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AUSTRALIAN SCHOOL SCIENCE
INFORMATION SUPPORT FOR
TEACHERS AND TECHNICIANS

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Posted by Anonymous on Wed, 2015-03-04 09:57

Students investigating mould and bacterial growth on food items: Are there any guidelines on how a prac investigating mould growth should be conducted? What safety measures and PPE have to be followed if students decide to grow mould on bread, cheese, fruit and vegetables? Is double bagging of food items enough? Are students allowed to drop bread on various surfaces, then bag the slice of bread to see what grows on it? How long are we allowed to let the bread sit in the bags for at room temperature? How should we dispose of the contaminated food items? There are so many questions regarding this prac, that seems so simple to start with.

Voting:



No votes yet

Australian Curriculum:

The growth and survival of living things are affected by the physical conditions of their environment

Year Level:

6

Laboratory Technicians:

Laboratory Technicians

Showing 1-1 of 1 Responses

students investigating mould and bacterial growth on food items

Submitted by sat on 11 March 2015

Guidelines for investigating microorganisms in schools: There are many considerations regarding the use of microorganisms in school laboratories. Science ASSIST is currently consulting authorities in order to make nationally consistent sensible and workable recommendations for best practice in school microbiology. The activity you are describing has a low level of risk, provided safe operating procedures are followed, principally for containment of mould spores.

The Australian and New Zealand Standard AS/NZS 2243.3:2010 sets out requirements, responsibilities and general guidelines relating to safe handling and containment of microorganisms in laboratories.

Most school laboratories are classified as Physical Containment Level 1 (PC1), if they conform to the requirements set out in Section 5 of Australian and New Zealand Standard AS/NZS 2243.3:2010 Safety in Laboratories. This means they are suitable for work with microorganisms where the hazard levels are low and require no special containment equipment, and is suitable for work with microorganisms from Risk Group 1¹. Work at this level might, for example, include investigations with brewer's or baker's yeast and certain algae, protozoa or moulds.

The basic approach to working with microorganisms is to regard them all as potential pathogens¹. It is the strict observance of correct procedures which enables students and staff to work safely with microorganisms. Aseptic technique is a fundamental skill in microbiology to maintain pure cultures whilst subculturing, to prevent microbes from being accidentally released into the environment and infecting others in the laboratory.

Safe work practices: Behavioural management processes in science laboratories and practical work areas should ensure that staff and students are aware of any potential hazards for the particular activity to be undertaken.

Making sure safety issues are addressed and adjustments are made to meet the learning needs and maturity of students with adequate precautions in place will minimise any hazards.

It is important to conduct a site-specific risk assessment prior to the activity. Science Assist has developed a one-page risk assessment template that may be useful. See [Risk Assessment Template](#).

Potential hazards: The release of Aerosols is the main hazard to consider during this activity. Aerosols are fine suspended particles of liquid containing microbial cells or spores, which can easily contaminate the laboratory. They are carried by air currents and increase the risk of infection by inhalation. Aerosols can be generated by spills.

Although the risks are very low for this activity, individuals who suffer from asthma, allergies or

are immunosuppressed, may be more sensitive to exposure to spores and aerosols.

Here is a link to a fact sheet on moulds and health concerns:

<http://www.health.nsw.gov.au/environment/factsheets/Pages/mould.aspx>

What safety measures and PPE have to be followed for this activity?

- Awareness of students suffering from asthma, allergies or who are immunosuppressed is an important consideration.
- Studies of mould grown on bread, cheese, vegetables and fruit that are exposed to the air and allowed to go mouldy should be carried out in closed containers, such as sealed petri dishes or single plastic zip-lock bags.
- Samples must be sealed and never opened by students to minimise the spread of spores into the air, which could cause allergy or asthma attacks.
- Wear personal protective equipment, such as safety glasses. Consideration should be given to the wearing of aprons and face masks for high-risk individuals, in the unlikely event of a spill when examining the samples during spoilage, to provide protection from aerosols.
- No hand-to-mouth operations should occur (e.g. chewing pencils, licking labels).
- All exposed cuts and abrasions must be protected with suitable waterproof dressings before starting practical work.
- There should be no eating or drinking in the science laboratory. Food for human consumption must not be kept in refrigerators in which material for science activities is stored.
- Teachers, technicians and pupils should thoroughly wash their hands with soap and water after the activity and before leaving the laboratory. Facilities for this should be available within the laboratory.

Is double bagging of food items enough?

- Microorganisms with little or known risk such as moulds and yeasts can be studied in sealed containers that the students should not open.
- Using single zip-lock plastic bags is sufficient for reducing the possible risk of any spores being inhaled causing allergy or asthma.
- Double bagging would make it more difficult to see the mould growing due to condensation generated in the bags.

Are students allowed to drop bread on various surfaces, then bag the slice of bread and see what grows on it?

- There is no need to drop the bread onto various surfaces. Simply placing the bread or other items of food into a zip-lock bag with a little moisture and incubating in a warm location should be sufficient to allow for the growth of moulds.
- Fruit and vegetables are all safe to use along with dairy products (cheese, milk and yoghurt), and vinegar, brewer's and baker's yeast.
- Moulds grown from most foods or 'food-based mediums' are allowed, but substances which pose a health risk are advised against (see below).
- Food spoilage should not be studied using meat or meat products because organisms, which cause food poisoning, may be present (e.g., poultry has a high risk of salmonella).

contamination).

- Particular care should be taken with surfaces on which meat has been handled such as in the Home Economics Department.
- Sampling must not be taken from unhygienic environments such as drains, or areas exposed to body fluids such as toilets.

How long should the bread be allowed to spoil in the bag at room temperature?

- Moulds grow best in warm, dark and moist conditions.
- Ensure sample bags are placed in a secure area away from student access.
- 1 to 2 weeks experiment time is required.

How to dispose of the contaminated food in the bags?

- When food is allowed to spoil in zip-lock bags, the bags must be sealed securely, double bagged and may be disposed of in the bin, as normal household waste.

Clean up procedure

- Use hot soapy water to clean laboratory benches and all used equipment (such as knives and chopping boards), dry well and then put away.
- If a spill occurs during the experiment (bags leaking or tearing), students must report this to their teacher immediately. Care should be taken if any aerosols or spores are released during a spill. If this occurs, it may be advisable to exit any students from the laboratory that may be at risk due to asthma, allergy or immunosuppression. If the spill is large, disinfecting the surface may be necessary. Benches should be wiped with a suitable disinfectant (e.g., 1% solution of sodium hypochlorite, or 70% alcohol). Both have good activity on mould. Wear disposable gloves and mask to decontaminate the area.

Information for growing mould on bread and other foods can be found in the links below:

<https://www.education.com/science-fair/article/environment-affects-food-mold-spoil/>

<https://www.infoplease.com/cig/science-fair-projects/foods-do-molds-love-best.html>

<http://www.ciec.org.uk/pdfs/resources/medicines-from-microbes.pdf>

ⁱ Australian Standards AS NZS 2243.3-2010. Safety in Laboratories. Microbiology safety and containment