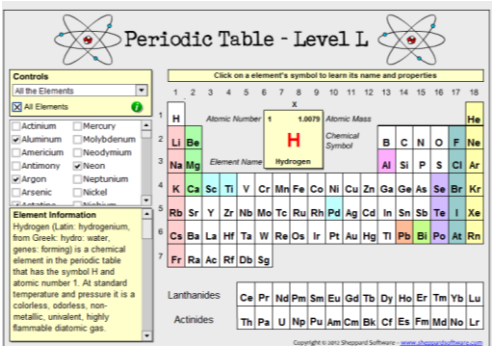
3 CHEMICAL ELEMENTS

1. Learn the names of elements in English https://www.webelements.com/

Go to this source or find a different website with a 'talking periodic table'.



2. Name chemical elements. Complete the gaps in the following list.

silver	**Ag**	carbon	**C**	hydrogen	**H**	manganese	**Mn**	_____	**Pb**
_____	**Al**	_____	**Ca**	helium	**He**	_____	**N**	sulphur	**S**
argon	**Ar**	chlorine	**Cl**	_____	**Hg**	_____	**Na**	_____	**Si**
_____	**As**	chromium	**Cr**	_____	**I**	neon	**Ne**	tin	**Sn**
barium	**Ba**	_____	**Cu**	_____	**K**	nickel	**Ni**	xenon	**Xe**
_____	**B**	_____	**F**	lithium	**Li**	oxygen	**O**	_____	**W**
bromine	**Br**	iron	**Fe**	magnesium	**Mg**	_____	**P**	zinc	**Zn**

3. Work in small groups to answer these questions:

a) What elements are present in the air? Do you know the percentages?
b) Which element is used as rocket fuel and as alternative fuel for cars?
c) What elements are present in the human body?
d) Do you know any alloys (combinations of metals)? Which ones? What metals are they made of?
e) Which elements can be dangerous? How are they dangerous?

4. What do you know about arsenic?

Watch the video and then complete the missing parts in the summary of the uses of arsenic.
https://www.youtube.com/watch?v=a2AbKwAvyos

Vocabulary:

sample (n) - vzorek
mould (n) – plíseň
volatile (adj) – těkavý
damp (adj) – vlhký
dispose of (v+prep) – zbavit se
feed livestock (v) – krmit dobytek
powder (n) – prášek
poisonous (adj) - jedovatý
vial (n) - lahvička

In the past, arsenic used to be ……. than it is nowadays.
In the 19th century, it was used as a ……. which contained copper arsenite.
When the rooms in Victorian houses were damp, ……
…… converted arsenic into volatile compound and several people ……..
Because arsenic is toxic, people used it widely …… their business partners, husbands, wives and lovers.
Now it is used in …… for getting electronic properties of transistors.
Sometimes it is still used as medication for …… or …… .

5. Comparing the properties: Circle the best answer according to the chart.

The Physical Properties of Six Metals

Metal	Specific Gravity	Melting Point (°C)	Boiling Point (°C)	Atomic Radius (Å)	Ionic Radius (Å)
Group I					
Copper	8.9	1083	2595	1.17	.96
Silver	10.5	960	2212	1.34	1.26
Gold	19.3	1063	2966	1.34	1.37
Group II					
Zinc	7.14	420	907	1.25	.74
Cadmium	8.65	321	765	1.41	.96
Mercury	13.60	-38.87	357	1.44	1.1

a) The atomic radius of cadmium is …… that of mercury. ***1***. *as high as* ***2.*** *not as high as*

b) …….. mercury, cadmium has a high boiling point. ***1.*** *Like* ***2***. *Compared to*

c) The specific gravity of cadmium and copper are … ***1.*** *similar* **2.** *identical ……*

d) Compared to the other metals in this table, gold has …… specific gravity. ***1.*** *a relatively high* **2**. *the highest*

e) The properties of cadmium and zinc are …… . ***1.*** *comparable* ***2***. *identical*

f) Copper and gold have ……. high boiling points. ***1.*** *comparatively* ***2***. *equally*

g) The melting points of the Group II metals are ……. those of Group I. ***1.*** *lower than* ***2***. *as low as*

h) The ionic radius of copper is …….. to that of cadmium. ***1.*** *similar* ***2.*** *equal*

6. Study the language structures for comparing. Complete the missing words from 1 to 7 below.

SIMILAR TO	*THE SAME*	*DIFFERENT*	*MODIFIER (informal)*	*MODIFIER (formal)*
comparable	*identical*	*not so/as …as*	*a bit denser*	*slightly denser*
like	*equal*	*whereas*	*a lot more corrosive*	*much more corrosive*
	is as …as	*differ*	*way higher*	*considerably higher*
	both … and	*in contrast to*	*significantly higher*	

SHOWING SIMILARITIES

Magnesium is	***like*** ***as important as*** ***similar to*** ***1_____ to***	*aluminium.*

The properties of these metals are	***2_____ / the same.*** ***similar / comparable.***

Magnesium	***resembles*** ***parallels***	*aluminium in many ways.*

3_____ *carbon dioxide* ***and*** *hydrogen are gases.*
Carbon dioxide and hydrogen are ***both*** *gases.*

SHOWING DIFFERENCES

Iron	*is* ***different from*** ***4_____ from***	*aluminium.*

Iron is	*(far / much)* ***heavier than*** ***less expensive than*** ***not as soft 5_____***	*aluminium.*

Unlike *iron,* ***Compared to*** *iron,* ***In 6_____ to*** *iron,*	*aluminium is light.*

Iron is heavy,	***whilst / while/7_____*** *aluminium is light.*

Iron is a	***relatively*** ***comparatively***	*soft metal.*

7. Write a short paragraph comparing these metals.

	atomic weight	**occurrence on the Earth**	**density**	**corrosion-resistant**
aluminium	26.982	crust	2.70 g/cm^3	yes
iron	55.845	core, crust	7.87 g/cm^3	no
magnesium	24.305	crust, sea water	1.74 g/cm^3	no

8. HOMEWORK The Wonder Metals

Read the text and find the answers to the questions:

1. Which metals are considered “wonder metals”?
2. What is the chemical substance called fool’s gold?
3. What are the most common alloys formed with iron?
4. What is the advantage of aluminium over iron?
5. Where does magnesium occur?
6. Which elements react violently with water?

The study of metals began in the Middle Ages when alchemists searched for a technique to convert “base metals”, like lead, to gold. They never succeeded in making gold but at least by experimenting with the metals (in contrast to the ancient Greeks, who only speculated about them) they made discoveries.

All but 20 of the over 100 elements identified to date are metals but only 7 of these are common in the earth´s crust. Iron, 1_____metal, is rarely found in the free state (not combined with other metals) and must be extracted from naturally occurring compounds (ores) such as hematite, magnetite, and pyrite. The beautiful colors of rocks are due to these iron compounds. In fact, iron pyrite is often called fool´s gold because of the similarity of its color to gold. Iron is very strongly magnetic, and the fact that the earth is a magnet itself tipped scientists off to the fact that iron is a major component of the earth´s core, or centre.

Pure iron is a relatively soft, silvery metal that is very active chemically (that is, it combines with oxygen to corrode or form rust). It is usually mixed with other elements or compounds to form alloys such as steel, stainless steel, or cast iron, which are 2_____ and rust resistant than pure iron.

Aluminum is the most abundant metal, but it was not used until a century ago because it is so active chemically and difficult to extract. Like iron it is soft, but in contrast to iron and steel, aluminum is very light and 3_____. These qualities make it useful for airplanes, trains, automobiles, and rockets.

In the 1940s, magnesium emerged as an important metal. Although it is 4_____ in the earth, 5_____, and harder to extract than aluminum, it is present in sea water and that means there is almost an endless supply of it.

In the space age, the extraordinary properties of titanium have made it the new wonder metal. 6_____and 7_____than steel, it is more resistant to corrosion and able to withstand heat.

The remaining major metals are sodium, potassium, and calcium, all too active chemically (they react violently with water) for use in construction.

Complete the gaps with these forms of adjectives:

lighter *stronger* *more chemically active* *more resistant to corrosion*
less abundant *the most widely used* *more durable*

Revise comparative and superlative adjectives

http://learnenglish.britishcouncil.org/en/english-grammar/how-form-comparative-and-superlative-adjectives
https://www.englisch-hilfen.de/en/exercises/adjectives_adverbs/adjectives_comparison_as_as.htm

Sources
Zimmerman, F.: English for Science, Prentice Hall, Inc., London