



Augmented cooperation in education
and training in nuclear and radiochemistry

Radiochemical experiments in a new virtual radionuclide laboratory - interim results from the European HORIZON 2020 project A-CINCH

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28 June 2023



European
Commission

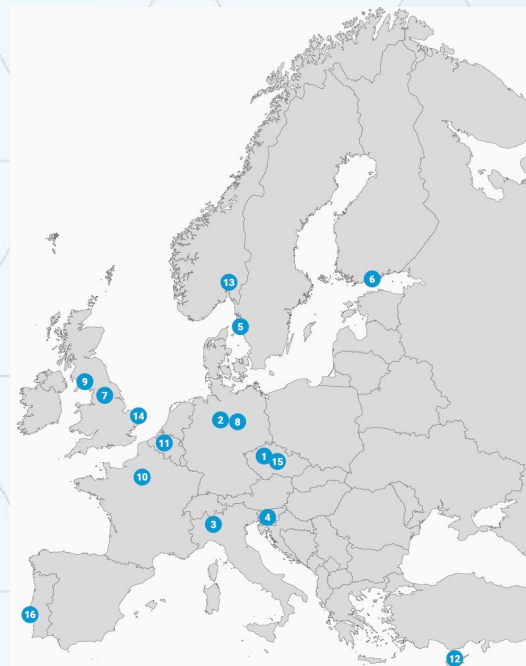
Horizon 2020
European Union funding
for Research & Innovation

This project receives funding from the EURATOM Research and Training programme under grant agreement N° 945301 and from the Norwegian Research Council under grant agreement N° 313053.



Augmented CINCH (A-CINCH)

- 4th project of the CINCH (Cooperation education and training in nuclear and radiochemistry) series
- 16 project partners
- 12 countries
- Duration 36 month
- EU funded



Main goals

- Missing expertise in the field of nuclear and radiochemistry (NRC)
- focusing on students and teachers and involving them by the “Learn through Play” concept.
- This will be achieved by bringing advanced educational techniques into NRC-education such as
 - state-of-the art 3D virtual reality NRC laboratory,
 - Massive Open Online Courses,
 - RoboLab distance operated robotic experiments,
 - Interactive Screen Experiments,
 - NucWik database of teaching materials, or
 - Flipped Classroom events

VR and Radiochemistry - why?

- Available at any time
 - Accessible to all (under graduated, pregnant women)
 - Experiments can be restarted
 - Less material input
 - Laboratory places are not limited
 - But VR can not replace real hands-on training
- It can be used in a complementary way

Prototyp designed during MEET-CINCH

- No interaction possible
- Users are observers
- Designed for special target group: members of authorities
- download: <https://seafiler.projekt.uni-hannover.de/f/c545722efc21442bac53/>



VR-Lab designed in A-CINCH

- Developed with *Unity*
- Target group: Pupils and students
- Browser application for Firefox
 - Controlling WASD and mouse -> keyboard needed!
- Partial experiment available for VR-headset

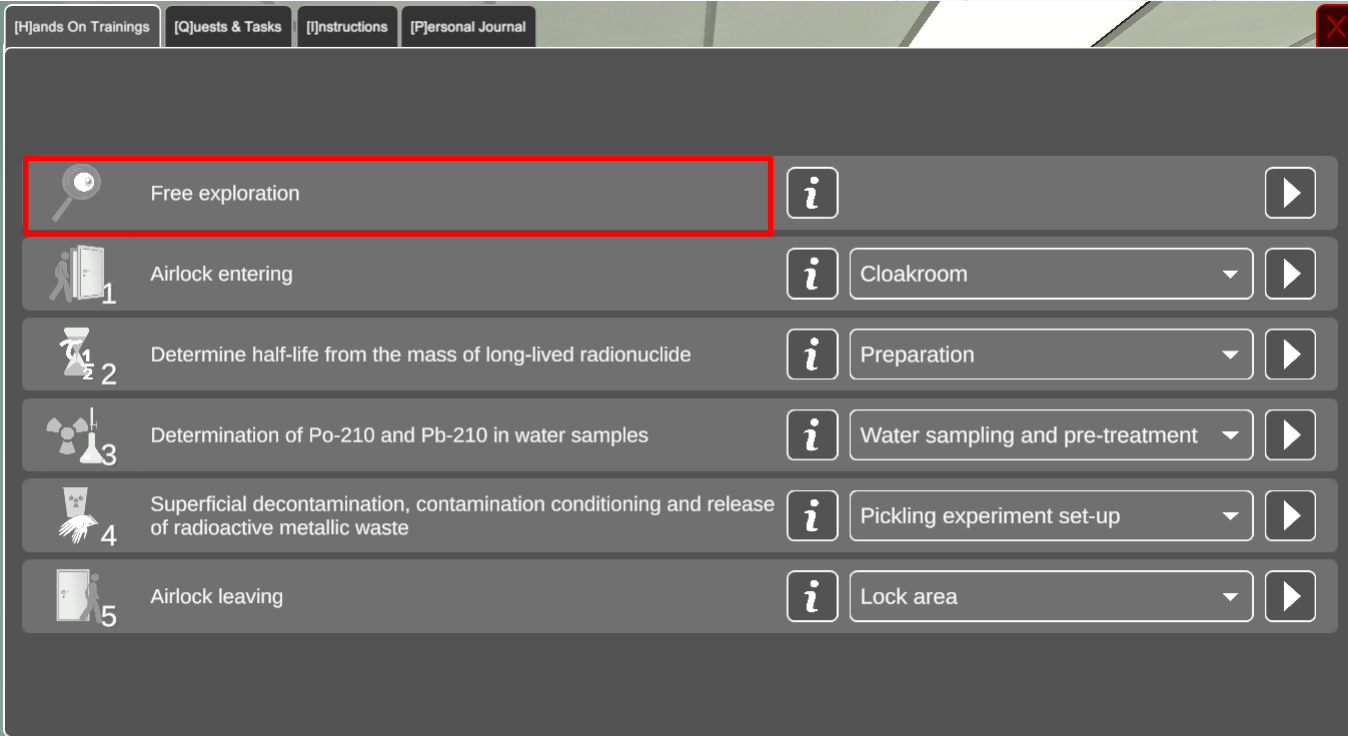
VR-Lab designed in A-CINCH

- Laboratory complex with various rooms:
 - Air-lock entry
 - Main lab for radiochemical analytic experiments
 - Measurement room
- Operation modes:
 - Free exploration
 - Guided experiments

VR-Lab



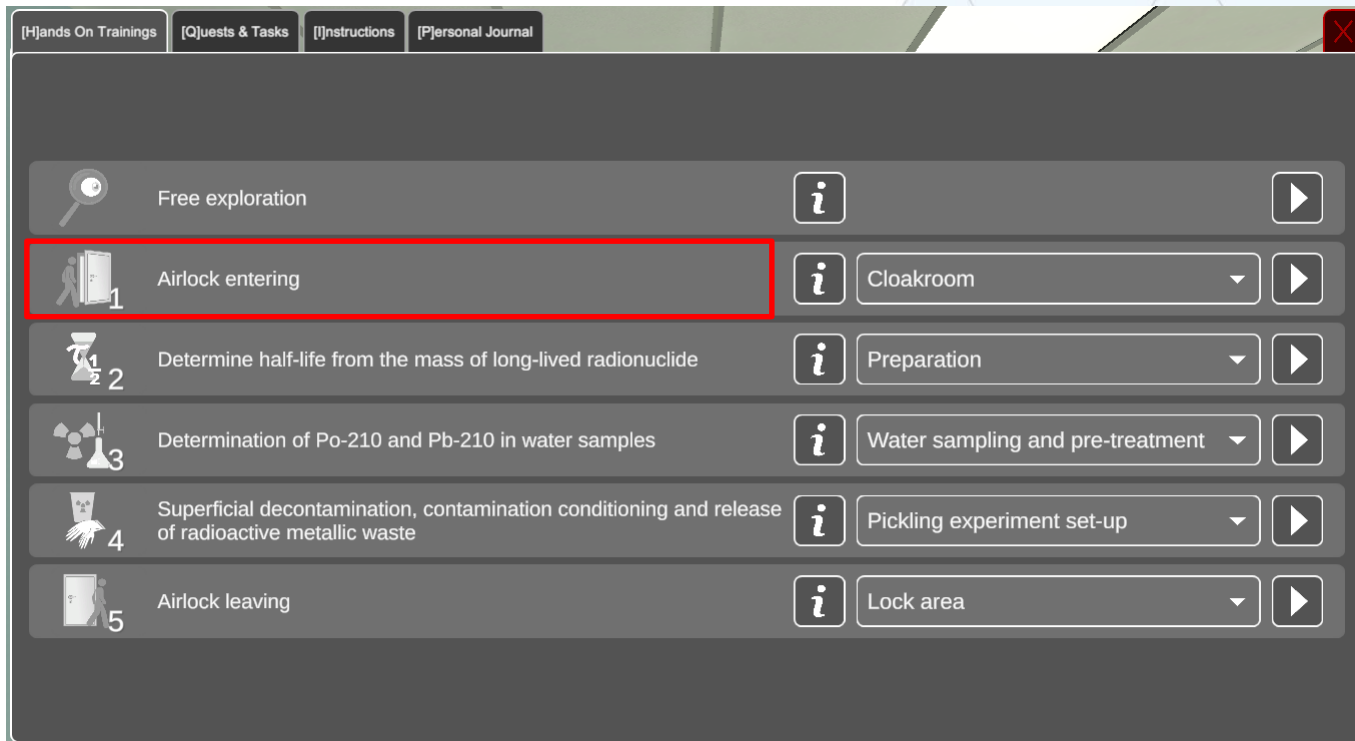
Main menu




















[H]ands On Trainings [Q]uests & Tasks [I]nstructions [P]ersonal Journal

- Free exploration
- 1 Airlock entering Cloakroom
- 2 Determine half-life from the mass of long-lived radionuclide Preparation
- 3 Determination of Po-210 and Pb-210 in water samples Water sampling and pre-treatment
- 4 Superficial decontamination, contamination conditioning and release of radioactive metallic waste Pickling experiment set-up
- 5 Airlock leaving Lock area

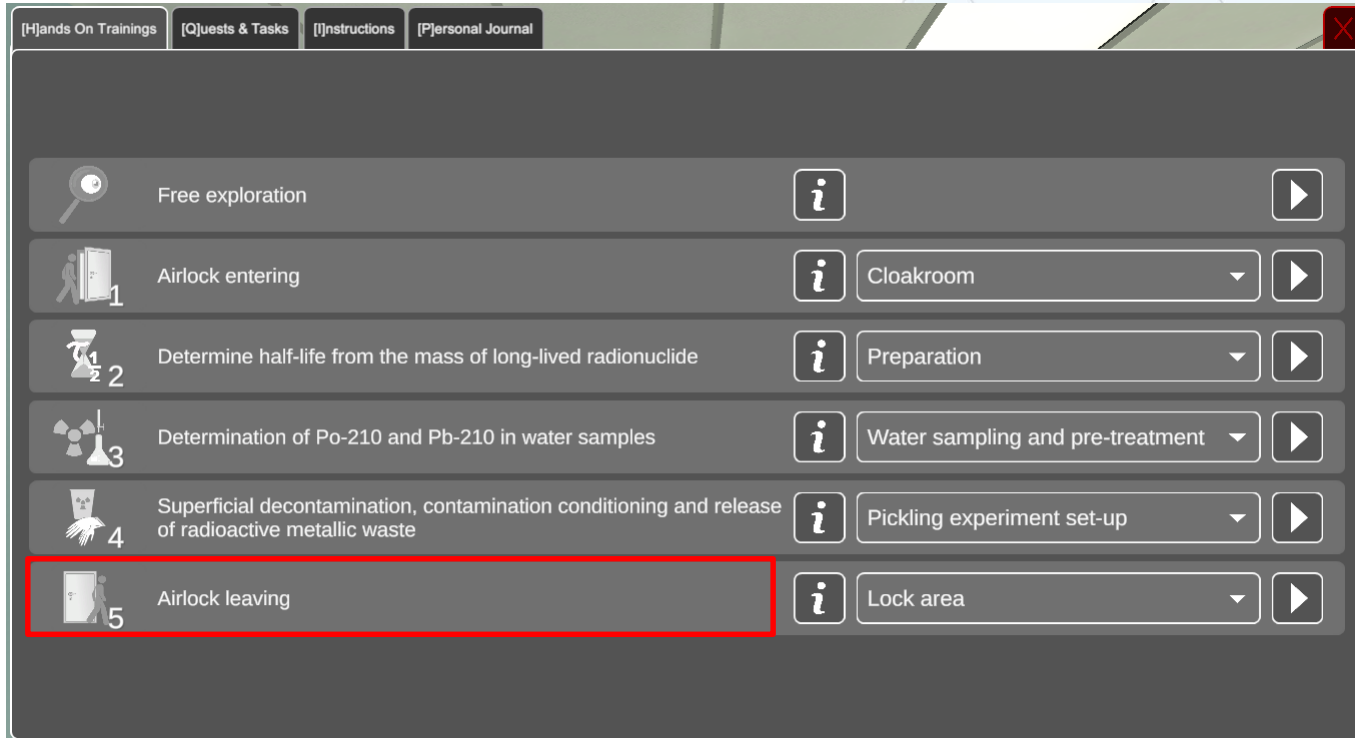
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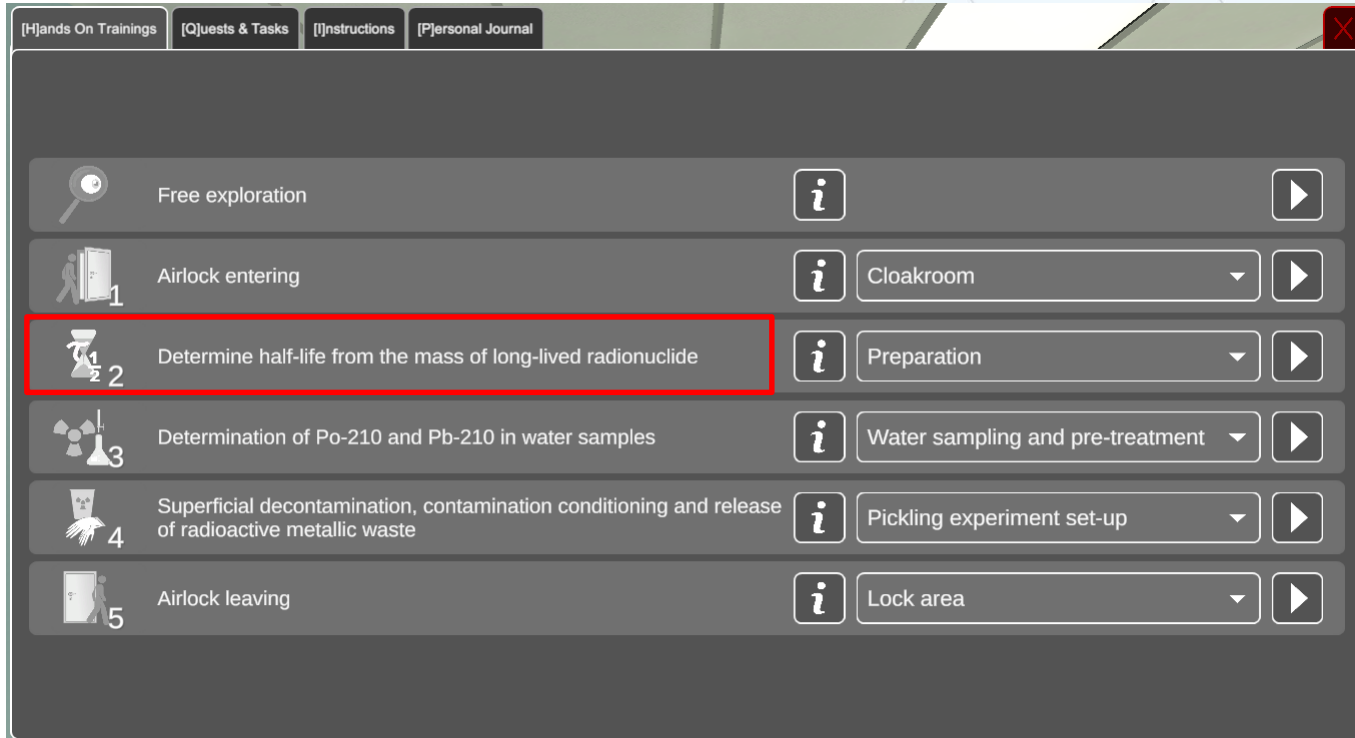
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Main menu

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✕

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Guided experiments

- User receive instructions for each step of the experiment
- Further information and explanations are available

Workplace

Quest system guiding through experiment


Major Quest 4/8: Po-210 and Pb-210 separation using Sr Resin

Minor Quest 1/2:
Sample dissolution

Task(s):

- Fetch a second pasteur pipette
- Bring the HCl (aq 2 mol/l) to the workplace


Leave Workplace



Shortcuts

- [H]ands on Trainings
- [O]bjects & Tasks
- [I]nstructions**
- [P]ersonal Journal

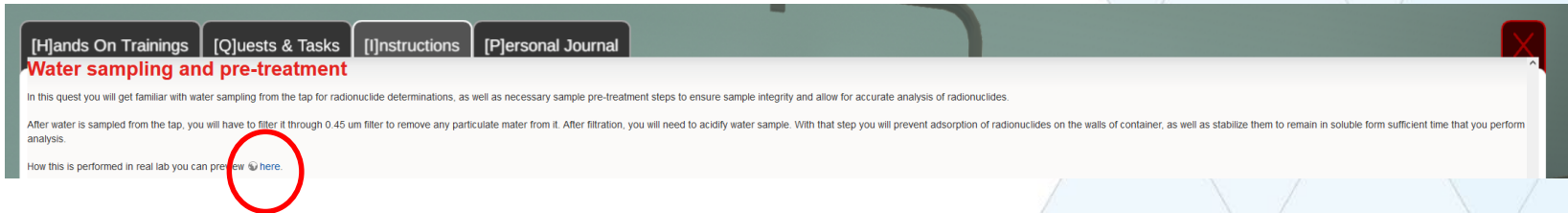
Personal Inventory



Further
information

[I]nstructions

- External HTML page
- Content can be changed at any time without programming knowledge



[H]ands On Trainings [Q]uests & Tasks [I]nstructions [P]ersonal Journal

Water sampling and pre-treatment

In this quest you will get familiar with water sampling from the tap for radionuclide determinations, as well as necessary sample pre-treatment steps to ensure sample integrity and allow for accurate analysis of radionuclides.

After water is sampled from the tap, you will have to filter it through 0.45 um filter to remove any particulate mater from it. After filtration, you will need to acidify water sample. With that step you will prevent adsorption of radionuclides on the walls of container, as well as stabilize them to remain in soluble form sufficient time that you perform analysis.

How this is performed in real lab you can preview [here](#).

Location: [EU Supported](#) » [CINCH Series of Projects](#) » [Basic course on analytical radiochemistry](#)

Water sampling and pre-treatment

author: [Marko Štrok](#), [Reaktorski center, Institut "Jožef Stefan"](#)
published: [Nov. 23, 2018](#), recorded: [November 2018](#), views: [316](#)

Categories

[Top](#) » [Chemistry](#) » [Nuclear Chemistry](#) » [Radiochemistry](#)

MEET-CINCH Courses

[Basic course on analytical radiochemistry](#)

 [Switch off the lights](#)

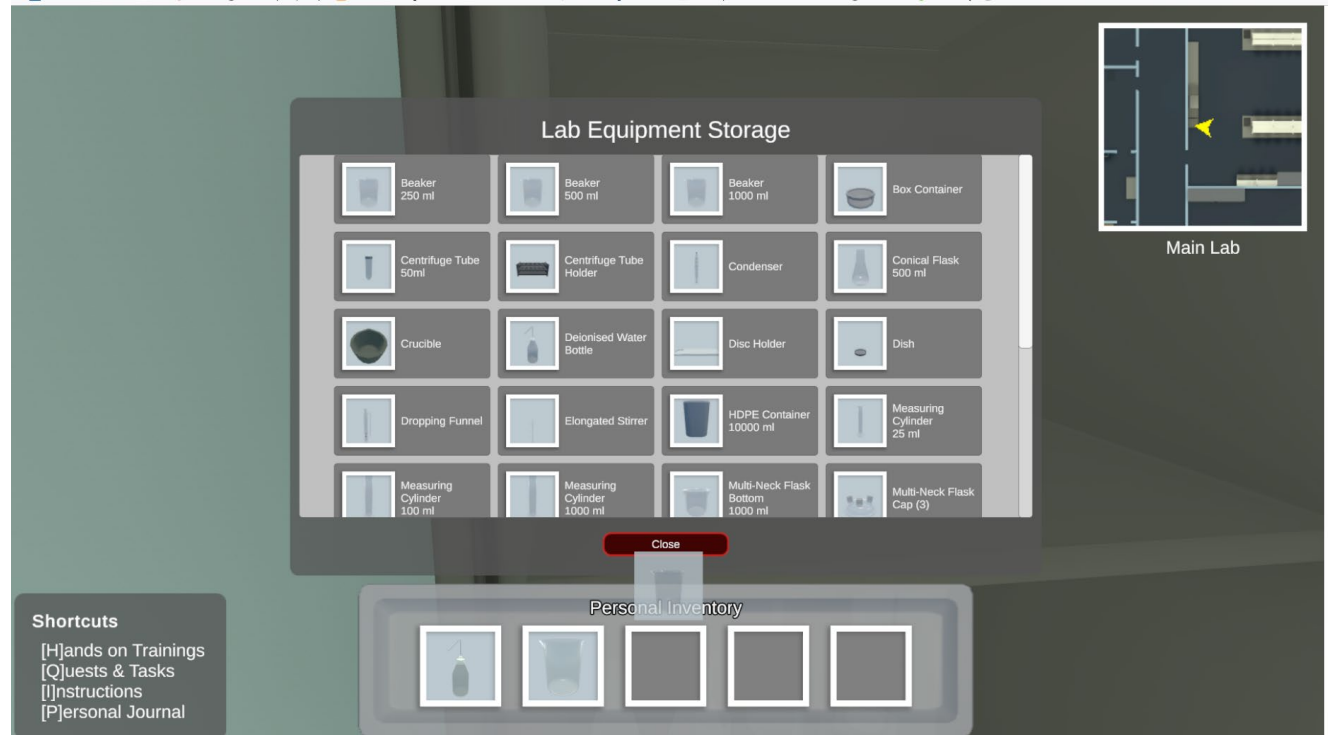


Lecture popularity:  You need to login to cast your vote.





















See Also:

[Tweet](#)

Glassware storage



Lab Equipment Storage

 Beaker 250 ml	 Beaker 500 ml	 Beaker 1000 ml	 Box Container
 Centrifuge Tube 50ml	 Centrifuge Tube Holder	 Condenser	 Conical Flask 500 ml
 Crucible	 Deionised Water Bottle	 Disc Holder	 Dish
 Dropping Funnel	 Elongated Stirrer	 HDPE Container 10000 ml	 Measuring Cylinder 25 ml
 Measuring Cylinder 100 ml	 Measuring Cylinder 1000 ml	 Multi-Neck Flask Bottom 1000 ml	 Multi-Neck Flask Cap (3)

Shortcuts

- [H]ands on Trainings
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Personal Inventory

Main Lab

Close

Video:

- Air lock entering procedure
- Fetch chemicals
- Balance and journal
- Pipetting, using stirring and heating block, time jump

Status Quo

- Not finished yet
- Anyhow – if you want to have a look, see here:
https://radchem.cz/CINCH-VRLab/2023_05_31/
- Or tomorrow from 11:00 – 11:30 during the break!



Thank you for your attention!



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