSOME
STOMACH
VACCINE

Science fair wordsearch

Z	H	I	N	U	H	Y	W	K	K	P	C	A	G
Q	T	X	L	W	R	K	O	R	L	R	O	A	L
W	S	F	A	C	I	Q	P	H	Z	E	N	P	O
S	A	A	K	T	V	S	B	H	I	C	T	K	B
C	Y	T	E	C	E	R	O	Z	F	I	A	A	A
L	A	O	E	O	R	P	G	H	W	P	M	T	L
G	V	C	T	R	W	N	S	I	F	I	I	M	W
Q	V	E	J	H	C	L	B	O	K	T	N	O	A
O	W	A	O	J	D	Y	V	R	L	A	A	S	R
X	D	N	A	L	C	M	C	H	L	T	T	P	M
Y	R	F	S	V	N	T	I	L	C	I	I	H	I
G	A	R	N	O	M	U	D	V	E	O	O	E	N
E	A	N	D	R	E	C	H	I	I	N	N	R	G
N	C	V	P	O	L	L	U	T	I	O	N	E	Z

WATERCYCLE
GLOBALWARMING
LAKE
OXYGEN
OCEAN
CONTAMINATION
RIVER
PRECIPITATION
ATMOSPHERE
POLLUTION



ACROSS

1. The smallest particle of an element.
3. A solid that turns directly into gas without becoming liquid.
5. The gas produced when baking soda reacts with vinegar. (3 letters)
6. pH < 7, like lemon juice or vinegar.
7. pH > 7, like baking soda.

DOWN

2. The type of reaction that releases heat.
4. This metal melts in your hand at about 29°C.

Answers

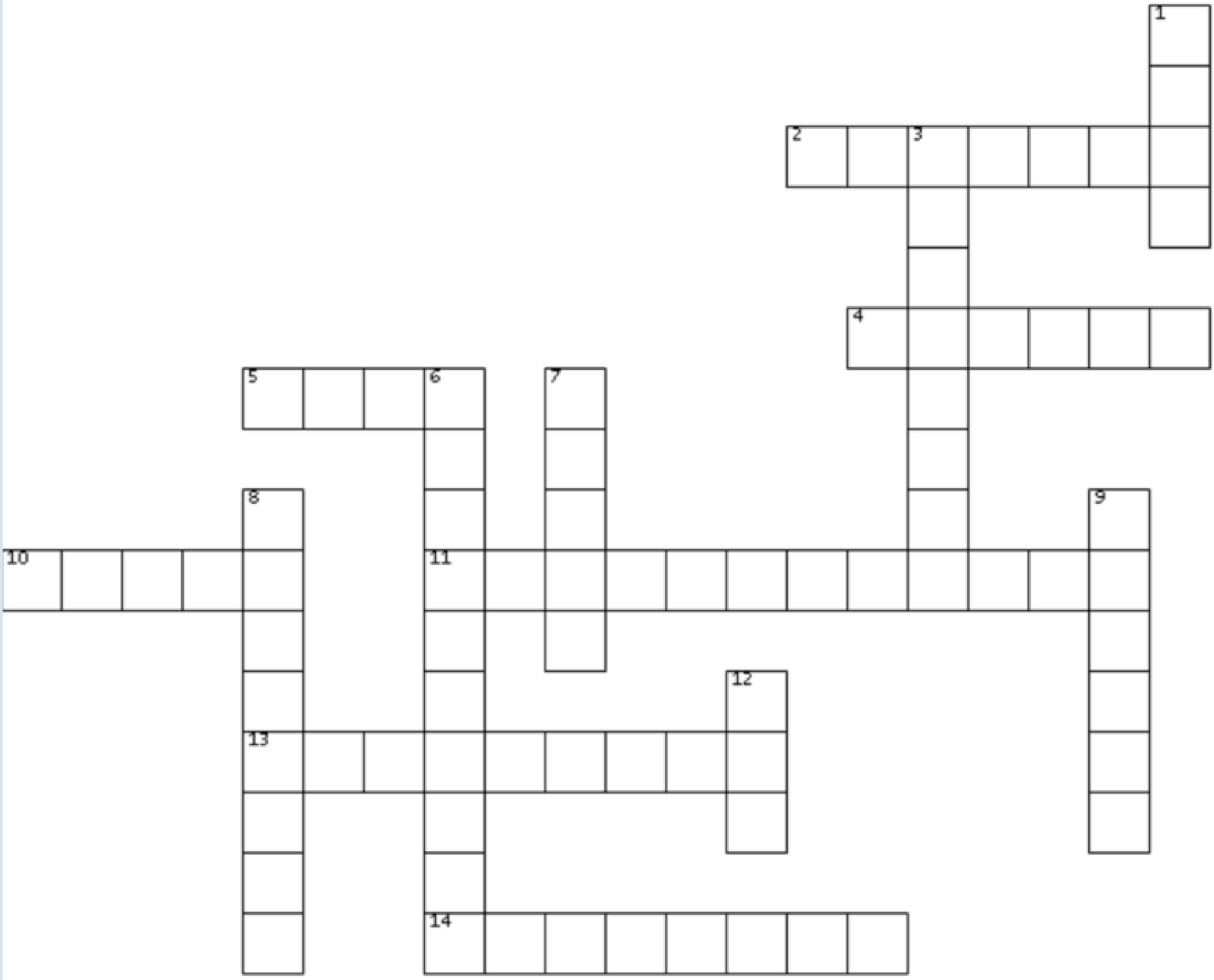
1. ATOM
2. EXOTHERM (or EXOTHERMIC if 10 letters allowed)
3. DRYICE (solid CO_2)
4. GALLIUM
5. CO2
6. ACID
7. BASE

Science fair wordsearch

Z	H	I	N	U	H	Y	W	K	K	P	C	A	G
Q	T	X	L	W	R	K	O	R	L	R	O	A	L
W	S	F	A	C	I	Q	P	H	Z	E	N	P	O
S	A	A	K	T	V	S	B	H	I	C	T	K	B
C	Y	T	E	C	E	R	O	Z	F	I	A	A	A
L	A	O	E	O	R	P	G	H	W	P	M	T	L
G	V	C	T	R	W	N	S	I	F	I	I	M	W
Q	V	E	J	H	C	L	B	O	K	T	N	O	A
O	W	A	O	J	D	Y	V	R	L	A	A	S	R
X	D	N	A	L	C	M	C	H	L	T	T	P	M
Y	R	F	S	V	N	T	I	L	C	I	I	H	I
G	A	R	N	O	M	U	D	V	E	O	O	E	N
E	A	N	D	R	E	C	H	I	I	N	N	R	G
N	C	V	P	O	L	L	U	T	I	O	N	E	Z

WATERCYCLE
GLOBALWARMING
LAKE
OXYGEN
OCEAN
CONTAMINATION
RIVER
PRECIPITATION
ATMOSPHERE
POLLUTION

ENTERTAINMENT



ACROSS

2. The “control center” inside a cell that holds the DNA.
4. Anything that has mass and takes up space.
5. The smallest unit of matter.
10. How fast energy is used or work is done.
11. How quickly something speeds up or slows down.
13. The process by which living things change over long periods of time.
14. Two or more atoms joined together

DOWN

1. How much matter is in something.
3. Something that speeds up a chemical reaction without being used up.
6. All the chemical reactions in your body that keep you alive.
7. A push or pull on something
8. Molecules that build and repair your body and help it work.
9. The ability to do work or cause change.
12. The molecule that carries the instructions for building and running living things.

Answers

1. mass
2. nucleus
3. Catalyst
4. Matter
5. Atom
6. Metabolism
7. Force
8. Proteins
9. Energy
10. power
11. Acceleration
12. DNA
13. Evolution
14. molecule

ANSWERS TO THE CROSSWORD:

Across

4. Root hair cells
5. Cytoplasm
8. Nucleus
9. Cell membrane
11. Mitochondria
12. Eukaryotic

Down

1. Chloroplast
2. Prokaryotic
3. Ribosomes
4. Sperm cell
5. Nerve cells (or neurones)
6. Muscle cells

Riddles:

I'm one of many, same in name, differing by neutrons in our atomic frame. Who am I? (Isotopes)

Bound together tightly, we form everything around. We're not a lone element, but a team found. What am I? (Molecules)

I'm not thirsty, but I swallow substances whole, dissolving them with ease, in my liquid role. What am I? (Solvent)

I fight invaders day and night, i'm white, i'm small, but I pack a fight. What am I? (White blood cells)

I travel as waves but i'm not in the sea, I let you watch Tiktok and see. What am I? (Light)

Chemistry:

-How do you call a process during which solids turn into gases? (sublimation)

-An acid is a chemical that has a pH value less than..? (7)

-Metals are good conductors of..? (energy)

-What is the difference between simple and fractional distillation? (One is for separating solids from Lq another is for 2 Lq)

-What are isotopes? (Same number of electrons in a shell, protons in a nucleus and a different amount of neutrons)

Biology:

-What is the name of the experiment we use to detect protein? (Biuret's)

-Explain the difference between a prokaryotic and a eukaryotic cell. (eukaryotic have a nucleus and organelles while prokaryotic do not)

-How does light intensity affect the rate of photosynthesis? (As light intensity increases, so does the rate of photosynthesis)

-How are the blood cells which produce antibodies called? (lymphocytes)

-What is the role of a vaccine? (teach body to defend itself without dangers of full infection)

Physics:

-An object is weightless when it is..? (In freefall)

-Each magnet has two ends, each one called a...? (magnetic pole)

-What makes a graph satisfied by hook's law? (The graph is linear passing through the origin, so force and displacement are directly proportional)

-What is the difference between a scalar and a vector? (A scalar is a quanity with only magnitude and vector has both magnitude and direction)

-How many types of waves are there?

Y9 – 10 PDS Science Fair Online Questionnaire
Form & Responses QR

TikTok & Instagram

@akademia.pds.sci

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