Sequence 6: radioactivity

Fiche de synthèse mobilisée (collection en français) :

- Fiche 6 : radioactivité

Sommaire des activités ETLV :

- ACTIVITY 1: radioactivity
- ACTIVITY 2: nuclear power
- ACTIVITY 3: nuclear power taboo game

ACTIVITY 1: radioactivity

Objective: listening to a recording to acquire vocabulary on radioactivity

Discovering vocabulary

DOCUMENT 1: radioactivity

Listen to the recording available on the website: radioactivity.mp3

Source: The Naked Scientists https://www.thenakedscientists.com/science-podcasts

Propose a definition or translation if needs be of the following words:

English	French
an isotope	
to wiz around	
to wonder off	
unstable	
to break apart	
to release a lot of energy	
radioactive decay	
to deflect	

Fill in the blanks

Listen to the recording once or twice, then fill in the blanks:

Atoms consist of three types of particles so going from the outside in: you have tiny negatively charged particles called _____ which wiz around a _____ made of _____ which have a positive charge and _____ which don't have any charge.
All of the atoms with the same number of _____ belong to the same element.

So, what keeps all these particles (atoms) together?
Well, the positive charge in the protons pulls in the negative charge in the electron so it stops them from _____ ___.
Normally, an atom has no charge over all, so the number of protons is same as the number of _____.

What about the number of neutrons?
Well, you can actually change the number of neutrons in an atom, and although this doesn't make much difference to the chemistry, it changes the mass slightly, so we say it's the same element but a different _____ of that element.
For example, a hydrogen atom always has one proton and one electron but it could have one or two neutrons or more normally, none.

So, if the number of neutrons doesn't affect the chemistry, what does it do?
Well, it can affect whether the nucleus is _____ or not. The nucleus of a radioactive element is _____ and it can _____ _____, releasing a lot of energy as it does. We call that _____ _____. And the energy can come out in a few different ways. Either as _____ or _____ _____ or as _____ _____.

And what's the difference between those different types of radiation?
OK, alpha particles are the _____ of helium atoms, which have no electron; beta particles are very fast moving _____ and gamma rays are high frequency, _____ _____.
And that's a type of light. Alpha particles are positively charged and you can _____ them using an _____ or electromagnetic _____. Beta particles are _____ and so you can deflect them in the other direction.

Rephrasing

Listen to the recording again, use the keywords to help you understand. Write a short summary of the mp3, and then explain it to the class.

_____
_____
_____
_____
_____

ACTIVITY 2: nuclear power

Objective: increasing your knowledge on nuclear power

DOCUMENT 1: nuclear power

Listen to the recording available on the website: nuclear_power.mp3

Source: The Naked Scientists https://www.thenakedscientists.com/science-podcasts

Propose a definition or translation if needs be of the following words:

English	French
the nucleus/nuclei of an atom/atoms	
nuclear fission	
nuclear fusion	
splitting things up = breaking up	
this process releases a huge amount of energy	
to run a power station	
to trigger	
two halves of the nucleus	
to repel	
to fly apart incredibly fast	
to spit out neutrons	
presumably	
to split	
in turn	
a chain reaction	
a nuclear reactor	
to be designed	
a rate of reaction	
a nuclear explosion	
to extract energy	

Fill in the blanks

Listen to the recording once or twice, then fill in the blanks

So, Dave what is the basis of nuclear power?
It's a way of _____ energy from the _____ of atoms. An atom's nucleus is the dense part of the centre of an atom. Made up of protons and neutrons and surrounded by a cloud of electrons. You can get energy from atomic nuclei in two main ways: nuclear _____ and nuclear _____.
OK let's look at the first of those: how does nuclear _____ work then?
_____ is another word for _____ things __ It involves _____ up the _____ of large elements such as uranium and plutonium to form much smaller ones. This process _____ a huge amount of energy in the form of _____; which you can then use to run a _____ _____

But how do you make the large atoms split up in the first place, to release energy like that?
First you have to pick an atom, which is _____ in the right way such as _____ ___ or plutonium 239. If a _____ hits the nucleus of one of these atoms, it can _____ the atom to split in two. This releases a _____

_____ of _____ because the two _____ of the nucleus are both positively charged. They _____ and _____ _____ _____ fast.
As well as the 2 halves of the nucleus, these atoms also _____ ___ 2 or 3 more neutrons.
And those neutrons _____ can then make other atoms split?
Yes, if they hit another nucleus, they can. So one atom that _____ can release another neutron to split another 2 or 3… Which __ _____ can each release another 2,3 neutrons. So, in each generation, more and more atoms will split and release energy. We call this a _____ _____.
And will that keep going forever?
A _____ _____ is very carefully _____ so you only get a certain ____ of _____, no more. But if you design the system in a different way then a chain reaction can get bigger and bigger and bigger and an immense amount of energy's released very quickly. This is a nuclear _____.

ACTIVITY 3: nuclear power taboo game

Objective: to reinvest vocabulary

Each student gets to pick a card in turn. The rest of the class does not get to see the card. The student tries to make the class guess his/her card without saying the three forbidden words written below.

Self sustaining  renewable wind solar	**uranium**  atom nucleus element
Radioactivity  atom unstable particles	**Nuclear waste**  radioactive uranium pollution
Nuclear reactor  atom nucleus energy	**pollution**  industry water air

Activity summary

What you must remember:

- **isotope**
- **half-life**
- **radioactivity**
- **a chain reaction**

Skills linked to the curriculum**:**

Compétences	Capacités à maîtriser	Où dans cette séquence ?
APP	Utiliser du vocabulaire spécifique	Activités 1 à 3
	Lire et comprendre des documents scientifiques	Activités 1 et 2
COM	S'exprimer à l'écrit et à l'oral en utilisant le vocabulaire adapté	Activités 1 à 3