

LAMPIRAN

Lampiran 1 Tabel Karakteristik 118 Unsur

No.	Nama Unsur	Kelompok	Karakteristik
1	<i>Hydrogen (H)</i>	<i>Hydrogen</i>	<i>Pure hydrogen in a glass sphere gives off a purple glow when electricified.</i>
2	<i>Lithium (Li)</i>	<i>Alkali metals</i>	<i>Lithium is the lightest of all metals. It can easily float on water.</i>
3	<i>Sodium (Na)</i>	<i>Alkali metals</i>	<i>Bright yellow lights in fireworks get their colour from burning sodium compounds.</i>
4	<i>Potassium (K)</i>	<i>Alkali metals</i>	<i>The name potassium comes from potash but the element's chemical symbol, K, is taken from kalium, a Latin word for "ash".</i>
5	<i>Rubidium (Rb)</i>	<i>Alkali metals</i>	<i>Rubidium was named after Latin word rubidius, meaning "deepest red". This refers to the red-coloured flame it produces when burned.</i>
6	<i>Caesium (Cs)</i>	<i>Alkali metals</i>	<i>Its name means "sky blue" and refers to the colour of caesium's flame when burning.</i>
7	<i>Francium (Fr)</i>	<i>Alkali metals</i>	<i>The French chemist Marguerite Perey discovered francium in 1939. She named this element francium after her home country.</i>

8	<i>Beryllium (Be)</i>	<i>Alkaline earth metals</i>	<i>It was discovered by the French chemist Louis Nicolas Vauquelin. He extracted the pure metal from emerald, which is a valuable green form of the mineral beryl.</i>
9	<i>Magnesium (Mg)</i>	<i>Alkaline earth metals</i>	<i>Chlorophyll is an important molecule in plants and at its centre sits a magnesium atom, which helps plants convert sunlight into energy in photosynthesis.</i>
10	<i>Calcium (Ca)</i>	<i>Alkaline earth metals</i>	<i>Oranges are a good source of calcium, and most orange juices have extra calcium added to them.</i>
11	<i>Strontium (Sr)</i>	<i>Alkaline earth metals</i>	<i>Strontium was discovered in a mineral found near the Scottish village of Strontian. Strontium carbonate produces a red colour in flares and fireworks.</i>
12	<i>Barium (Ba)</i>	<i>Alkaline earth metals</i>	<i>Barium is named after the Greek word barys, which means "heavy", because barium and its minerals are dense.</i>
13	<i>Radium (Ra)</i>	<i>Alkaline earth metals</i>	<i>Radium is the only radioactive member of the alkaline earth metals.</i>
14	<i>Scandium (Sc)</i>	<i>Transition metals</i>	<i>Scandium is spread so thinly in Earth's rocks that it is very difficult to collect a large amount of this element. It is a soft and</i>

lightweight metal, scandium is similar to aluminium.

15	<i>Titanium (Ti)</i>	<i>Transition metals</i>	<i>Titanium was named after the Titans, a race of mythic Greek gods. This strong metal makes excellent protective shields in body armour.</i>
16	<i>Vanadium (V)</i>	<i>Transition metals</i>	<i>Ancient metalworkers used tiny amounts of vanadium compounds to make Damascus Steel (Damascus is the capital city of Syria, where the world's sharpest swords were made).</i>
17	<i>Chromium (Cr)</i>	<i>Transition metals</i>	<i>Chromium is named after chroma, the Greek word for "colour".</i>
18	<i>Manganese (Mn)</i>	<i>Transition metals</i>	<i>The human body needs a tiny amount of manganese, which we can get from pineapples.</i>
19	<i>Iron (Fe)</i>	<i>Transition metals</i>	<i>The human body uses iron to make haemoglobin, a substance in blood that carries oxygen around our body (oxygen helps our cells produce energy for the body to work.</i>
20	<i>Cobalt (Co)</i>	<i>Transition metals</i>	<i>When Medieval German miners tried to purify ore of cobalts, the arsenic gas released made them sick. This unwanted side-effect led to the name kobold, a mischievous spirit.</i>

21	<i>Nickel (Ni)</i>	<i>Transition metals</i>	<i>Nickel is named after Old Nick, a demonic spirit from Christian lore that was believed to live underground.</i>
22	<i>Copper (Cu)</i>	<i>Transition metals</i>	<i>Pure copper does not rust, but it reacts with air over time to form a layer of grey-green copper carbonate called verdigris. This can be seen on the Statue of Liberty.</i>
23	<i>Zinc (Zn)</i>	<i>Transition metals</i>	<i>Along with many other elements, zinc atoms are form inside supernovae (exploding giant stars).</i>
24	<i>Yttrium (Y)</i>	<i>Transition metals</i>	<i>The samples of rock brought back from the Moon by astronauts in NASA's Apollo missions contained higher levels of yttrium than rocks on Earth.</i>
25	<i>Zirconium (Zr)</i>	<i>Transition metals</i>	<i>This element is named after the mineral zircon, which means "golden" in Persian, a reference to the golden-brown colour of its crystals.</i>
26	<i>Niobium (Nb)</i>	<i>Transition metals</i>	<i>Niobium does not expand when hot.</i>
27	<i>Molybdenum (Mo)</i>	<i>Transition metals</i>	<i>Molybdenum gets its unusual name from the Greek word molybdos, which means "lead". Miners once mistook molybdenite,</i>

a dark mineral containing this metal, for an ore of lead.

28	<i>Technetium (Tc)</i>	<i>Transition metals</i>	<i>Technetium was the first element to be produced artificially by researchers. It is the lightest radioactive element.</i>
29	<i>Ruthenium (Ru)</i>	<i>Transition metals</i>	<i>Ruthenium is named after Ruthenia, an old Latin name for Russia.</i>
30	<i>Rhodium (Rh)</i>	<i>Transition metals</i>	<i>The rosy red colour of one of its compounds inspired the name rhodium. The Greek word rhodon means "rose-coloured".</i>
31	<i>Palladium (Pd)</i>	<i>Transition metals</i>	<i>Palladium absorbs hydrogen, like a sponge soaking up water.</i>
32	<i>Silver (Ag)</i>	<i>Transition metals</i>	<i>Silver gets its symbol "Ag" from its Latin name argentum, which means "shiny white".</i>
33	<i>Cadmium (Cd)</i>	<i>Transition metals</i>	<i>Cadmium is a highly toxic metal, and is known to cause cancer.</i>
34	<i>Hafnium (Hf)</i>	<i>Transition metals</i>	<i>Hafnium is named after Hafnia, the Latin word for the city of Copenhagen in Denmark.</i>
35	<i>Tantalum (Ta)</i>	<i>Transition metals</i>	<i>Tantalum is a hard metal named after Tantalus, a man from Greek mythology who was punished by the gods.</i>
36	<i>Tungsten (W)</i>	<i>Transition metals</i>	<i>Tungsten has the highest melting point of any metal: it turns to liquid at a searing 3,414 C.</i>

Tungsten's high melting point allows it to be used in the filaments of light bulbs.

37	<i>Rhenium (Re)</i>	<i>Transition metals</i>	<i>Rhenium has the highest boiling point of any element. This allows alloys made of this element to be used in very hot conditions, such as those in the jet engines of fighter planes.</i>
38	<i>Osmium (Os)</i>	<i>Transition metals</i>	<i>A red osmium oxide stains cells so they can be seen clearly under a powerful microscope, while a black oxide powder allows fingerprints to be revealed in crime investigations.</i>
39	<i>Iridium (77)</i>	<i>Transition metals</i>	<i>Iridium is the rarest natural element on Earth. Scientists believe this small quantity was deposited by the dust from an explosion 66 million years ago when a large meteorite hit our planet.</i>
40	<i>Platinum (Pt)</i>	<i>Transition metals</i>	<i>Spanish explorers first found platinum in the mines of South America in the 1700s. They obtained a whitish substance that the locals living near there called platina, meaning "little silver".</i>
41	<i>Gold (Au)</i>	<i>Transition metals</i>	<i>This metal has always been seen as valuable and many ancient</i>

artefacts, such as the 3,300-year-old death mask of Egyptian pharaoh Tutankhamun, were forged from it.

42	Mercury (Hg)	Transition metals	Ancient Romans called mercury hydrargyrum, meaning "silver water". It was later known as quicksilver because of how fast it flowed as a stream of liquid.
43	Rutherfordium (Rf)	Transition metals	Rutherfordium was the first superheavy element to be discovered. It is named after the New Zealand scientist Ernest Rutherford, who, in 1913, suggested that every atom has a nucleus, or core.
44	Dubnium (Db)	Transition metals	It took scientists nearly 30 years to agree on a name for this element. Dubnium was finally named after the Russian city of Dubna, where the first atoms of this element were created.
45	Seaborgium (Sg)	Transition metals	Atoms of seaborgium break apart in about three minutes, so little is known about it. It was named after the US scientist Glenn T. Seaborg.
46	Bohrium (Bh)	Transition metals	Bohrium is an artificial element named after the Danish scientist Niels Bohr. Atoms of this metal are unstable: half of any sample of

bohrium atoms breaks apart in 61 seconds.

47	<i>Hassium (Hs)</i>	<i>Transition metals</i>	<i>Scientists think hassium is a metal, but they have not been able to produce enough of its atoms to study it in any detail.</i>
48	<i>Meitnerium (Mt)</i>	<i>Transition metals</i>	<i>Researchers think meitnerium might be the densest of all elements.</i>
49	<i>Darmstadtium (Ds)</i>	<i>Transition metals</i>	<i>A team led by German physicist Sigurd Hofmann created darmstadtium by smashing nickel atoms into leads atoms in a particle accelerator (a machine in which atoms are smashed together).</i>
50	<i>Roentgenium (Rg)</i>	<i>Transition metals</i>	<i>Scientist believe that this metal shares many characteristics with precious metals, such as gold and silver.</i>
51	<i>Copernicium (Cn)</i>	<i>Transition metals</i>	<i>Copernicium is named after Nicolaus Copernicus, the Polish astronomer who theorized that our planet orbits the Sun.</i>
52	<i>Lanthanum (La)</i>	<i>Lanthanides</i>	<i>Although the word "lanthanum" means "to lie hidden", it is more abundant than most metals. Lanthanum carbonate is used to treat patient with kidney disease.</i>

53	<i>Cerium (Ce)</i>	<i>Lanthanides</i>	<i>Cerium was the first of the lanthanides to be discovered. It is named after the dwarf planet Ceres, which was discovered two years before the element was isolated.</i>
54	<i>Praseodymium (Pr)</i>	<i>Lanthanides</i>	<i>Part of this element's name comes from prasinos, the Greek word for "green". Praseodymium compounds provide a green colour to some artificial jewels.</i>
55	<i>Neodymium (Nd)</i>	<i>Lanthanides</i>	<i>Strong magnets made of neodymium can be used to lift thousands of times their own mass</i>
56	<i>Promethium (Pm)</i>	<i>Lanthanides</i>	<i>Promethium is the rarest lanthanide element. Being very radioactive, it is used in more missiles, because it converts this radioactivity into electrical power.</i>
57	<i>Samarium (Sm)</i>	<i>Lanthanides</i>	<i>Samarium is mixed with cobalt to make permanent magnets that are often used in electric guitars.</i>
58	<i>Europium (Eu)</i>	<i>Lanthanides</i>	<i>Europium was named after the continent of Europe. When placed under ultraviolet (UV) light, the compound europium oxide gives off a red glow.</i>
59	<i>Gadolinium (Gd)</i>	<i>Lanthanides</i>	<i>Gadolinium compounds are used to obtain clear MRI scans.</i>

60	<i>Terbium (Tb)</i>	<i>Lanthanides</i>	<i>Pure terbium is added to other metals to make powerful magnets used in sound-producing devices, such as the device which uses magnets to turn any flat surface. like a window, into a loudspeaker.</i>
61	<i>Dysprosium (Dy)</i>	<i>Lanthanides</i>	<i>Dysprosium reacts more easily with air and water than most other lanthanide metals.</i>
62	<i>Holmium (Ho)</i>	<i>Lanthanides</i>	<i>Pure holmium can produce a strong magnetic field and is therefore used in magnets.</i>
63	<i>Erbium (Er)</i>	<i>Lanthanides</i>	<i>Many erbium compounds are pink in colour and are used to colour pottery and glass.</i>
64	<i>Thulium (Tm)</i>	<i>Lanthanides</i>	<i>Thulium is a soft metal that glows blue under ultraviolet (UV) light.</i>
65	<i>Ytterbium (Yb)</i>	<i>Lanthanides</i>	<i>Ytterbium tends to be more reactive than other lanthanide metals. It is stored in sealed containers to stop the metal from reacting with oxygen.</i>
66	<i>Lutetium (Lu)</i>	<i>Lanthanides</i>	<i>Lutetium was the last of the rare earth metals to be discovered. It is also the final member of the lanthanides.</i>
67	<i>Actinium (Ac)</i>	<i>Actinides</i>	<i>Rare in nature, actinium is a metal formed by the decay of other radioactive elements.</i>

68	<i>Thorium (Th)</i>	<i>Actinides</i>	<i>Thorium was named after Thor, the Viking god of thunder.</i>
69	<i>Protactinium (Pa)</i>	<i>Actinides</i>	<i>The name protactinium means "before actinium". Small quantities of protactinium are found in ancient sands and mud.</i>
70	<i>Uranium (U)</i>	<i>Actinides</i>	<i>Named after the planet Uranus, a.k.a. the ice giant, uranium was the first known radioactive element.</i>
71	<i>Neptunium (Np)</i>	<i>Actinides</i>	<i>Sitting next to uranium in the periodic table, neptunium was named after the planet Neptune, the other ice giant in the solar system.</i>
72	<i>Plutonium (Pu)</i>	<i>Actinides</i>	<i>Plutonium was named after the planet Pluto, following the other two elements, Uranium and Neptunium. Hardly any plutonium exists in nature: most of it has decayed into other elements over time.</i>
73	<i>Americium (Am)</i>	<i>Actinides</i>	<i>Radioactivity emitted by americium atoms causes the air inside smoke detectors to conduct electricity. When smoke disrupts the electric current, an alarm goes off.</i>

74	<i>Curium (Cm)</i>	<i>Actinides</i>	<i>Curium is a silvery, radioactive metal that glows reddish purple in the dark.</i>
75	<i>Berkelium (Bk)</i>	<i>Actinides</i>	<i>Berkelium has no uses other than the creation of heavier elements, such as tennessine.</i>
76	<i>Californium (Cf)</i>	<i>Actinides</i>	<i>Californium is used in the treatment of cancer.</i>
77	<i>Einsteinium (Es)</i>	<i>Actinides</i>	<i>This element was named after the great German-born scientist Albert Einstein, and was found to be a silvery, radioactive metal that glows blue in the dark.</i>
78	<i>Fermium (Fm)</i>	<i>Actinides</i>	<i>Fermium was first identified in the debris of an atom bomb test in 1953. This unstable element has no known uses beyond research.</i>
79	<i>Mendelevium (Md)</i>	<i>Actinides</i>	<i>Mendelevium is produced in very small amounts by firing parts of helium atoms at einsteinium atoms in a particle accelerator (a machine in which atoms are smashed together).</i>
80	<i>Nobelium (No)</i>	<i>Actinides</i>	<i>This artificial metal is named after the Swedish chemist Alfred Nobel, who started the Nobel Prize.</i>
81	<i>Lawrencium (Lr)</i>	<i>Actinides</i>	<i>It is named after the US scientist Ernest Lawrence, who developed the first cyclotron particle accelerator. Its atoms were</i>

produced in a similar machine by firing boron atoms at californium atoms.

82	<i>Boron (B)</i>	<i>The Boron Group</i>	<i>Boron-deficient corn does not grow properly.</i>
83	<i>Aluminium (Al)</i>	<i>The Boron Group</i>	<i>Aluminium is expensive to purify, so it is often recycled instead. Drinks cans are almost 100 per cent pure aluminium and can be shredded, melted down, and made into new cans.</i>
84	<i>Gallium (Ga)</i>	<i>The Boron Group</i>	<i>Gallium melts at just 29 C (84.2 F), which means it soon becomes liquid when held in the hand.</i>
85	<i>Indium (In)</i>	<i>The Boron Group</i>	<i>Indium was named after indigo, which is the colour of the light its atoms release when electricified.</i>
86	<i>Thallium (Tl)</i>	<i>The Boron Group</i>	<i>Thallium was named after the Greek word thallos, which means "green shoot": it was first identified from the colours in its flame, which includes a bright green light.</i>
87	<i>Nihonium (Nh)</i>	<i>The Boron Group</i>	<i>Nihonium was named after the Japanese word nihon, which means Japan.</i>
88	<i>Carbon (C)</i>	<i>The Carbon Group</i>	<i>Each carbon atom can bond to four others, allowing them to form chains and rings.</i>

89	<i>Silicon (Si)</i>	<i>The Carbon Group</i>	<i>Tiny hairs on stinging nettle have silica (a silicon compound) tips that break off when we touch them, releasing chemicals that sting.</i>
90	<i>Germanium (Ge)</i>	<i>The Carbon Group</i>	<i>This semi-metal is named after the country Germany. Germanium is found in the atmosphere of Jupiter.</i>
91	<i>Tin (Sn)</i>	<i>The Carbon Group</i>	<i>Tin was one of the first metals used by humans. As long as 5,000 years ago, tin was mixed with copper to make bronze, an alloy that was stronger than either pure metal.</i>
92	<i>Lead (Pb)</i>	<i>The Carbon Group</i>	<i>The chemical symbol for lead, Pb, comes from the Latin word plumbum. This is where the word "plumber" comes from: in ancient Roman times, water pipes used in plumbing were made from this soft metal.</i>
93	<i>Flerovium (Fl)</i>	<i>The Carbon Group</i>	<i>Flerovium was produced by smashing together atoms of calcium and plutonium.</i>
94	<i>Nitrogen (N)</i>	<i>The Nitrogen Group</i>	<i>A group of nitrogen compounds is used in explosives, including TNT. When ignited, they explode because the bonds between</i>

nitrogen atoms detach very quickly.

95	Phosphorus (P)	The Nitrogen Group	This was accidentally discovered by Henning Brand. He boiled a pot full of urine for days & produced a mysterious glowing substance, which he called phosphorus, meaning " giver of light".
96	Arsenic (As)	The Nitrogen Group	Arsenic is often called the "king of poisons". Every form of arsenic - either pure or in a compound - is poisonous to animal. Arsenic compounds are used in making some rat poisons.
97	Antimony (Sb)	The Nitrogen Group	Antimony gets its name from the Greek word anti-monos, meaning "not alone". Its symbol, Sb, comes from stibium, the Latin word for kohl, a form of eye make-up.
98	Bismuth (Bi)	The Nitrogen Group	Yellow bismuth pigments are used in paints and cosmetics. Nail polish gives a pearly effect because of bismuth compounds.
99	Moscovium (Mc)	The Nitrogen Group	Moscovium is named after the Russian capital city os Moscow. It was first created at the Joint Institute for Nuclear Research in Dubna, Russia.
100	Oxygen (O)	The Oxygen Group	Oxygen is also used up when it reacts with other elements to form

compounds called oxide. However, it is replenished by plants through photosynthesis, which releases fresh oxygen.

101	Sulfur (S)	The Oxygen Group	Many sulfur compounds smell bad. For example, the rotten-egg smell of volcanic pools is due to hydrogen sulfide gas.
102	Selenium (Se)	The Oxygen Group	Selenium is named after Selene, the Greek goddess of the Moon. Selenium has two main pure forms: grey selenium, which is a hard substance, and red selenium, which is a soft powder.
103	Tellurium (Te)	The Oxygen Group	Tellurium is one of the 10 rarest elements on this planet. It gets its name from the Latin word tellus, which means Earth.
104	Polonium (Po)	The Oxygen Group	Despite its radioactivity, this element is used to heat and power spacecraft, such as the Russian Lunokhod rovers, which landed on the Moon in the 1970s.
105	Livermorium (Lv)	The Oxygen Group	This highly radioactive element was produced by firing calcium atoms at curium atoms in a particle accelerator (a machine in which atoms are smashed together).

106	Fluorine (F)	The Halogen Group	<i>This pale yellow gas is incredibly dangerous when pure: just a tiny amount added to the air can kill a person. Thus, pure fluorine is often stored in nickel containers that can resist its attack.</i>
107	Chlorine (Cl)	The Halogen Group	<i>Chlorine is named after the Greek word <i>chlóros</i>, which means "pale green", a reference to the colour of this gaseous element.</i>
108	Bromine (Br)	The Halogen Group	<i>Bromine is the only non-metal that is a liquid at room temperature. It is named after the Greek word for "stench" because of its strong smell. Pure bromine is a red-brown liquid.</i>
109	Iodine (I)	The Halogen Group	<i>This element forms a purple gas when heated, and is named after the Greek word <i>iodes</i>, which means "violet".</i>
110	Astatine (At)	The Halogen Group	<i>Atoms of astatine are unstable, and typically break down after just a few hours, into atoms of lighter elements, such as bismuth.</i>
111	Tennessine (Ts)	The Halogen Group	<i>Tennessine is the youngest element in the periodic table. Only a few atoms of it have ever been made. Scientists have predicted it to be a semi-metal, unlike all the other non-metal halogens.</i>

112 *Helium (He)* *Noble Gases* *Helium is the second lightest element after hydrogen. Unlike hydrogen, which is very reactive, helium is a noble gas and does not react at all. Thus, it is safe to use in objects such as party balloons.*

113 *Neon (Ne)* *Noble Gases* *Some of the element neon was locked in Earth's rocks when the planet formed, and this is released into the air by volcanic eruptions. It is most commonly used in lighting, such as illuminated signs.*

114 *Argon (Ar)* *Noble Gases* *It undergoes no reactions with any other element, and was named after the Greek word argos, meaning "idle".*

115 *Krypton (Kr)* *Noble Gases* *The word krypton means the "hidden one" in Greek. Pure krypton produces a very bright white light when electricified with a current, which makes it ideal for use in flash bulbs.*

116 *Xenon (Xe)* *Noble Gases* *Xenon is so rare that there is only one atom of this gaseous element for every 10 million atoms in the air. Xenon is used in powerful lasers that can kill bacteria.*

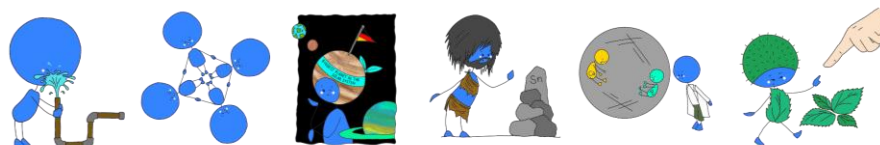
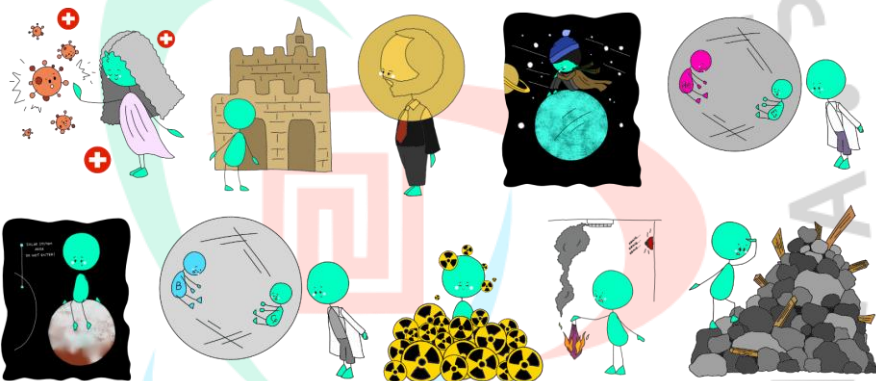
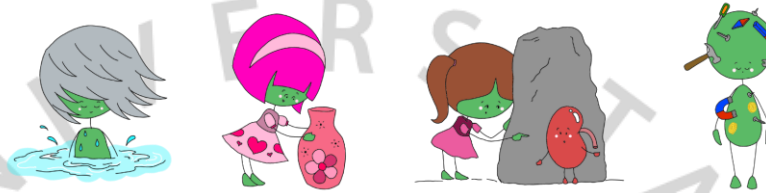
117 *Radon (Rn)* *Noble Gases* *Radon is the only natural radioactive noble gas. Radon is*

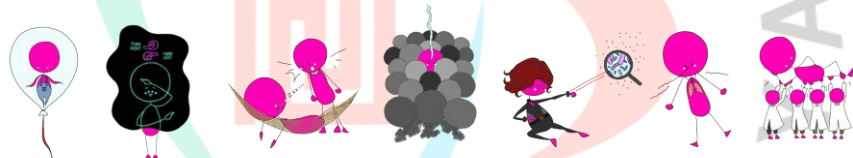
very radioactive and breathing it in can cause illness, such as lung cancer.

118	Oganesson (Og)	Noble Gases	<i>The heaviest element yet made is oganesson. Only a few atoms have been created so far, so its properties are not well understood.</i>
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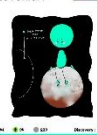





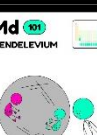
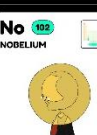
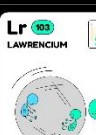
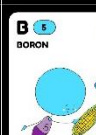
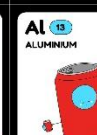
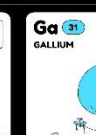













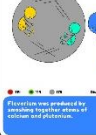









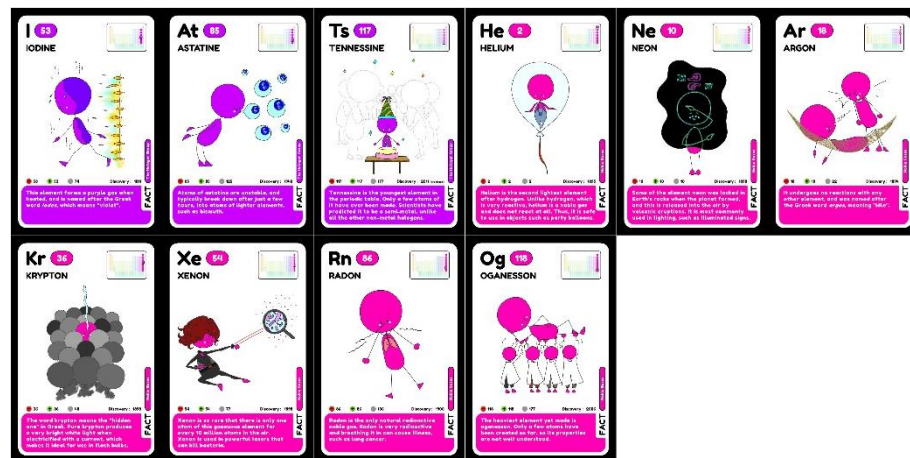


Lampiran 3 Hasil Desain 118 Kartu Permainan “Elemion”




Ir 77 IRIDIUM <p>Iridium is the rarest natural element on Earth. Scientists believe this metal quantity was deposited by the dust from an explosion of billions years ago which is large asteroids but not planets.</p>	Pt 78 PLATINUM <p>Spanish explorers first found platinum, the name of South American in the 1500s. They obtained a whitish substance that they found using their three colored plume meaning "white dove".</p>	Au 79 GOLD <p>This metal has always been seen as valuable and many ancient artifacts, such as the 3,300-year-old death mask of Egyptian pharaoh Tutankhamun, were forged from it.</p>	Hg 80 MERCURY <p>Ancient Romans called mercury "hydrargyrum," meaning "silver water." It was later known as "quicksilver" because of how fast it flowed in a stream of liquid.</p>	Cn 112 COPERNICIUM <p>Copernicium is named after Nicolaus Copernicus, the Polish astronomer who theorized that our planet orbits the Sun.</p>	Db 105 DUBNIUM <p>It took scientists nearly 55 years to create a name for this element. Dubnium was finally named after the Russian city of Dubna, where the first atoms of this element were created.</p>
Sg 106 SEABORGIUM <p>Atoms of seaborgium break apart in about three minutes, so little of it has been made. It was named after the US scientist Glenn T. Seaborg.</p>	Bh 107 BOHRHIUM <p>Bohrium is an artificial element named after the Danish physicist Niels Bohr. Atoms of this metal are unstable, half of any sample of bohrium decays breaks apart in 67 seconds.</p>	Hs 108 HASSIUM <p>Scientists think hassium is a metal, but they have been unable to produce enough of it alone to study it in any detail.</p>	Mt 109 MEITNERIUM <p>Researchers think meitnerium might be the heaviest of all elements.</p>	Ds 110 DARMSTADIUM <p>A team led by German physicist Siegfried Hofmann created darmstadtium by smashing nickel atoms into lead atoms in a particle accelerator (a machine in which atoms are smashed together).</p>	Rg 111 ROENTGENIUM <p>Scientists believe that this metal shows some characteristics of noble gases, such as gold and silver.</p>
Sc 21 SCANDIUM <p>Scandium is spread as thinly as flint in Earth's crust, but it is more difficult to collect a large amount of this element. It is a soft and lightweight metal, similar to titanium.</p>	Ta 73 TANTALUM <p>Tantalum is a hard metal named after the Greek god of wealth, Cronus. It is a rare metal, and it is named by the gods.</p>	Rf 104 RUTHERFORDIUM <p>Rutherfordium was the first superheavy element to be discovered. It is named after the New Zealand physicist Ernest Rutherford, who, in 1908, discovered that every atom has a nucleus, or core.</p>	Ce 58 CERIUM <p>Cerium was the first of the elements in the f-block to be named after the first planet, Ceres, which was discovered less than a year before the element was isolated.</p>	Pr 59 PRASEODYMIUM <p>Part of this element's name comes from the Greek word "praseos," which means "green." Praseodymium is named after the color of its compounds.</p>	La 57 LANTHANUM <p>Although the word "lanthanum" means "to lag behind," it is more abundant than most lanthanides. Lanthanum is used in many types of glass, such as in the light bulbs.</p>
Nd 60 NEODYMIUM <p>Strong magnets made of neodymium can be used to lift thousands of times their own mass.</p>	Pm 61 PROMETHIUM <p>Promethium is the rarest lanthanide element. Being very radioactive, it is used in many fields, because it emits a very strong light when it decays.</p>	Sm 62 SAMARIUM <p>First isolation was achieved in 1935 by the American chemist A. S. Dunning. It is the parent element of the actinide series.</p>	Eu 63 EUROPIUM <p>Europium was named after the continent of Europe. When placed under ultraviolet (UV) light, the element europium emits a bright red glow.</p>	Dy 66 DYSPROSIUM <p>Dysprosium reacts more easily with air and water than most other lanthanide metals.</p>	Er 68 ERBIUM <p>Erbitum was the last of the rare earth metals to be discovered. It is named after the city of Erbitum, where it was first isolated.</p>
Gd 64 GADOLINIUM <p>Gadolinium compounds are used to enhance MRI scans.</p>	Tb 65 TERBIUM <p>Terbium is named after the island of Terby, where it was first discovered. It is a very rare element, and it is named after the island.</p>	Ho 67 HOLMIUM <p>First isolation was achieved in 1917 by the American chemist A. S. Dunning. It is the parent element of the actinide series.</p>	Tm 69 THULIUM <p>Thulium is named after the island of Thule, where it was first discovered. It is a very rare element, and it is named after the island.</p>	Yb 70 YTTERIUM <p>Ytterbium was named after the island of Ytterby, where it was first discovered. It is a very rare element, and it is named after the island.</p>	Lu 71 LUTETIUM <p>Lutetium was named after the island of Lutetia, where it was first discovered. It is a very rare element, and it is named after the island.</p>
Th 90 THORIUM <p>Thorium was named after Thor, the Viking god of thunder.</p>	Es 99 EINSTEINIUM <p>This element was named after the great German-born physicist Albert Einstein. It is named after the physicist.</p>	Ac 89 ACTINIUM <p>Actinium was named after the Greek word "aktis," which means "ray." It is named after the Greek word.</p>	Pa 91 PROTACTINIUM <p>The name protactinium means "before actinium." It is named after the element actinium, which was discovered first.</p>	U 92 URANIUM <p>Uranium was named after the planet Uranus, which was discovered in 1781. It is named after the planet.</p>	Np 93 NEPTUNIUM <p>Neptunium was named after the planet Neptune, which was discovered in 1846. It is named after the planet.</p>

Pu 94 PLUTONIUM  <p>Plutonium was named after the planet Pluto, following the other two planets Uranium and Neptunium. Many early elements exist in nature, most of which formed before the dawn of time.</p> <p>FACT Plutonium is a radioactive element that is used in nuclear reactors and weapons.</p>	Am 95 AMERICIUM  <p>Americium was named after the American continent. It is a radioactive element that is used in nuclear reactors and weapons.</p> <p>FACT Americium is a radioactive element that is used in nuclear reactors and weapons.</p>	Cm 96 CURIUM  <p>Curium is named after the Curie family, who discovered it. It is a radioactive element that is used in nuclear reactors and weapons.</p> <p>FACT Curium is a radioactive element that is used in nuclear reactors and weapons.</p>	Bk 97 BERKELIUM  <p>Berkelium is named after the city of Berkeley, California. It is a radioactive element that is used in nuclear reactors and weapons.</p> <p>FACT Berkelium is a radioactive element that is used in nuclear reactors and weapons.</p>	Cf 98 CALIFORNIUM  <p>Californium is named after the state of California. It is a radioactive element that is used in nuclear reactors and weapons.</p> <p>FACT Californium is a radioactive element that is used in nuclear reactors and weapons.</p>	Fm 100 FERMIUM  <p>Fermium is named after the physicist Enrico Fermi. It is a radioactive element that is used in nuclear reactors and weapons.</p> <p>FACT Fermium is a radioactive element that is used in nuclear reactors and weapons.</p>
Md 101 MENDELEVIUM  <p>Mendelevium is named after the chemist Dmitri Mendeleev. It is a radioactive element that is used in nuclear reactors and weapons.</p> <p>FACT Mendelevium is a radioactive element that is used in nuclear reactors and weapons.</p>	No 102 NOBELIUM  <p>Nobelium is named after the chemist Alfred Nobel. It is a radioactive element that is used in nuclear reactors and weapons.</p> <p>FACT Nobelium is a radioactive element that is used in nuclear reactors and weapons.</p>	Lr 103 LAWRENCIUM  <p>Lawrencium is named after the physicist Ernest Lawrence. It is a radioactive element that is used in nuclear reactors and weapons.</p> <p>FACT Lawrencium is a radioactive element that is used in nuclear reactors and weapons.</p>	B 5 BORON  <p>Boron is a non-metal element that is used in glass and ceramics.</p> <p>FACT Boron is a non-metal element that is used in glass and ceramics.</p>	Al 13 ALUMINIUM  <p>Aluminium is a metal element that is used in cans and foil.</p> <p>FACT Aluminium is a metal element that is used in cans and foil.</p>	Ga 31 GALLIUM  <p>Gallium is a metal element that is used in semiconductors.</p> <p>FACT Gallium is a metal element that is used in semiconductors.</p>
In 49 INDIUM  <p>Indium is a metal element that is used in semiconductors.</p> <p>FACT Indium is a metal element that is used in semiconductors.</p>	Tl 81 THALLIUM  <p>Thallium is a metal element that is used in semiconductors.</p> <p>FACT Thallium is a metal element that is used in semiconductors.</p>	Nh 113 NIHONIUM  <p>Nihonium is a metal element that is used in semiconductors.</p> <p>FACT Nihonium is a metal element that is used in semiconductors.</p>	C 6 CARBON  <p>Carbon is a non-metal element that is used in pencils and diamonds.</p> <p>FACT Carbon is a non-metal element that is used in pencils and diamonds.</p>	Si 14 SILICON  <p>Silicon is a non-metal element that is used in semiconductors.</p> <p>FACT Silicon is a non-metal element that is used in semiconductors.</p>	Pb 82 LEAD  <p>Lead is a metal element that is used in batteries and pipes.</p> <p>FACT Lead is a metal element that is used in batteries and pipes.</p>
Ge 32 GERMANIUM  <p>Germanium is a metalloid element that is used in semiconductors.</p> <p>FACT Germanium is a metalloid element that is used in semiconductors.</p>	Sn 50 TIN  <p>Tin is a metal element that is used in solder and pipes.</p> <p>FACT Tin is a metal element that is used in solder and pipes.</p>	Fl 114 FLEROVIUM  <p>Flerovium is a metal element that is used in semiconductors.</p> <p>FACT Flerovium is a metal element that is used in semiconductors.</p>	N 7 NITROGEN  <p>Nitrogen is a non-metal element that is used in fertilizers and explosives.</p> <p>FACT Nitrogen is a non-metal element that is used in fertilizers and explosives.</p>	P 15 PHOSPHORUS  <p>Phosphorus is a non-metal element that is used in fertilizers and matches.</p> <p>FACT Phosphorus is a non-metal element that is used in fertilizers and matches.</p>	As 33 ARSENIC  <p>Arsenic is a metalloid element that is used in pesticides and alloys.</p> <p>FACT Arsenic is a metalloid element that is used in pesticides and alloys.</p>
Sb 51 ANTIMONY  <p>Antimony is a metalloid element that is used in alloys and pigments.</p> <p>FACT Antimony is a metalloid element that is used in alloys and pigments.</p>	Bi 83 BISMUTH  <p>Bismuth is a metal element that is used in alloys and pigments.</p> <p>FACT Bismuth is a metal element that is used in alloys and pigments.</p>	Mc 115 MOSCOWIUM  <p>Moscovium is a metal element that is used in semiconductors.</p> <p>FACT Moscovium is a metal element that is used in semiconductors.</p>	O 8 OXYGEN  <p>Oxygen is a non-metal element that is used in breathing and combustion.</p> <p>FACT Oxygen is a non-metal element that is used in breathing and combustion.</p>	S 16 SULFUR  <p>Sulfur is a non-metal element that is used in fertilizers and matches.</p> <p>FACT Sulfur is a non-metal element that is used in fertilizers and matches.</p>	Se 34 SELENIUM  <p>Selenium is a non-metal element that is used in semiconductors and pigments.</p> <p>FACT Selenium is a non-metal element that is used in semiconductors and pigments.</p>
Te 52 TELLURIUM  <p>Tellurium is a metalloid element that is used in alloys and pigments.</p> <p>FACT Tellurium is a metalloid element that is used in alloys and pigments.</p>	Po 84 POLONIUM  <p>Polonium is a metal element that is used in semiconductors and pigments.</p> <p>FACT Polonium is a metal element that is used in semiconductors and pigments.</p>	Lv 116 LIVERMORIUM  <p>Livermorium is a metal element that is used in semiconductors and pigments.</p> <p>FACT Livermorium is a metal element that is used in semiconductors and pigments.</p>	F 9 FLUORINE  <p>Fluorine is a non-metal element that is used in toothpaste and refrigerators.</p> <p>FACT Fluorine is a non-metal element that is used in toothpaste and refrigerators.</p>	Cl 17 CHLORINE  <p>Chlorine is a non-metal element that is used in disinfectants and bleach.</p> <p>FACT Chlorine is a non-metal element that is used in disinfectants and bleach.</p>	Br 35 BROMINE  <p>Bromine is a non-metal element that is used in disinfectants and dyes.</p> <p>FACT Bromine is a non-metal element that is used in disinfectants and dyes.</p>



Lampiran 4 Rekap Percakapan Bimbingan TA

7/14/23, 11:14 PM	Rekap Percakapan Bimbingan
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REKAP PERCAKAPAN BIMBINGAN

Judul Tugas Akhir : Perancangan Board Game "Elemion" sebagai Sarana Pembelajaran Tabel Periodik Unsur Kimia

Sesi / Bahasan : ke-1 / Membahas hasil seminar proposal dan memilah-milah bagian-bagian yang harus dikeep dan ditakeout dari proposal seminar proposal untuk laporan TA

Mahasiswa : 2019061054 - Camila **Dosen Pembimbing** : 08.0120.001 - Zita Nadia, S.Ds, M.Ds.

Mahasiswa

Jumat, 14 Juli 2023, 23:06:04

Salam Bu Zita, terlampir laporan dengan bagian-bagian yang sudah saya milah-milah dari masukan sempro Bu. Mohon review dan feedbacknya Bu. Terima kasih

Sesi / Bahasan : ke-2 / Diskusi buku referensi visual untuk pengembangan karakter "Elemion"

Mahasiswa : 2019061054 - Camila **Dosen Pembimbing** : 08.0120.001 - Zita Nadia, S.Ds, M.Ds.

Jumat, 14 Juli 2023, 23:08:30

Salam Bu Zita, untuk buku yang saya gunakan dalam perancangan visual adalah The Elements Book: A Visual Encyclopedia of the Periodic Table. Apakah aman Bu? Mohon feedbacknya dan masukkan Ibu untuk buku lain yang mungkin bisa dipakai Bu. Terima kasih

Sesi / Bahasan : ke-3 / Memilah buku yang membahas tentang perancangan board game. Diskusi terkait poin-poin penting apa saja yang dapat digunakan sebagai acuan dalam perancangan board game

Mahasiswa : 2019061054 - Camila **Dosen Pembimbing** : 08.0120.001 - Zita Nadia, S.Ds, M.Ds.

Jumat, 14 Juli 2023, 23:09:26

Salam Bu Zita, izin diskusi terkait poin-poin yang harus diperhatikan dalam perancangan Board Game. Terima kasih

Sesi / Bahasan : ke-4 / Membahas masukan yang diperoleh dari preview 2 dan pengaplikasiannya pada laporan persiapan kelayakan sidang

Mahasiswa : 2019061054 - Camila **Dosen Pembimbing** : 08.0120.001 - Zita Nadia, S.Ds, M.Ds.

Jumat, 14 Juli 2023, 23:10:07

Permisi Bu Zita. Izin diskusi hasil revisi laporan berdasarkan masukan dari preview 2 Bu. Terima kasih

Sesi / Bahasan : ke-5 / Diskusi perkembangan visual karakter-karakter pada elemion. Mendiskusikan apakah ada yang kurang terkait gaya visual karakter

Mahasiswa : 2019061054 - Camila **Dosen Pembimbing** : 08.0120.001 - Zita Nadia, S.Ds, M.Ds.

Jumat, 14 Juli 2023, 23:10:40

Salam Bu Zita. Izin diskusi terkait pengembangan karakter unsur yang telah saya buat. Terima kasih Bu

Sesi / Bahasan : ke-6 / Membahas hasil desain kartu setelah ditambahkan karakter dan informasi-informasi terkait karakter unsur dengan masukan bahwa penggunaan frame berwarna pada bagian "FACT" akan lebih baik.

Mahasiswa : 2019061054 - Camila **Dosen Pembimbing** : 08.0120.001 - Zita Nadia, S.Ds, M.Ds.

Jumat, 14 Juli 2023, 23:11:41

Permisi Bu Zita. Izin konsultasi desain kartu yang ditata bersama dengan karakter "Elemion" yang sudah coba explore Bu. Terima kasih

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7/14/23, 11:14 PM

Rekap Percakapan Bimbingan

Sesi / Bahasan : ke-7 / Diskusi proses laporan dan menyusun poin-poin penting yang perlu dihighlight di dalam laporan supaya lebih informatif, khususnya konten dalam BAB 2, 3, dan 4

Mahasiswa : 2019061054 - Camila **Dosen Pembimbing** : 08.0120.001 - Zita Nadia, S.Ds, M.Ds.

Jumat, 14 Juli 2023, 23:12:15

Permisi Bu Zita. Izin diskusi dan bimbingan poin-poin yang harus di-highlight dalam laporan TA. Terima kasih

Sesi / Bahasan : ke-8 / Membahas judul final project TA dalam bahasa Indonesia dan bahasa Inggris

Mahasiswa : 2019061054 - Camila **Dosen Pembimbing** : 08.0120.001 - Zita Nadia, S.Ds, M.Ds.

Jumat, 14 Juli 2023, 23:12:47

Permisi Bu Zita. Izin diskusi dan konfirmasi persetujuan judul untuk TA saya Bu. Terima kasih

Sesi / Bahasan : ke-9 / Membahas jenis merchandise yang akan dibuat, apakah gantungan, pin, atau stiker

Mahasiswa : 2019061054 - Camila **Dosen Pembimbing** : 08.0120.001 - Zita Nadia, S.Ds, M.Ds.

Jumat, 14 Juli 2023, 23:13:23

Salam Bu Zita. Bu, izin diskusi jenis merchandise yang sebaiknya saya cetak untuk pameran TA. Terima kasih Bu

Sesi / Bahasan : ke-10 / Preview desain kotak packaging "Elemion" sebelum dicetak. Hasil diskusi mengusulkan sebaiknya ditambahkan subtitle. Subtitle akhirnya berupa "Conquer the Land of the Elements"

Mahasiswa : 2019061054 - Camila **Dosen Pembimbing** : 08.0120.001 - Zita Nadia, S.Ds, M.Ds.

Jumat, 14 Juli 2023, 23:14:02

Permisi Bu. Bu saya izin konfirmasi desain permainan dan kemasan permainan sebelum dicetak Bu. Terima kasih ya Bu