IRSN
INSTITUT
DE RADIOPROTECTION
ET DE SÛRETÉ NUCLÉAIRE

Faire avancer la sûreté nucléaire

Educational Experiment with active participation of Teachers and Students in the field of Radioactivity and Radon Exposure

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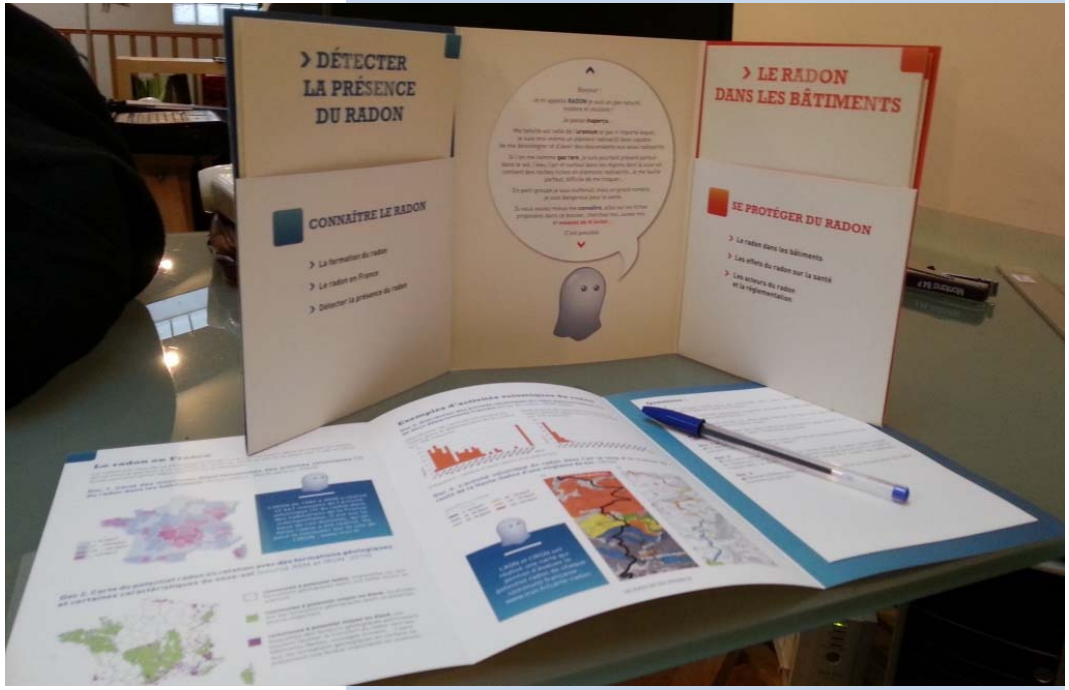


Introduction

- Since 2010 IRSN has an Education and Information Strategy for french citizens to enhance their radiation protection and nuclear safety culture
- One way is to start with the young generation like primary school, high school and university students.
- To obtain a basic knowledge when they become adults

Objectives of the Education Strategy

- a better understanding of what is at stake, enlight their choice as citizens

- Once Adults, they keep a basic knowledge to understand the situation in case of an incident or accident in France. For example as consumers or tourists, their choice depends on their knowledge and consequently their risk perception. This will influence in a positive or negative way the cost of such an event.Their attitude towards the accidental situation will influence the Image of France abroad.

- For long term sustainable development it will hopefully inspire vocations because nuclear activities need scientists to manage safety and radiation protection for a long period of time (for the safe functioning of existing nuclear plants, for dismantling and for existing waste management).

Programs at Schools

Radioactivity and Nuclear aspects are not topics on any school program.

The Education Program IRSN developed on Radioactivity can be easily linked to the few elements, which are given today in French High schools Programs :

- The electrons and nucleus of atoms in physics (but not the disintegration of some of them only in scientific options)

- Environmental risks in geography

- Chernobyl story in history

- DNA and Geology in Natural Science Disciplines

The current situation of French School Programs

Children know little about Ionizing radiation education
About atoms, they know electrons and nucleus (13/14 years old)

The Educative Programs of physics covering radioactivity and nuclear fission are more detailed as a scientific option, which begins at the age of 16 but they are reduced more and more in each new School Program.

Ionizing Radiation is no longer a topic of interest for Physics Teachers : Today they highlight the physics necessary to understand Climate Change and New Energy Production Systems.

Nuclear Energy seems to be an old fashioned topic for young people.

Interdisciplinary Approach is necessary

- The development of the IRSN Education Exhibition on radioactivity proved that an interdisciplinary approach in schools was necessary
- Radioactivity, its measurements, and the associated challenge cannot be learnt easily in a single discipline.
- It is easier to do this in a multidisciplinary project, but for teachers, it needs coordination and time and the willingness to do that.

Range of Available Tools

- Specific Educations Tools were developed by IRSN in close collaboration with an association involved in Risk Education at schools (IFFO RME) and with the French Nuclear Safety Authority (ASN).
- Primary school and first till third grade Highschool students need different tools than fourth till sixth grade students
- WACH O RISK (GAFFORISK in French) is developed for the 11/14 years old students
- Radon guide for the 14/15 years old students
- Exhibition on Radioactivity for the last grades are the same as for adults
- Movies, small interactive experiments, role plays

6 Education Guides for Radon

LES FICHES

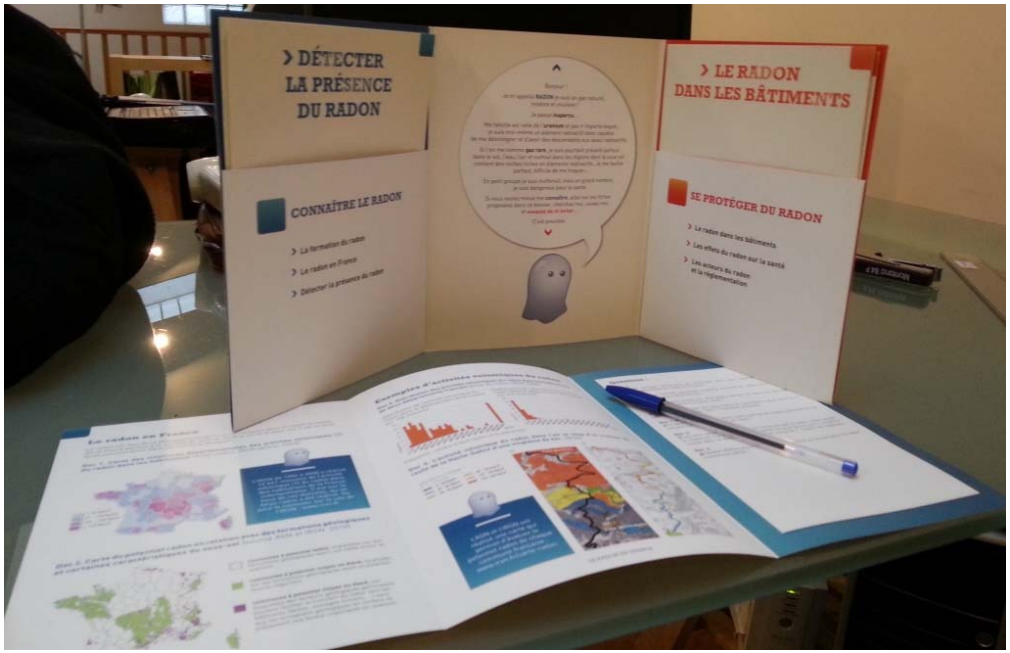
Connaître le radon

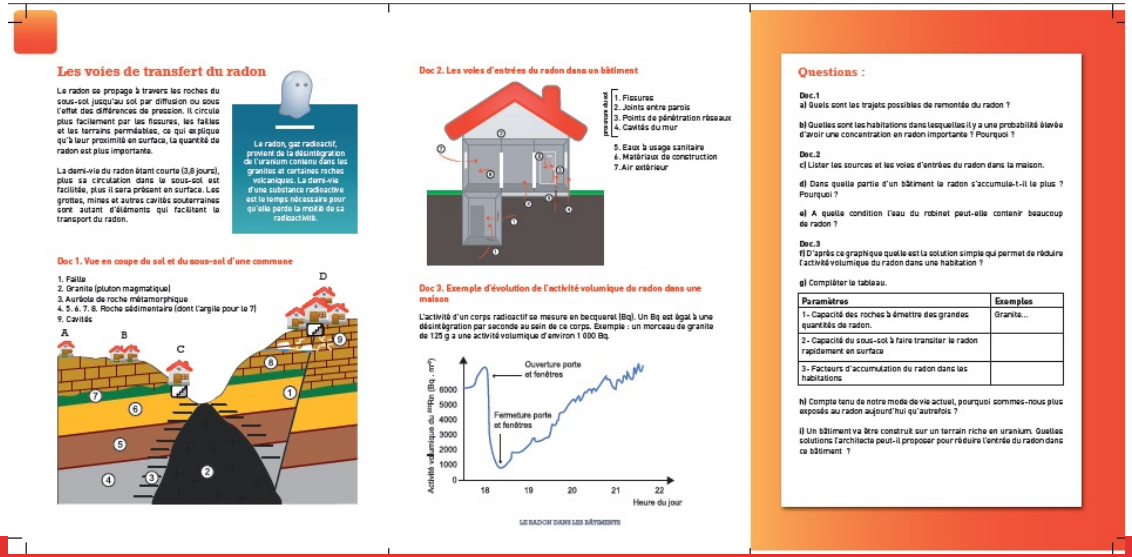
- La formation du radon
- Le radon en france
- Détecter la présence du radon

Se protéger du radon

- Le radon dans les bâtiments
- Les effets du radon sur la santé
- Les acteurs du radon et la réglementation

11/14 years old students





Exhibition on Radioactivity

- IRSN & ASN developed 80 kakemonos on ionizing radiation divided in 10 different modules

- Depending on what the teachers want to talk about, they select 25 to 30 from the 80 Kakemonos with the help of a questionaire the students are invited to find themselves the information on the Kakemonos

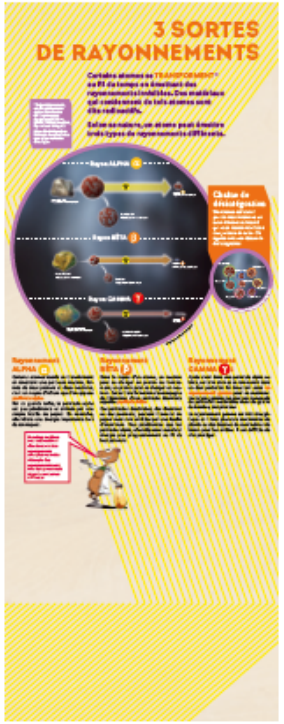
- What are the modules :

1-Radioactivity (units, basic knowledge, radon, radioactivity in food (C14 and polonium 210, example of calculation for food), 2-Health aspects, 3- Medical Use, 4-Nuclear Installations and their safety ,5-accidents, 6- Fuel Cycle 7-Waste 8- Radioactivity and Environment

panneau **1**

panneau **2**

panneau **3**



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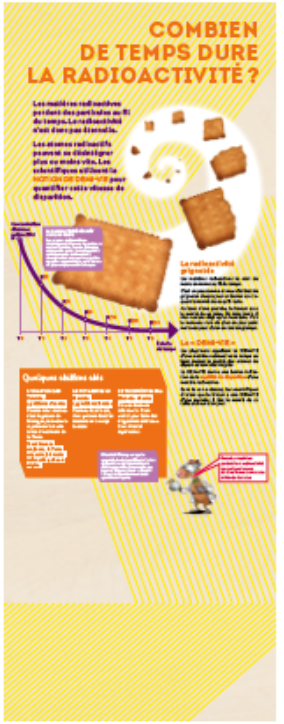
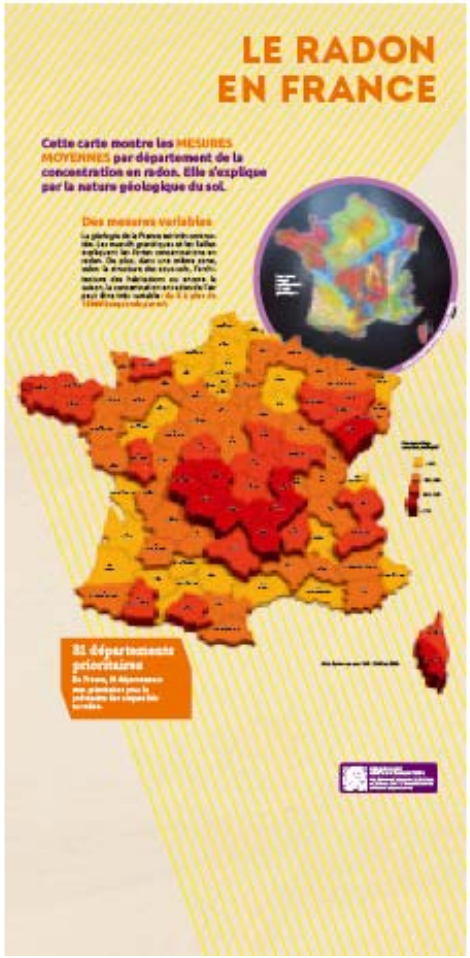


panneau **5**

Radon


RADIOACTIVITÉ NATURELLE : L'EXEMPLE DU RADON
L'uranium est présent depuis la formation de la Terre dans les roches granitiques et volcaniques de certains départements en France et, dans une moindre mesure, dans tous les sols. Cet uranium se désintègre en une succession de corps radioactifs : thorium, radium puis RADON. Le RADON est un gaz POTENTIELLEMENT DANGEREUX pour la santé.
Du radon dans ma maison ?
Quel danger représente le radon ?
Radon : carte d'identité


LE RADON EN FRANCE
Cette carte montre les MESURES MOYENNES par département de la concentration en radon. Elle s'explique par la nature géologique du sol.
Des mesures variables
31 départements prioritaires

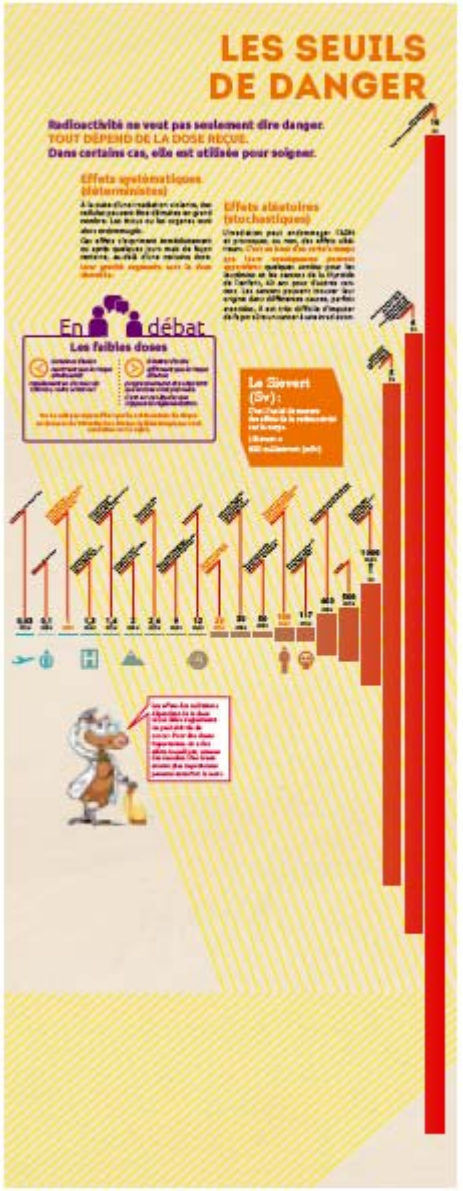

DU RADON DANS MA MAISON ? QUE FAIRE ?
Si la présence de radon est confirmée, DES ACTIONS DE PROTECTION EFFICACES existent.
Dépister
Calfeutrer / équiper
Aérer / ventiler
Du neuf sans radon

How efficient is it ?

Like their parents, young people prefer the module about the Health Aspects

This year, more than 15 High Schools requested the Exhibition and in depth presentations

IRSN provides Activity Leaders for these presentations (All scientific and technical experts on a voluntary bases)



How to engage students in Measurement activities, Interpretation and Communication

- With the help of measuring device coming from IRSN teachers can give the first basic knowledge on Radon and natural radioactivity, the most interesting phase is when students explain and discuss their results.
- They can make hypothesis on their results and verify them.
- They present their results in front of experts : they can show their creativity in communication.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Lessons learnt

- Ionising radiation and their risks is not a fashionable topic in a normal situation
- It needs interdisciplinary projet to have an holistic perspective on ionising radiation, radon or natural radioactivity.
- This topic may scare teachers who don't want to appear as Pro-Nuclear if they speak about radioactivity and Ionising radiation.
- By the experience feedback of the project, that Valery Bordois and his student will explain, IRSN realized that the best way is an inter active interdisciplinary project with student engagement a combination of education and communication

Thank to all the teachers and students for their outcomes

thank you for your attention