## Assignment description remote radioactivity lab

We offer practicals with radioactive sources at high schools. We visit them with specialized equipment and 22 different practicals for students to choose from. Often, these practicals are mandatory because it is written into the school’s PTA. However, we only visit a school once every school year, so when a student is absent, they have a problem.

Therefore, we would like an experiment setup that students can access remotely. We use such a setup right now, but it's located at an Australian university, so when something isn't working, we can't do anything about it. Besides that, the setup doesn’t completely cater to our needs. I've added a link to the setup below, so that you can get an idea.

What we want is an experiment setup with the following abilities:

* Changing the radioactive source
* Adding absorbers of different materials and different thicknesses (paper, perspex, aluminum, lead) between the source and the detector. This should include the following thicknesses:
  + Aluminum: 0.2, 0.6, 1.0, 1.4, 2.0, 4.0 mm
  + Perspex: 1, 2, 4, 6, 8, 10, and 12 mm
  + Lead: 2, 4, 6, 8, 10 mm
* Changing the distance between the detector and the source, height difference should be able to differ between 10 cm and 40 cm
* Setting a measurement time
* Repetition of measurements
* Optional: a webcam where the student can see the setup moving as they are changing the settings
* Optional: changing the detector type

Another point of attention are the radioactive sources. While designing this setup, keep in mind that in radiation safety, we follow a rule called ALARA, As Low As Reasonably Achievable. This means that there should be proper shielding of the radioactive materials, like covering the sources when they are not being used. They should also not influence measurements of other sources, which can be an issue when using a gamma emitting source.

The sources we will be using are:

* Sr-90 (x3)
* Am-241 (x1)
* Cs-137 (1x)

If you would like to know more about our practicals, you can visit our websites:

<https://stralenpracticum.nl/>

<https://docenten.stralenpracticum.nl/>

Link to the Australian setup:

<https://onlinelab.space/client/radiolab/?coupon_id=1305&passkey=1b63449fbd0b85169399e90f46da716c&labServerGuid=radioabguid123>