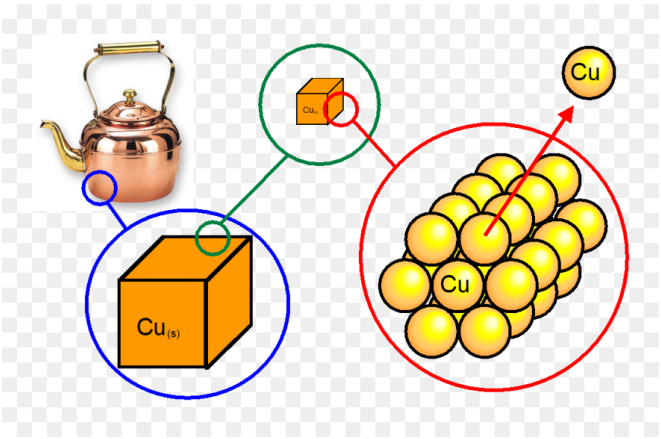
Химийн элемент гэж юу вэ? Жишээ гаргана уу.

Elements

1. Pure substance
   - Made of only 1 type of particle
   - Ex: copper wire only has copper atoms



2. Can't be separated into simpler substances by chemical or physical means

Elements

3. Each has a unique set of properties
   - Called characteristic properties
   - Can be physical or chemical

At room temperature
Standard pressure

- a soft, silver-white metal
- melting point $98^{o}C$
- Boiling point $884^{o}C$

- a yellow-green
- melting point $-101^{o}C$
- Boiling point $-34^{o}C$

Metals and non-metals in the periodic table

/ 2021.03.15 /

- *Metals and non-metals in the periodic table*
- *Physical properties of metals and non-metals*
- *Chemical properties of metals and non-metals*
- *Reactions between metals and non-metals*
- *Reactions between oxygen and metals and non-metal*

Metals and non-metals in the periodic table

- Almost everyone knows from an early age what a metal is. It is shiny, hard and feels cool to the touch.
- Chemists divide the elements into metals and non-metals and while we know what a metal is, most people are unsure about non-metals.
- Non-metal elements are not as striking in appearance as metals and some are colourless but they form most of the matter in the Earth's crust, the oceans, the atmosphere and even living things.

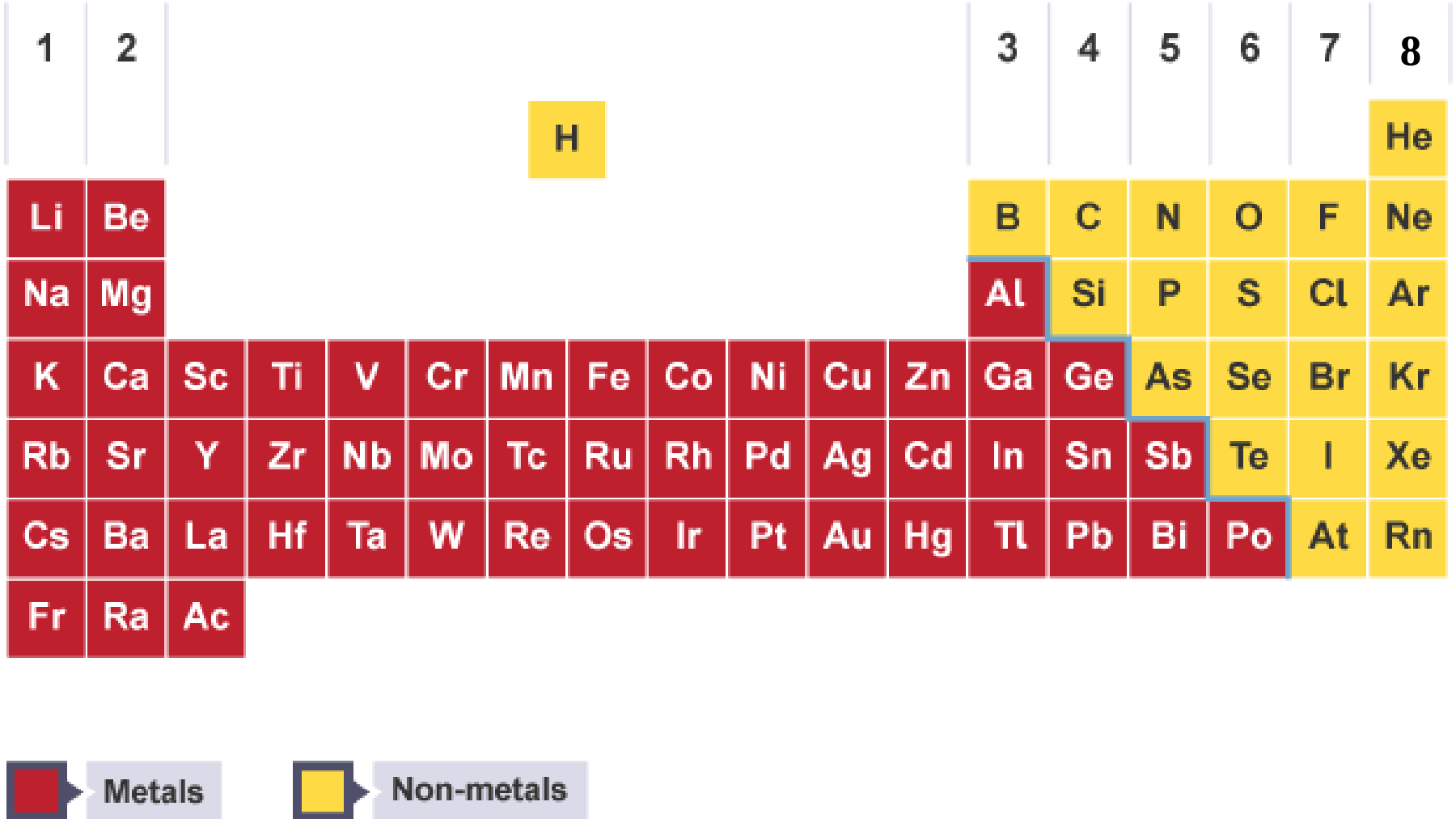
Metals and non-metals in the periodic table

- In Chapter 9 the periodic table was introduced and you were set the challenge of learning about the first twenty elements in it.
- Here is the periodic table again but this time we are going to look at the distribution of the metals and non-metals in it.

The uses and properties and metals

- Most of the metals that we use are not in their pure elemental form.
- We use metals mostly in alloys or in compounds with other metals and with non-metals.
- Table 11.1 is a survey of just ten metals to show their range of features and uses and some of their physical properties.

Part of the periodic table showing the positions of the metals and non-metals



Metals

Physical properties

Typical **physical properties** of **metals**:

- All metals are solid
- high **melting points-**хайлах цэг их
- good **conductors** of electricity
- good conductors of heat
- high **density**
- **Malleable-**уян харимхай
- **Ductile-**давтагдаж, сунгагдах чанартай

Some metals have properties that are not typical.

For example:

•Mercury (a metal) has a low melting point and exists as a liquid at room temperature.

•**elements** in **group 1** have low melting points, but also low densities, for example, sodium is less dense than water and so it floats

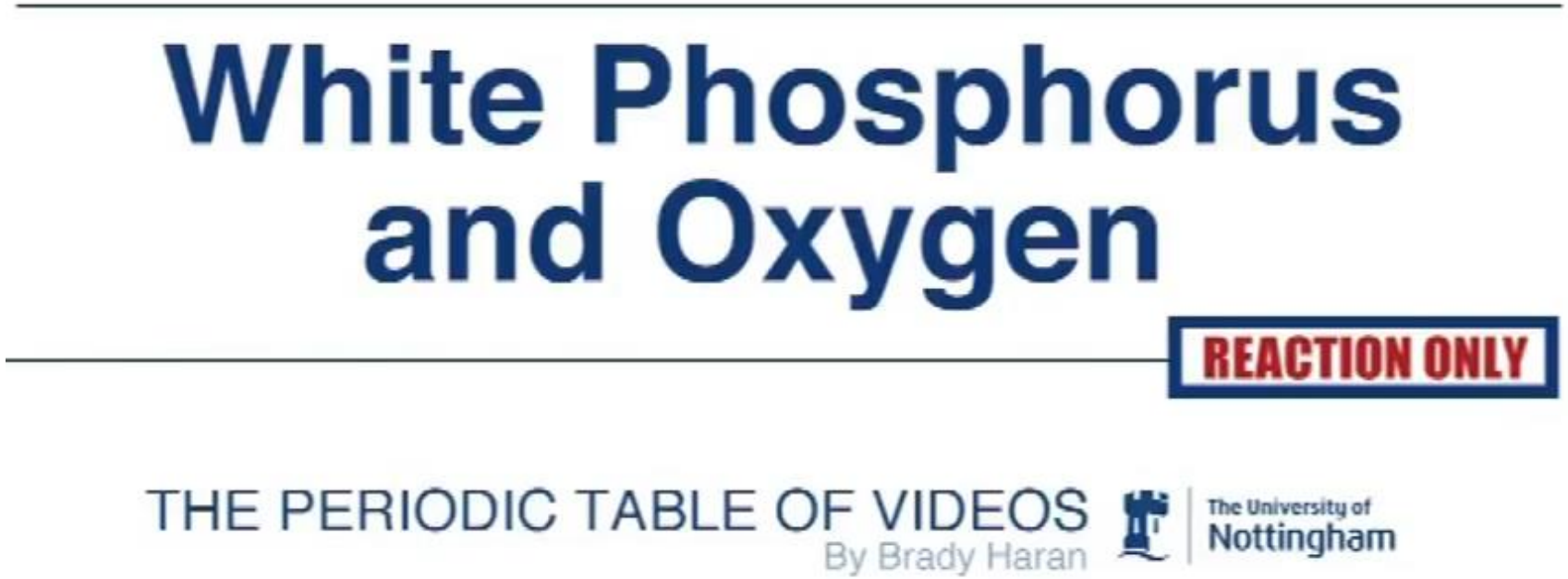
Physical properties

- A substance with a high density means it has a high mass for its size.
- **Malleable** substances can be bent or hammered into shape without shattering, while **brittle** substances shatter when bent or hit.
- **Ductile** means that a substance can be drawn out into a long wire without snapping or breaking.

Phosporus

- Phosphorus is found in three main forms: white, red, and black. (There are also numerous allotropes of each of these forms.)
- White phosphorus is a soft, waxy, flammable substance, consisting of tetrahedral P_4 molecules; it is often slightly yellowish because of the presence of impurities (hence, it is sometimes imaginatively known as yellow phosphorus). White phosphorus is highly reactive, and spontaneously ignites at about 30°C in moist air. It is usually stored under water, to prevent exposure to the air. It is also extremely toxic, even in very small quantities. (See Hazard warnings below.)
- Red phosphorus is stable at room temperature, but can be converted to the more reactive white phosphorus by heat, sunlight, or friction. Red phosphorus is used on the strike surface of the box that safety matches are stored in; the friction caused by dragging the match head across the rough surface converts some of the red phosphorus to white phosphorus, which spontaneously ignites, causing the match head to ignite. Red phosphorus is also used in fireworks, and other explosives.
- Black phosphorus is the least reactive form, and has little commercial value, but can be converted to white phosphorus by heating it under pressure.

White poshphorus and oxygen



Posphorus

- !!! Hazards !!!

- White phosphorus is extremely toxic; the approximate fatal dose is about 50 to 100 mg.
- Even in very small quantities, it produces severe gastrointestinal irritation, diarrhea, and liver damage. It also causes burns when it comes in contact with skin. Chronic exposure to white phosphorus causes bony necrosis (especially of the jaw, a condition called "phossy-jaw") and anemia.

- White phosphorus should be handled with gloves! This procedure must be performed in a fume hood!

Physical properties

Property	Metals	Non-metals
	Shiny	Dull
	High melting points	Low melting points
	Good conductors of electricity	Poor conductors of electricity
	Good conductors of heat	Poor conductors of heat
	High density	Low density
	Malleable and ductile	Brittle-Бутрамтгай

•mercury (a metal) has a low **melting point** and exists as a liquid at room temperature

•graphite, a form of carbon (a non-metal), has a high **boiling point** and is also a good **conductor** of electricity

Үгэн тэгшитгэл бичээрэй.