IPEM Institute of Physics and Engineering in Medicine

X- Ray Demonstration

Equipment

- Light sensitive paper
- Sunlight or UV lamps
- Different objects – either natural ones like feathers, sticks, leaves, ferns or classroom objects like see-through rulers, pens, paper clips etc
- Bowl of water
- Tissues or towels

Safety / Risk assessment notes

There are no real risks in terms of physical injury but when the blue paper is put in water the un-fixed dye washes off and might stain clothing and skin.

Background

The idea of this demo is to show how light is used to take images and different things with different densities let the light through differently

How does it work?

- Ask them to put their name on the paper first and then to put some objects from the collection on to the page
- Collect the objects (it work beautifully with natural objects like leaves and ferns)
- Place objects are placed on the paper (blue side up) - a variety of opaque and transparent bits works well.
- Expose the paper to real sunlight for a few mins (~2).
- Where the light/UV can get to the blue dye is fixed to the paper and where it is shielded by the paper the day does not fix.
- Wash the paper in water, the un-fixed blue dye washes off, and place on a paper towel.

Tips:

- Open the packets only when you need them to avoid unnecessary UV exposure.
- Cut the paper in half if you think you will be busy

- it’s a good idea to get them to wash their own paper as if you are doing it all day your fingers are blue by the end of it!
- protect any pale surfaces hear the water bowl and drying papers, it the blue water stains!
- watch your shoes and pale clothes – try to avoid blue splashes!

Handout to print

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How is your picture like a real medical x-ray?

Your picture	Real x-ray
The light from the lamps passes through objects which you can see through and hits the paper.	X-rays go through the soft squishy tissue in your body and hit the x-ray film.
The light can't pass through the objects which you can't see through.	X-rays can't easily go through bones and hard parts of your body, so the x-ray film does not change very much.
When you wash the paper, the parts where the light could not get to washes off and are now white. The places where the light could get to stay blue.	When the film is developed, the parts where the x-rays could get through turn black. The parts of the film where the x-rays are stopped by the bone stay white.