STEAMING SYSTEMS

TRACKS TO SAFETY

LEVEL

Year 11

VCE: Systems Engineering

ACTIVITY DESCRIPTION

Engineers have excellent knowledge of workplace safety and risk management. They have skills in the safe use of tools, measuring equipment, materials, machines and processes, including using relevant information and communications technologies and understanding the risk management processes.

To gain an awareness of the quality and industry standards expected, students develop skills in the safe, efficient and effective use of tools and equipment by designing, printing and displaying posters that effectively illustrate the safe and appropriate use of workshop equipment, including risk reduction and management.

SUBJECT AREA

Unit 1: Mechanical Systems

Area of Study 2 – Producing and evaluating mechanical systems

MATERIALS REQUIRED

- "Tracks to Safety" Worksheet
- A3 paper
- Pens/Pencils/textas
- Workshop equipment
- Microsoft PowerPoint or access to other multimedia/presentation programs

INSTRUCTIONS

1. As a whole class activity move around the engineering workshop space and point out equipment that will be available for students to use throughout the year. Have students take notes on any of the equipment that they may be interested in using.
2. Highlight the need for students to develop skills in the safe, efficient and effective use of tools, equipment, materials, machines and processes, including digital technologies. Remind students that when designing and building their mechanical systems throughout the year they will be developing a design brief and evaluation criteria. They will also need to include a list of components, materials and procedures, throughout this process, including safety procedures for the equipment they are using.
3. Show students some examples of workplace/ workshop safety posters – refer to background information (https://www.worksafe.vic.gov.au/ posters)
4. On the board write a list of the most used equipment throughout the workshop space that requires safety procedures.
5. Assign students, in pairs or groups, a piece of equipment to research the safe and appropriate use of.
6. Provide students with A3 paper, pens, pencils and textas or access to Microsoft PowerPoint/other multimedia programs to develop an A3 poster, to display around the room, for the safe use of their chosen piece of equipment.
   NOTE: Teachers can create a template for students to use to create their posters.
7. In group or pairs, students use the "Tracks to Safety" Worksheet for details to include on the poster.

8. Give students an appropriate amount of time to create their poster. Once completed have students place posters around the room, at the appropriate piece of equipment, and do a gallery walk with the class to view safety posters.

EXTENSION: As a class, or individually, students can create risk assessments for their final project and/or a particular piece of equipment. This will allow students to perform a risk assessment and select and safely use materials, tools, equipment, components and machines. They will also gain a greater understanding of the role of specifications, data sheets, safety data sheets and technical data manuals.

SUGGESTIONS FOR ASSESSMENT

Contribution to class discussions. Working efficiently and in small groups. Successful completion of Safety Poster to effectively illustrate the safe and appropriate use of workshop equipment, including risk reduction and management.

CURRICULUM LINKS

SYSTEMS ENGINEERING

Unit 1: Mechanical Systems

Area of Study 2

Producing and evaluating mechanical systems.

- Students develop skills in the safe, efficient and effective use of tools, equipment, materials, machines and processes, including digital technologies.
- Safety must be considered at all stages of creation and use of the system. The risk assessment and management process is used to identify and minimise risk or harm for the maker or user.
- They need to demonstrate safe and correct use of appropriate tools, equipment, machines and components to fabricate and assemble the system, ensuring it is compliant with OH&S requirements

BACKGROUND INFORMATION

Teaching your students to recognise the dangers that exist in the workshop and how to combat them is an important skill.

Risk assessing is a process we all do in our everyday lives, without even realising. When we cross the road we make a risk assessment – identifying the hazard of crossing in traffic, the harm of being hit by a vehicle, the severity of that harm. We identify control measures of looking for traffic, selecting safter places to cross, moving across the road quicky.

All this might happen very quickly in our minds, so we don't see it as a process. This comes from having internalised our training when we were younger and applying the control measures frequently.

When we carry out practical work, we are risk assessing both in the situation and, more deliberately and formally, in our planning. As part of their scientific education, students need to develop knowledge and skills in risk assessment. This starts from their first day in the laboratory, right up to self-directed extended investigation. Knowing about hazards, risks and control measures is key to keeping themselves and others safe.

(Reference: https://edu.rsc.org/ideas/how-to-teach-risk-assessment-skills/4016786.article)

TRAINING STUDENTS

Training students to use a particular piece of equipment in the workshop should consist of three elements:

GENERAL – the basic skills and knowledge common to all equipment. This will include aspects of 'good housekeeping'.

MACHINE SPECIFIC – the basic skill in the operation of the machine, including the position and function of emergency stops; basic safety rules related to the operation of a machine or class of machines; the use and adjustment of guards, safety devices and PPE (Personal Protective Equipment).

FAMILIARISATION: On-the-job – under close supervision by a teacher.

SAFETY POSTERS

Reference: Safestart.com

When used correctly safety posters can be an incredibly effective communication tool in the workshop.

Safety posters are used to showcase:

- Milestones, goals, progress
- Behaviour change and motivation
- Compliance requirement
- Informational, awareness (this is the most important one)
- Support for larger initiatives
- Systems and processes
- Event announcements or training schedules

There are also informational posters. It can be an incredibly powerful form of safety communication and it's the type of safety poster that's most likely to have a daily impact on worker safety. It reminds workers about safety requirements and best practices. It can also be motivational, encouraging employees to make use of their safety skills and awareness.

When workers see a safety poster, they should instantly be reminded of a best practice they learned in safety training, think about a hazard they've already been told about, or recall a safety issue they need to be mindful of.

The poster needs to be designed to lead the viewer through the work presented separating things like the headline, supporting material, images, etc. by formatting and spacing—directing the viewer's attention to the different sections in a systematic way.

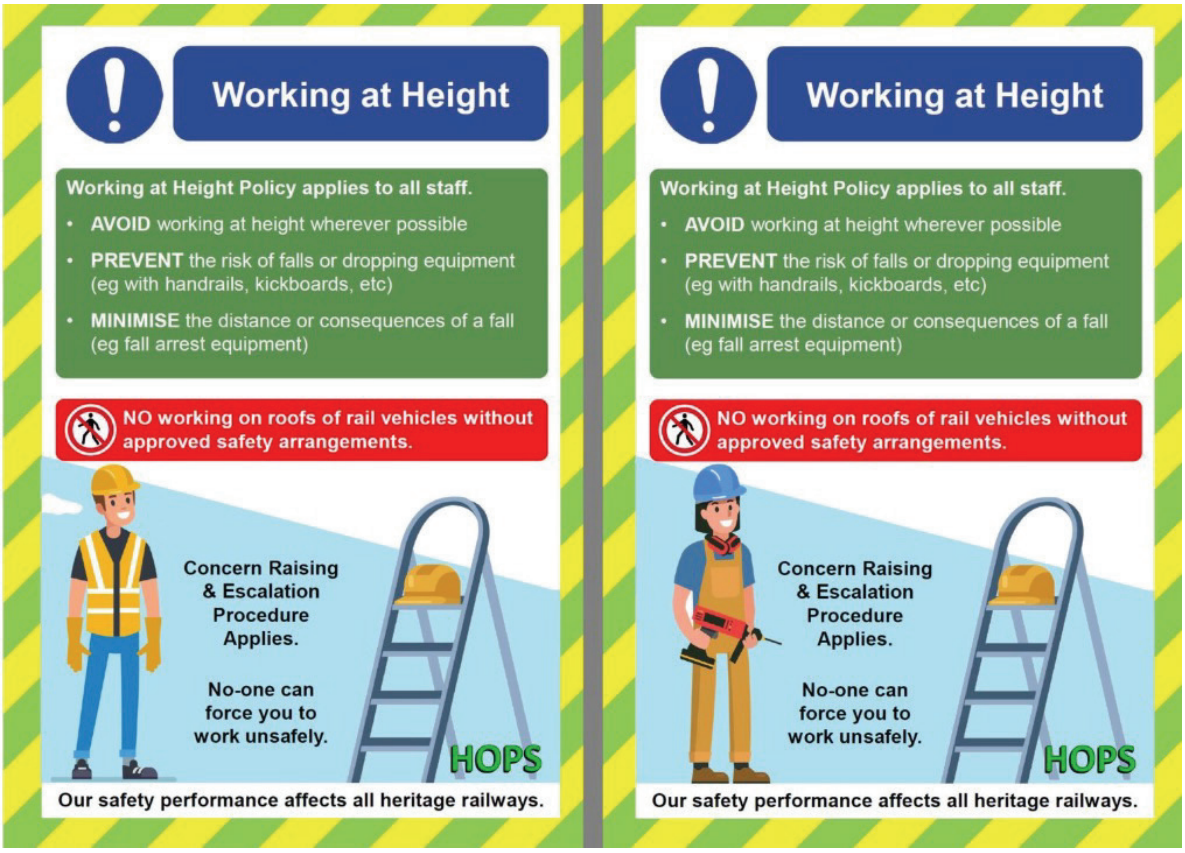
An informative Safety Poster should include:

- Headline
- Statement
- Images
- Supporting material
- Conclusion
- Logo, contact information and other details

When creating your safety poster students need to consider:

- Colour
- Font use
- Quality not quantity

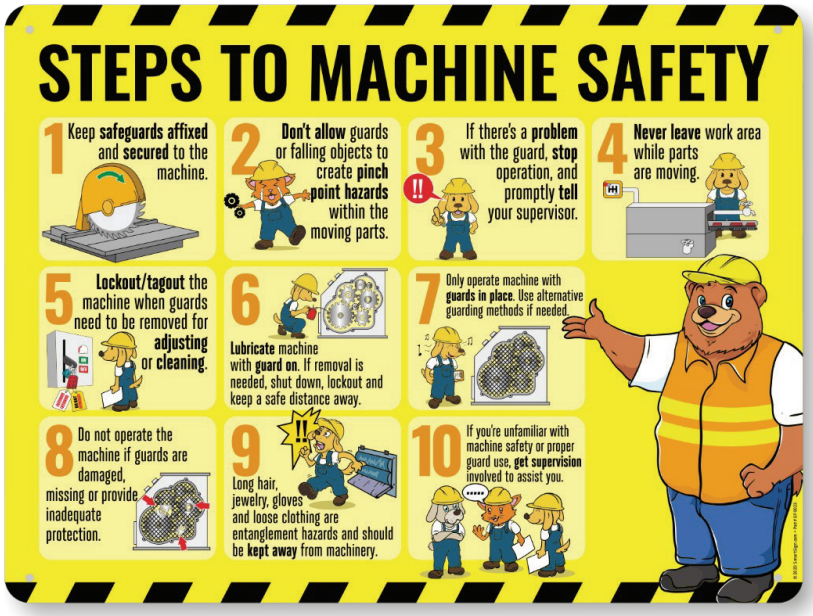
SAFETY POSTERS EXAMPLES



Reference: www.hrailsafety.org/working-at-height

SAFETY POSTERS EXAMPLES

Reference: https://safestart.com/news/the-ultimate-guide-to-safety-posters



Reference: https://www.mysafetysign.com/steps-to-machine-safety-workplace-poster/sku-sp-0023

Reference: Buysafetyposters.com

Reference: https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2024-06/Safer-manual-handling-electricians-poster-2024-06.pdf

Reference: work-fit.com

References

https://www.australiancurriculum.edu.au/resources/work-samples/samples/poster-stay-safe-above/

https://www.safework.nsw.gov.au/resource-library/printable-resources-machinery

https://www.roadsafetyeducation.vic.gov.au/educational-resources/tertiary-education/module-1-safe-system-principles-in-engineering

https://www.worksafe.vic.gov.au/posters

https://edu.rsc.org/ideas/how-to-teach-risk-assessment-skills/4016786.article

https://hsseworld.com/workshop-safety-guideline-and-free-posters/

https://safestart.com/news/the-ultimate-guide-to-safety-posters/#:~:text=A%20required%20safety%20poster%20displays,information%20as%20mandated%20by%20law.

WORKSHEET – TRACKS TO SAFETY

Engineers working in industry need to develop skills in the safe use of tools, measuring equipment, materials, machines and processes – including using relevant information and communications technologies – and understand the risk management processes.

You will design, and print, a poster that effectively illustrates the safe and appropriate use of a piece of workshop equipment, including risk reduction and management.

WORKSHOP EQUIPMENT:

YOUR POSTER NEEDS TO BE:

- A3 in size
- Bright to capture attention
- You can create your poster by hand or using a multimedia program, but it must be printed and displayed

IT MUST INCLUDE:

- Name of piece of equipment
- The type of PPE someone needs to wear
- Identify common hazards with equipment
- Systems and processes to follow
- Images or pictures that align to the messaging
- Call to action or safety messaging