

In search of more solutions

Health & Safety

In open-ended problem-solving activities, it may be difficult to anticipate all of the strategies that students might adopt in attempting to solve a particular problem. The best solutions are often the completely unexpected ones: the imagination of young people, uncluttered with a knowledge of the 'right' answers, may be much more original than that of their teachers. It is therefore wise to set problems that require only relatively low hazard chemicals or procedures.

Teachers need to be particularly vigilant during practical problem-solving activities. A higher degree of supervision is needed than in activities with more closed outcomes. Students may need to be questioned about what they are doing. This is no bad thing as it will help with the assessment of their performance on a problem. Students need to be encouraged to take a responsible attitude towards safety, both of their own and that of others, and a statement to that effect should appear prominently in the instructions for the problem. In planning their solution to the problem, students should be asked to consider safety. In appropriate cases, they might be asked to carry out their own risk assessment. A possible *pro forma* to help them do this is included below; this may be copied. Even if this is used, however, teachers **must** still check the plans before they are implemented. Remember, however, that you are not checking whether the plan will work, but whether it is safe. Bear in mind that students often do not stick to their plans: reasonably enough, these are modified in the light of experience. Constant vigilance is therefore necessary, to prevent new hazards from being introduced.

If in any doubt insist on eye protection if there is a hazardous activity taking place in the laboratory. Even if a particular student's activity has no significant hazards associated with it, or they have not yet started any practical work at all, the student on the opposite side of the room may be doing something that is decidedly hazardous! During a competitive event, and especially if artifacts are being tested in some way at the end, excitement levels can rise. Do not allow things to get out of hand, and stop competitors from putting themselves or others in danger.

Under various regulations employers are required to carry out a prior risk assessment before hazardous chemicals are used or made or before hazardous activities are undertaken. Almost all employers at school/college level, including local authorities, multi-academy trusts and independent schools have adopted various nationally available publications as model (or general) risk assessments, usually those of CLEAPSS¹, or, in Scotland, SSERC² or ASE³. Before undertaking a practical activity schools must then consult such model risk assessments and consider whether they need modification to cater for the particular situation of this class, this school, this room, this teacher. Any significant deviation from the model needs to be recorded. If there were no model risk assessment, which adequately covers the situation, schools, would need to contact CLEAPSS or SSERC for a Special Risk Assessment.

In general, we have tried to stay within the limits of the model risk assessments. The more unusual the activity, the less hazardous are the chemicals suggested for use. Nevertheless, a teacher must always comply with her/his employer's procedures and in some cases may decide that a particular activity is inappropriate in their situation.

¹ www.cleapss.org.uk

² www.sserc.scot

³ www.ase.org.uk

Pro forma sheet for risk assessment

RISK ASSESSMENT FORM

Name of person completing this form: _____

Outline of proposed practical procedure: _____

Chemical used or made for potentially hazardous procedure	Hazard (eg flammable, corrosive, toxic; exposure limit etc)	Source(s) of advice/general risk assessments (eg <i>Hazcards, Topics in Safety</i> etc)	Strategy to reduce risk (eg substitute chemicals; reduce scale; use fume cupboard, safety screens, protective gloves, goggles etc)

Junk list

Many of the chemical egg races type of task require the use of 'junk'. The following is a list of the types of item envisaged:

plastic lemonade bottles

'squeezy' bottles (washing up liquid containers)

empty beer/soft drink cans (dry)

coffee tins/syrup tins

coffee jars/jam jars

yoghurt pots/margarine tubs

shoe boxes/cereal packets

cardboard tubes from toilet rolls/kitchen towels

blocks of expanded polystyrene packing

polystyrene meat trays/egg boxes

disposable foil trays (oven ready)

lollipop sticks

wood off-cuts/cotton reels

used tights

In chemical egg races non junk items are often used alongside junk:

sticky tape

glue and/or glue gun

Blu-tack/plasticine

string

rubber bands

paper clips/split fasteners

pegs

wire

pins

aluminium kitchen foil

cling film

balloons

plastic bags

drinking straws

plastic tubing

assorted bungs and corks

plastic syringes

plastic gloves

paper towels

stapler

ruler

simple tools: tin snips, saw, bradawl, file, stanley knife *etc.*

Credits

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Health & safety checked May 2018

Page last updated June 2018