

## Microscale diffusion

### *Education in Chemistry*

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### Teacher and technician notes

This practical is based on the RSC Microscale Chemistry practical number 32, [A microscale study of gaseous diffusion](#).

### Technician notes

Make up class sets of dropper bottles of the following:

- 0.2 mol/dm<sup>3</sup> potassium iodide solution
- Soluble starch solution
- 50% v/v bleach solution (ensure fresh bleach is used) [IRRITANT]
- 1 mol/dm<sup>3</sup> hydrochloric acid solution

The practical sheet can be laminated, or placed inside a plastic wallet.

One half of a petri dish is also required.

### Teacher notes

These instructions are '[integrated instructions](#)' with an apparatus diagram, textual and pictorial information integrated to reduce the 'split-attention effect' for students.

If this is the first-time students have carried out microscale chemistry and/or used integrated instructions, it is worth demonstrating the practical first, preferably with a visualiser so all students have a clear view of what they should be doing.

Chlorine gas is evolved from the bleach/acid drop, and diffuses away from the 'grey' circle. The chlorine dissolves into the iodide/starch drops. Chlorine displaces the iodine, forming the dark blue/black iodine/starch complex.

Students should observe the surrounding iodide/starch drops turning completely blue/black, with successively more distant drops taking longer to change colour, and to lesser extents.

### Hazard information:

- **Ensure you complete your own risk assessment before you carry out this practical activity.**
- Most domestic bleaches will be >0.4M and <0.7M sodium chlorate(I), and are 'corrosive' and 'dangerous to the environment'. Using 50% bleach solution reduces the hazard to 'irritant'.
- Mixing bleach with acid produces chlorine (oxidising, toxic, environmental hazard). By using very small volumes and containing the gas within the petri-dish lid, very little chlorine is released into the classroom. **However, working in a well-ventilated laboratory is recommended.**
- After the reaction is complete, the drops can be wiped up with paper towels and disposed of in laboratory waste.