

Wash and glow - visualising the spread of bacteria

SSERC received an enquiry recently about a practical activity designed to simulate the spread of bacteria. Learners spread a commercially available “lotion”, containing microscopic particles that fluoresce when exposed to UV light, over their hands and then shake hands with their peers in the classroom. During this process, lotion will be transferred between learners, simulating the spread of microbes. To determine the extent to which transfer has occurred, learners irradiate their hands with a UV light.

SSERC have produced guidance on optical radiation [1], which is pertinent to this activity. The majority of the radiation emitted from the type of lamps typically used in this activity is UVA, which poses hazards to the eyes and skin. SSERC have carried out various tests and found that the exposure limits for emissions from such lamps are unlikely to be breached in a school lab provided that:

- Users avoid looking directly at the lamp
- Users do not hold or carry the lamp with their hands or fingers across the tube when the lamp is on
- Users avoid irradiating their skin where possible.

Given the requirement for learners to irradiate their hands with UV light to visualise the lotion, the activity does not adhere to SSERC guidance. Figure 1 shows a hand-held UV light that might be used in such an activity; there are other types of UV lamp that might be used, which can have more stringent control measures.

A straight-forward, although messy, alternative to this proposed activity is to use glitter gel; learners spread a glitter gel over their hands, shake hands and then observe the transfer of glitter. This ultimately shows the same result but without the need to use UV light.

Another alternative option involves learners each starting with a test tube of water – except one learner, who has a suspension of starch (with starch representing a microbe). The “transfer of bodily fluids” involves each learner using a pipette to exchange half of their test



Figure 1 - Guidance states that individuals must not carry UV lamps with fingers across the tube.

tube contents with another learner. This can continue for 3-4 exchanges. At the end, they all test their samples using iodine to find out how far the starch/microbe spread. Inexpensive, safe, fun and still conveys the same message. <<

Reference

- [1] SSERC, School sources of optical radiation, available at <https://www.sserc.org.uk/health-safety/physics-health-safety/optical-radiation/school-sources-of-optical-radiation/>.