

SAFETY

CONCEPTS

HEALTH & SAFETY IN TECHNOLOGY CLASSROOMS



*An introduction
to health & safety concepts for students
using technology classrooms*



TEACHER BOOKLET

LESSON PLAN

Class: Safety in Technology Classrooms **No.** 24

Day: **Date:** **Time:**

Subject: Any Junior Cert Technology... **Topic:** Health & Safety Concepts **Duration:** 80 mins

PREVIOUS KNOWLEDGE & EXPERIENCE OF THE MATERIAL

The students may have completed a brief taster programme before choosing the subject for the Junior Certificate. Apart from this, the students are new to the subject and have no specific prior knowledge or experience of the health and safety issues related to the technology subjects.

SUBJECT MATTER

Safety in technology classrooms:

- safety terminology
- safety concepts (hazard/ risk/ control measures)
- personal responsibilities

RESOURCES

Typical technology classroom
 Powerpoint presentation
 Student booklet
 White/black board
 Teacher Booklet
 Student Booklet

LESSON PLAN

| AIMS | LEARNING OUTCOMES | ASSESSMENT |
|--|--|---|
| <p>This lesson aims to...</p> <ol style="list-style-type: none"> 1. foster an appreciation of the potentially hazardous nature of a typical technology classroom. 2. introduce students to the key concepts (of health and safety). 3. develop an awareness of the importance of behaving responsibly in the technology classroom. | <p>On successful completion of this lesson the students should...</p> <ol style="list-style-type: none"> 1. recognise the hazards present in a technology classroom 2. explain the key concepts of health & safety 3. differentiate clearly between hazard & risk 4. calculate the level of risk associated with typical classroom activities 5. propose control measures for typical processes 6. assess the effectiveness of various control measures 7. demonstrate safe behaviour 8. appreciate the importance of personal responsibility 9. challenge unsafe behaviour. | <p>The following assessment tools will be used</p> <ol style="list-style-type: none"> 1. the students, working independently, will identify a number of hazards in the classroom. 2. the students will complete the relevant exercises/ activities in the booklet. 3. the students will complete the relevant exercises/ activities in the booklet. 4. the students will engage in whole class discussion. 5. the students will complete the relevant exercises/ activities in the booklet. 6. a number of individuals will present their solutions and the class will be asked to rank the solutions in order of effectiveness. 7. using role play activities, the students will demonstrate safe behaviour. 8. the students will complete the relevant exercises/ activities in the booklet. 9. using role play activities... booklet |

| TEACHER ACTIVITY | STUDENT ACTIVITY | TIMING |
|--|--|--|
| <p>Introduction Introduce the lesson & distribute the activity booklets.</p> <p>Activity 1: Danger in the classroom Explain what is to be done & direct students to complete this activity in their workbooks. Get the students to give examples of the dangers -build up a resource on the blackboard -categorise the dangers.</p> <p>Activity 2: Words Use the powerpoint presentation to describe and explain the meaning of the terms - direct students to complete the activity in their workbook.</p> <p>Activity 3: Hazard & risk Explain the activity, go through the example and then take the students through the activity on the screen.</p> <p>Go through each situation with the students. Call on volunteers to give their answers. Engage the group in discussion to identify the strengths and weaknesses of the answers. Ensure each student has correctly identified the level of risk magnitude.</p> <p>Activity 4: Choosing the best control measure. Go through the instructions with the students. Check for understanding. Then present the hazard (first slide) then the control measures (second slide). Engage the students in discussion to clarify thinking. E.G. "Why did you select that measure first?" and so</p> <p>Finally, show the students the hierarchy of control measures and discuss this in the context of the activity they have just completed. Ask a selection of the students to apply the hierarchy to the measures given in activity 4.</p> <p>Activity 5: Behaving Responsibly Briefly explain the importance of behaving safely. Mention the legal requirement on everybody to behave safely - show slide on safety legislation.</p> <p>Choose some 'volunteers' to act out the role plays. Discuss the role plays with the whole group and address any issues that arise.</p> <p>Encourage the students to devise their own role play. Circulate and watch the various role plays or get the students to perform them for the whole group.</p> <p>Conclusion Summarise (using final slide) the main concepts of the lesson..</p> <p>Ask the students to complete any unfinished activities in the booklet at home.</p> <p>Collect booklets and review to ensure that the learning outcomes have been realised.</p> | <p>Listen.</p> <p>Working independently, record at least 5 hazards which they have noticed in the classroom. Stating clearly why they think each example is hazardous.</p> <p>Listen & discuss - then complete activity 2, working independently, in the workbook.</p> <p>Listen, do the example with the teacher. Then, working independently, complete the activity.</p> <p>Volunteer answers for discussion with the teacher and the wider group.</p> <p>Listen; working in pairs, complete the first example. Discuss adv's & disadv's with teacher and whole group.</p> <p>Listen, reconsider the options given in activity 4 and classify them.</p> <p>Listen - complete the first part of activity 5 in the workbook.</p> <p>Act out the role plays one at a time. Discuss issues that arise from each.</p> <p>Working in groups of four the students devise and present a role play.</p> <p>Listen and answer questions.</p> <p>Tidy up, orderly exit.</p> | <p>5 mins</p> <p>10 mins</p> <p>10 mins</p> <p>10 mins</p> <p>20 mins</p> <p>5 mins</p> <p>10 mins</p> <p>5 mins</p> <p>5 mins</p> |

POST LESSON APPRAISAL

ACTIVITY 1 Danger in the classroom!

This is a starter activity to get the students focussed.

Emphasis should be placed on:

- *each student working independently.*
- *finding dangers that others haven't noticed.*
- *finding dangers that are separate and distinct.*

Take 2 minutes to look around the classroom. Try to find at least 5 things that you think could be dangerous. List each danger in the space below. Write a short note beside it explaining why you think it's dangerous.

Example



1. Trailing leads on the floor - this could cause someone to trip over and bang their head.

Things in my classroom that could be dangerous

1. Tripping hazards:

- school bags, trailing leads, boxes and other items left on the floor.

2. Sharps hazards:

- hand tools, machinery

3. Electrical hazards:

- any electrically powered equipment.

4. Chemical hazards:

- varnishes, spirits and other chemical products.

5. Entrapment hazards:

- any tool or machine that could cause entrapment injury (e.g. sleeve caught in pillar drill or lathe).

ACTIVITY 2 Words

Begin this activity by explaining the importance of knowing the 'jargon' related to every activity...

Every activity has its own vocabulary. For example, every sport uses different words to describe the positions of each player (for example, full forward, scrumhalf, point guard). It is important to understand the words used to discuss an activity before doing it. Health & safety has it own vocabulary too.

Explain the following terms in your own words

1. Hazard

A hazard is anything that could cause you harm.

2. Risk

The likelihood of a hazard resulting in an actual injury.

3. Risk magnitude

A measure of how risky something is - taking into account, the likelihood it will happen plus how bad the injury might be plus how many people could be injured. (i.e. likelihood x severity x number of people).

4. Control

Any action taken to reduce the level of risk.

5. Personal protective equipment

Clothing or other item worn by a person to reduce the level of risk.

ACTIVITY 3 Identifying hazard & risk

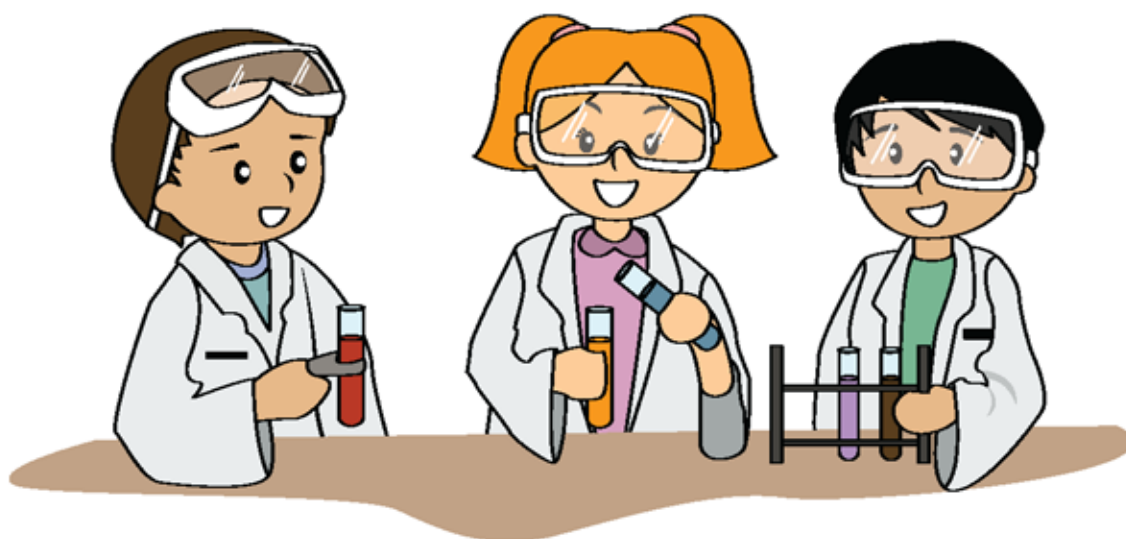
Instruct the students to...

Look at the examples shown on the screen. In each case, identify whether each statement describes a hazard or a risk (by ticking either hazard or risk). Then decide whether the risk magnitude is low, medium or high. Finally, explain what risk control measures you would use to control the risk.

Example

What is the hazard here?

What is the risk?



1. the chemicals
2. the student on the left getting the chemicals splashed in his eyes or the student in the centre spilling the chemicals on her hands

☒ hazard

☐ risk

☐ hazard

☒ risk

Risk magnitude (please tick the appropriate box)

☐ Low

☐ Medium

☒ High

The likelihood is high, severity is high, the number of people exposed is low.

Control

To control the risk I would

always wear personal protective equipment (e.g. safety glasses, protective gloves, lab coat) when carrying out experiments.

Now look up at the screen

3.1 Image: trailing lead

1. the lead trailing across the floor
2. tripping over the lead

☒ hazard

☐ risk

☐ hazard

☒ risk

Risk magnitude (please tick the appropriate box)

☐ Low

☐ Medium

☒ High

The likelihood is high, severity is low, the number of people exposed is high.

Control

To control the risk I would

use a cordless tool, use the corded tool nearer to the socket, cover the trailing lead with a floor mat.

3.2 Image: wearing a hoodie using a pillar drill

1. the drill rotating at high speed
2. the hoodie strings getting entangled in the drill

☒ hazard
☐ hazard

☐ risk
☒ risk

Risk magnitude (please tick the appropriate box)

☐ Low

☐ Medium

☒ High

Control

To control the risk I would

The likelihood is high, severity is high, the number of people exposed is low.

remove the hoodie and hang it up somewhere appropriate – not under the bench!

3.3 Image: using a scroll saw with no guard

1. cutting your finger on the blade
2. the saw blade is not guarded

☐ hazard
☒ hazard

☒ risk
☐ risk

Risk magnitude (please tick the appropriate box)

☒ Low

☐ Medium

☐ High

Control

To control the risk I would

The likelihood is medium, severity is low, the number of people exposed is low.

only use the saw when the guard is in place and correctly adjusted so there is just enough room for the material.

3.4 Image: using a lathe without safety glasses

1. not wearing safety glasses
2. waste material flying into the air

☒ hazard
☐ hazard

☐ risk
☒ risk

Risk magnitude (please tick the appropriate box)

☐ Low

☐ Medium

☒ High

Control

To control the risk I would

The likelihood is high, severity is high, the number of people exposed is low.

always wear eye protection when using the lathe. (Also, roll up sleeves, make sure ties are tucked in (apron) and wear ear defenders if necessary.)

3.5 Image: using a strip heater/ line bending heater

1. touching the hot line
2. the hot line

☐ hazard
☒ hazard

☒ risk
☐ risk

Risk magnitude (please tick the appropriate box)

☒ Low

☐ Medium

☐ High

Control

To control the risk I would

The likelihood is medium, severity is low, the number of people exposed is low.

always use the guard and take my time.

ACTIVITY 4 Choosing the best controls

Take the students through the following instructions...

In this activity you are shown a number of options that could be used to reduce the risk associated with a particular process. Working in pairs, discuss the options and number each risk control measure in order of merit on a scale of one to four, (1 = best... 4 = worst). When you have completed the first example discuss the advantages and disadvantages of each with me and the rest of the class

It is important to remember that there is room for debate here, especially with the later examples... the students may not agree with each other or with you – this is a positive thing and should allow you to engage the students in a discussion of the benefits of each approach.

4.1 Image: A can of spirit based varnish & white spirits.

Hazard: Using chemical products.

Risk: Eye contact/ skin contact/ breathing in fumes.

Controls:

| | | | |
|---|--------------------------------|---|--|
| 4 | wear safety glasses and gloves | 3 | use a smaller can of varnish & a smaller brush |
| 1 | use a pre-finished board | 2 | use a water based varnish |

4.2 Image: A bandsaw cutting a piece of steel – no guard.

Hazard: Unguarded cutting tools.

Risk: Cutting yourself, getting waste in your eyes, hearing damage.

Controls:

| | | | |
|---|--|---|------------------------------|
| 3 | guard the saw and wear personal protective equipment | 1 | buy in the steel cut to size |
| 2 | cut the steel with a hacksaw | 4 | guard the saw only |

4.3 Image: Corded power tools (belt sander) & an extension lead.

Hazard: Extension lead trailing across the aisle.

Risk: Tripping over the lead.

Controls:

| | | | |
|---|--|---|---------------------------------|
| 2 | use a cordless tool | 4 | cover the lead with a floor mat |
| 3 | move the work to a bench near a socket | 1 | use a hand tool instead |

4.4 Image: Lifting a heavy box.

Hazard: The box is very heavy.

Risk: Injury to your back.

Controls:

| | | | |
|---|---|---|--------------------------------------|
| 1 | remove the contents and pack into two smaller boxes | 3 | get someone to help you lift the box |
| 2 | use a hand cart to move the box | 4 | ask your teacher to lift it |

4.5 Image: Mains powered electrical tools.

Hazard: Electricity.

Risk: Electric shock.

Controls:

| | | | |
|---|--------------------------|---|-----------------------------|
| 3 | use 110V tools | 1 | use hand tools instead |
| 2 | use cordless power tools | 4 | check for faults before use |

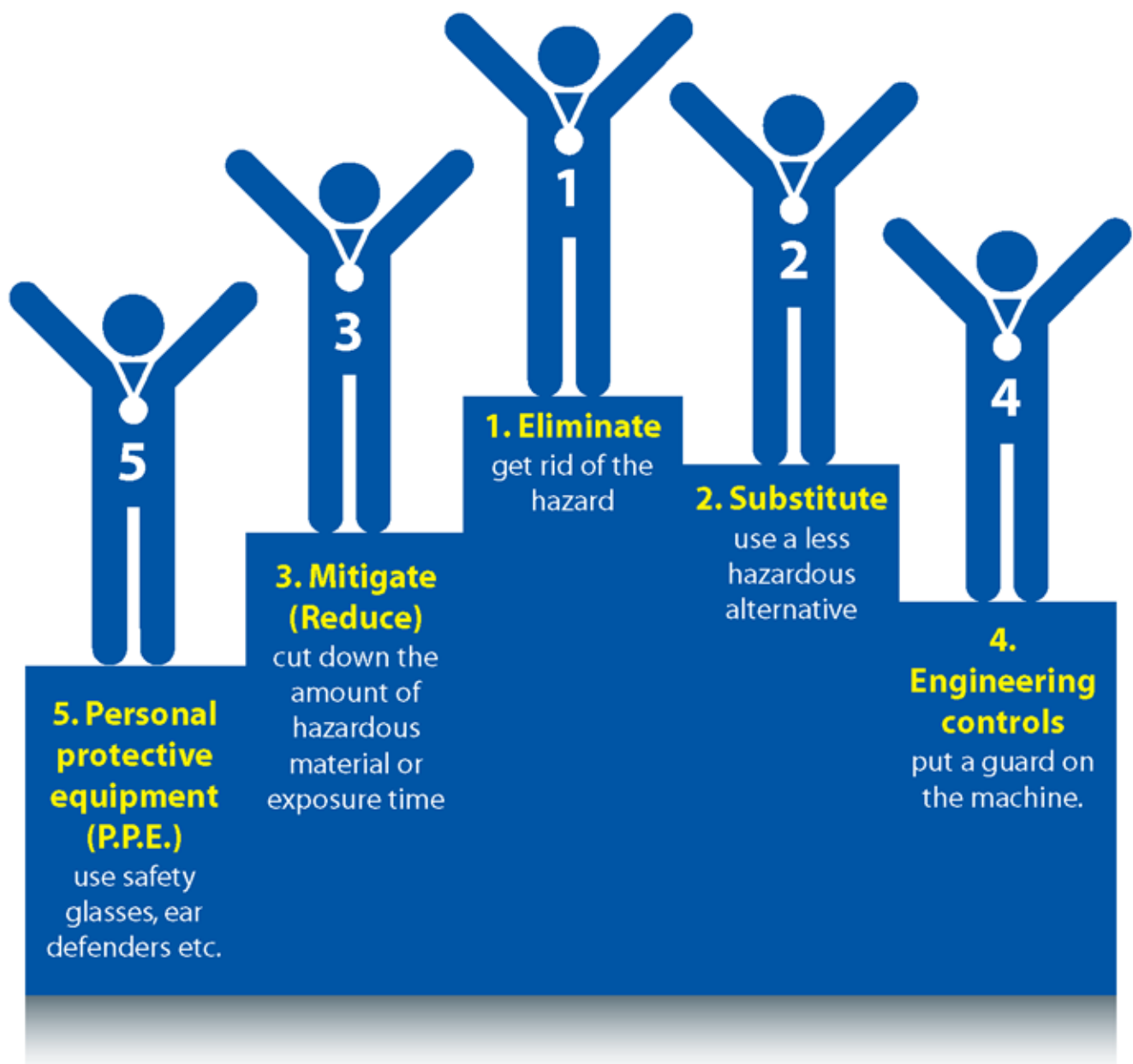
HEALTH & SAFETY IN TECHNOLOGY CLASSROOMS

Generally there are 5 things you can do to control risks – although sometimes only some of them apply to particular situations.

REMEMBER

it is always best to eliminate (get rid of) the hazard if possible,
next best is to substitute it for something safer.

CONTROL HIERARCHY



ACTIVITY 5 Taking responsibility

Explain the purpose of this activity...

We are now going to do look at some situations and talk about how to handle them. This activity is all about taking responsibility for your own behaviour.

Before we begin I'd like you to take few minutes to think about why it is important to behave responsibly in the technology classroom. When you're ready, write down your ideas in the booklet.

5.1 Write a short note explaining, in your own words, why it is important to behave safely in the technology classroom:

It is important to behave safely in the technology classroom because:

- *there are a lot of potential hazards in the room*
- *if there is an accident, it could potentially be very severe*
- *there are a lot of people in the room*
- *there are a lot of different activities going on at once*
- *my teacher has to able to trust me to work safely on my own.*

Role play

The idea here is to provide the students with an opportunity to do something that doesn't come naturally...

"It is very important to behave responsibly when in a technology classroom. One of the best things about doing technology subjects is that you get to design and make your own work.

If you are going to do this, I have to be able to trust you to use tools and equipment safely when you are working independently. I also have to trust you to behave safely toward other students.

Behaving responsibly sometimes means that you have to have the maturity to display leadership qualities. This is just like when the captain of a team has to make difficult decisions under pressure – he or she has to tell the other players what to do.

In the technology classroom this might mean having the leadership ability to tell someone to wear their safety glasses or to use a tool properly or maybe you'll have to tell someone to stop messing.

You should also remember it is a legal offence, under the Safety, Health & Welfare at Work Act 2005, to endanger someone at school."

This is supposed to be a fun activity... Consider allowing the students to use their own language if they want to make it more realistic.

During this activity it is important to include yourself – for example, during each role play say where you are while this is going on... Remember the bandsaw is a direct supervision machine; so you should be very nearby – arrive on the scene toward the end of the role play and praise 'Student B' for being helpful. Also, you might want to mention safe working zones and that it is important that student B leave the immediate vicinity.

"This activity creates some situations that will allow you to display leadership and encourage safe behaviour. Feel free to adapt the dialogue to something you'd say in this situation – just get the message across."

Role play 1

Student A is standing at the lathe. (S)he has the work-piece mounted and is about to turn the lathe on. Student B notices that Student A is not wearing eye protection, even though it is right beside the lathe.

Student B: "Hey (name) don't forget your safety glasses"

Student A: "I'm not wearing them – I'll look stupid"

Student B: "Don't be daft – everyone wears them. Anyway, if something flies into your eyes you could be really badly hurt."

Student A: "Don't mind that – I'll be grand"

Student B: "I'm serious (name) you really should put them on – anyway, you heard (teacher) if anyone is caught not wearing the safety glasses (s)he'll turn it off for the rest of the class"

Student A: "Would you just get lost and mind your own business"

Student B: "Okay – suit yourself. But I'm telling (teacher) 'cause if you get hurt none of us will be allowed to use the lathe ever again"

Student A: "Alright, alright – I'm putting them on"

Student B: "Good – call me when you're finished, I want to use it after you"

Role play 2

The teacher has gone to the door to talk to the school principal. Student A is throwing small waste pieces of wood/ plastic/ steel at other students.

Student A: *Throws a waste piece of wood/ plastic/ steel at a group of students. Remember this is a role play – don't actually throw anything!!*

Student B: "Cut it out (name)"

Student A: "Ah, don't be such a loser, I'm only messing" *Throws another piece.*

Student B: "Listen, if you hit someone in the eye it could be serious"

Student A: "Who left you in charge? I'll do whatever I like" *Throws another piece.*

Student C: "Would you ever cop on"

Student A: "Stop now or I'm calling (teacher)"

Student B: "Alright, alright – I'll stop."

Student A & C look at each other and throw their eyes up.

Role play 3

Student A is about to use the bandsaw. The work-piece is 6mm in thickness but the guard is 50mm above the work-piece. **Remember the bandsaw is a direct supervision machine; so you (the teacher) should be very nearby – arrive on the scene toward the end of the role play and praise 'Student B' for being helpful.**

Student B: "(Name) you should lower the guard before you use that"

Student A: "What do you mean?"

Student B: "Well, the guard should be just above the work-piece. The less of the blade exposed, the less likely you are to get injured."

Student A: "Oh right... Could you remind me how to lower it? I can't remember."

Student B: "No problem – you just twist this..." *Shows the student how to lower the guard.*

Now, go ahead and make up your own role play...

Scenario:

.....

.....

Student :

Student :

Student :

Student :

Student :

Student :

Student :

Student :

Student :