

# Measuring Radiation

## Apparatus

TLD badges, film badges, Geiger counter or any radiation measuring devices available, sources such as smoke detectors, old gas lamp mantles, old watches with glowing numbers

## Action

The students examine the devices and try to explain how they work. They also measure the radiation from various sources.

## The Physics

The GM tube in the Geiger counter is filled with low pressure gas, and around +400 Volts are applied to the thin wire in the middle. When a particle enters the tube, it ionizes a gas atom. The electron is attracted to the central wire, and as it rushes towards the wire, it ionizes more gas atoms, giving an ion cascade and creating a pulse which can be amplified and counted.

Radioactivity will darken ("fog") the photographic film in a film badge. The badges have "windows" made of different materials, which block different radiation, so that the dose of  $\alpha$ ,  $\beta$  and  $\gamma$  can be distinguished.

Scintillation detectors work by the radiation striking a suitable material such as sodium iodide and causing a tiny flash of light, which is picked up by a photo-multiplier tube.

Students at the University of New South Wales using a Geiger counter to measure radioactivity from a mobile phone. Other sources including gas lantern mantles and a smoke detector are shown.



## Accompanying sheet:

### Measuring Radiation

Different means of measuring radiation are shown.

Explain how they work.

Which ones would be suitable monitoring devices for persons working in a radiation area?