

Analysing Building Designs – safety, accessibility and usability

Design and Technologies

Year 9 (Australian Curriculum v9)

Buildings shape the way people live, move and interact every day — at school, at home, in shops, cafés and public spaces. While people often notice how buildings look, good design is also measured by how safely, comfortably and effectively a space works for the people who use it.

This lesson introduces students to analysing the built environment through the lens of building surveying and design evaluation. Using a simple building layout as a case study, students investigate how decisions about layout, movement, access and emergency planning influence safety, accessibility and usability in everyday environments.

Through guided analysis and collaborative problem solving, students identify design issues, evaluate their impact on different users, and propose realistic improvements. The lesson develops observation, evidence-based reasoning and justified decision-making while introducing students to the role of building surveyors in helping ensure buildings are safe, functional and fit for purpose.

By the end of the lesson, students understand that effective building design is not only about appearance — it is about creating spaces that work well for people in both everyday use and emergency situations.

Definitions

Accessibility means how well all people (including wheelchair users or people with temporary injuries) can move through and use a building.

Building Surveyor is an independent expert who protects the safety of the built environment by assessing compliance with all relevant Australian construction standards.

Compliance is whether a building meets the rules, standards and regulations that make it safe and fit for purpose.

Egress means the ability for people to safely exit a building during an emergency. This includes exit locations, corridor widths, door direction, and how quickly people can move to safety. Also known as emergency movement.

Emergency movement means the ability for people to safely exit a building during an emergency. This includes exit locations, corridor widths, door direction, and how quickly people can move to safety. Also known as egress.

Fire safety refers to how a building is designed to prevent fire, detect fire early, and allow people to safely evacuate in an emergency. This includes exits, alarms, signage and clear escape routes.

Safety refers to how well a building design prevents injury, danger or harm, including in everyday use and emergencies.

Usability is how practical and comfortable a space is for the people who use it — whether it works well for its intended purpose.

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Context of unit

This lesson focuses on how building design decisions influence the safety, accessibility and usability of everyday environments.

Students examine buildings as designed solutions that must respond to user needs, movement, constraints and rules to function effectively and safely.

Through analysis of a simple building layout, students learn how to identify design issues, explain why those issues matter, and consider who is affected by design choices. They apply design thinking to evaluate how well a building works in real-world conditions and how problems can be addressed through informed design improvement.

Through this learning sequence, students will:

- analyse a building layout to identify issues related to safety, accessibility and usability
- explain how design decisions impact different and everyday users of a space
- propose and justify design improvements that respond to identified real-world issues and constraints.

Curriculum content covered

This unit aligns with the following Australian Curriculum v9 Design and Technologies content descriptions:

- **Explain how people consider factors that impact design decisions and technologies used to design and produce solutions**
(AC9TDE10K01)
- **Analyse needs or opportunities for designing; develop design briefs and investigate, analyse and select materials, systems, components, tools and equipment to create designed solutions**
(AC9TDE10P01)

Optional cross-curriculum link:

- HASS Civics & Citizenship – laws, regulation and roles of government

Success criteria

Students demonstrate success when they can:

- Identify design issues in a building layout that affect safety, accessibility and usability
- Explain why identified design issues matter, including how they affect different users in everyday situations
- Identify and analyse fire safety and emergency evacuation (egress) issues in a building layout
- Propose realistic design improvements that respond directly to identified issues and improve how the space functions
- Justify design decisions using evidence from their analysis and appropriate design terminology

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Unit Overview

This one-lesson unit introduces students to analysing building designs as part of the Design and Technologies curriculum. Students explore buildings as designed solutions and investigate how design decisions influence safety, accessibility, usability and emergency performance in everyday environments.

Working collaboratively, students apply a structured inquiry process to analyse a building layout, identify design issues and consider how those issues affect different users. They evaluate how spaces function in both everyday use and emergency situations, including fire safety and egress, before proposing realistic design improvements.

The learning sequence develops students' skills in observation, analysis and evidence-based decision-making. It reinforces the importance of evaluating designs against user needs, constraints and real-world considerations, and of justifying improvements through informed design thinking.

Teacher preparation

Pre-work:

- Prepare images to show students of familiar buildings (home, school, café, gym, local shopping centre)
- Activity 1 – Hand out and worksheet (attached) – print for pairs (pg. 10-11)
- Activity 2 – Handout, Building Layout and Worksheet (attached) – print for pairs (pg. 12-16)
- Activity 3 – Worksheet (attached) – print for pairs (pg. 17-19)

Author and Licensing

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Lesson outline

Analysing Building Design

Students develop a shared understanding of how building design influences the safety, accessibility, usability and emergency fire safety (egress, evacuation routes and alarms) of everyday spaces. The lesson highlights how regulations, user needs and design decisions shape the function and safety of the built environment in different contexts.

Students will define and explore:

- safety, accessibility and compliance with building design
- strategies for improving the safety, fire safety usability and accessibility of buildings
- how designs are assessed against rules, standards and user needs
- common risks, barriers and design issues found in everyday buildings
- the impact of design decisions on different users and on the overall performance of a space.

Assessment opportunities

- **Observation:** student participation, collaboration and problem-solving during analysis and discussion of the building plan.
- **Analytical thinking:** identification of relevant safety, accessibility, usability and emergency evacuation (fire safety/egress) issues through notes, discussion or annotations.
- **Annotated plan:** clarity and accuracy of annotations that demonstrate understanding of design issues, user impact and opportunities for improvement.
- **Design improvement:** effectiveness and practicality of proposed design changes in responding to identified issues and improving building performance.
- **Communication and justification:** ability to clearly explain and justify design decisions using appropriate design terminology.
- **Reflection:** demonstrated understanding of how design decisions influence safety, accessibility and usability in the built environment.

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Lesson

Total time
50 minutes

Analysing Building Design

Students will identify real-world problems on a building plan and develop design solution to address it.

Purpose

To make visible the thinking involved in assessing building design, including decisions about safety, fire safety, accessibility, user needs and regulatory compliance, and how these factors influence the function and performance of everyday spaces.

Learning intention

Students will:

- Understand the role of a building surveyor in keeping buildings safe and usable
- Identify safety, fire safety, accessibility and compliance issues in a simple building design
- Consider smoke alarms and other possible active systems to alert building occupants in a fire situation to evacuate
- Consider egress in an emergency situation and why clear exits are required for escape
- Consider building materials, i.e. brick, concrete and stone as non-combustibles, and consider the use of combustible building materials in the safety of buildings
- Apply design thinking to improve a building so it better meets requirements.

Introduction

5 minutes

Exploring why building design matters

Teacher script

Today we're going to look at something you use every day, often without thinking about it — buildings.

Think about the last place you were before coming to class. It might have been your house, the bus stop, a hallway, a shop, or a café.

Those spaces were designed to work for specific users and purposes.

Every door, walkway, counter and room has been deliberately designed.

Now imagine this:

- *A space that feels crowded even when there aren't many people there.*
- *A doorway that's hard to get through when you're carrying something.*
- *A layout that becomes confusing or unsafe when lots of people are moving at once.*

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These problems aren't caused by people — they're caused by design decisions.

Show images of familiar buildings (home, school, café, gym, shopping centre).

Let's think like designers for a moment:

- *How do people move through this space?*
- *Who might find parts of it difficult to use?*
- *What could go wrong if the design hasn't been carefully thought through?*
- *What would happen in this space if there was a fire or emergency? How quickly could people get out? Would everyone be able to see exits and alarms clearly?*

In Design and Technologies, analysing designs helps us understand how well a solution works — not just how it looks.

Key idea made explicit

- Design decisions always involve trade-offs
- Designers work within rules, constraints and user needs
- Good design reduces risk before problems occur.

Activity 1

10 minutes

Live site audit (in pairs)

Students investigate a real school space to identify design issues related to safety, accessibility, usability and emergency movement through direct observation.

Purpose

To introduce design analysis through **real-world observation** before moving to a building layout.

Task

Working in pairs, students move to a nearby school space (e.g. classroom, corridor, canteen area, entry, stairs or courtyard).

Using the handout and worksheet to guide them, students observe how the space works and identify three design issues.

Teacher script

Before analysing a building plan, we're going to analyse a real space.

Designers observe how spaces actually work.

Look for places where:

- *someone could get hurt*
- *movement is difficult*
- *the space doesn't work well*
- *people might get stuck in an emergency*

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Record three issues based on what you observe.

Teacher prompts (if needed)

- *Where do people slow down or get stuck?*
- *Can everyone move through the space easily?*
- *Are exits clear and easy to find?*
- *Who might find this space difficult to use?*

Activity 2

15 minutes

Assessing the design in detail (in pairs)

Students analyse a building to explain how design issues affect use, safety, accessibility and emergency evacuation.

Purpose

To develop structured analysis of how design decisions affect:

- everyday use of space
- movement and accessibility
- safe evacuation in an emergency (i.e. fire scenarios),

moving from not just identifying the issues but explaining why they matter.

Task

Use the building layout provided students work in pairs to:

- select 3 key issues
- explain who is affected
- explain why the issue matters
- consider what happens when the space is crowded or during an emergency

Students record responses on the worksheet.

Suggested teacher script

You've just analysed a real space by observing how it works.

Now we're going to apply that same thinking to a building layout.

The difference is you can't walk through it — so you'll need to use your observation skills and reasoning to work out how the space would function.

You've already identified some problems. Now your role is to explain them more clearly.

Think like a building surveyor:

- *Why does this matter?*
- *Who does it affect?*
- *What happens if the space is busy or people need to leave quickly?*

Focus on explaining the impact of your ideas — not finding new problems.

Teacher prompts (if needed)

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- *Who might find this space harder to use than others?*
- *What could become a problem if the café is very busy?*
- *How would this layout affect people trying to leave quickly?*
- *Where might people get stuck?*

Class check-in (optional)

Ask one or two pairs to share one issue and why it matters.

Transition

Teacher script

You've identified issues and analysed their impact.

Now use that evidence to improve the design.

Your goal is not to redesign everything — choose the changes that would make the biggest improvement for safety, accessibility, usability or emergency evacuation.

Be ready to explain why your decisions are justified.

Activity 3

15 minutes

Improving design – make the design safer (in pairs)

Students use their analysis from 2 to propose design improvements that address both everyday use and emergency evacuation performance (fire safety and egress).

Purpose

To apply evidence from analysis to propose realistic design improvements.

Task

Using the same building layout and notes from Activity 2, students:

- choose key issues to fix
- propose improvements
- explain how their changes improve safety, accessibility, usability or emergency movement.

Suggested teacher script

You've identified problems and explained why they matter.

Now your job is to improve the design.

Focus on the changes that will make the biggest difference.

For each improvement, be ready to explain:

- *what you changed*
- *what problem it fixes*
- *how it makes the space safer or easier to use*

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Teacher prompts

- *How does this change reduce risk or make the space easier to use?*
- *Which users benefit most from this improvement?*
- *Does this improvement solve more than one issue?*
- *Is this improvement realistic within the constraints of the building?*

Reflection

5 minutes

Teacher script:

Today you analysed a building like a building surveyor.

First, you identified problems.

Then you explained why they matter.

Finally, you improved the design.

Good design is not just about how something looks – it's about how well it works for people.

What is one thing that would make the biggest difference?

Ask students to call out answers.

Optional extension / homework

Write 4-6 sentences:

- Describe one problem and one improvement from today's task
- OR
- Describe two problems and one improvement in a building you know.

Activity 1. Building Surveyors Handout

4 KEY THINGS

BUILDING SURVEYORS ALWAYS CHECK



EMERGENCY MOVEMENT

How easily and quickly people can get out of a building in an emergency.



- ✓ Can you see the exit easily?
- ✓ Can lots of people leave at the same time?
- ✓ Would anyone get stuck or confused?





USABILITY

How easy and convenient a building is for people to use every day.



- ✓ Is the layout logical and easy to understand?
- ✓ Are things easy to find and use?
- ✓ Does the space work well for what it's meant to do?





ACCESSIBILITY

How well a building can be used by everyone, including people with disabilities.



- ✓ Can wheelchair users get in and around easily?
- ✓ Are there ramps or lifts if needed?
- ✓ Are doors, paths and facilities designed for everyone?





SAFETY

How well a building protects people from harm and reduces risks.



- ✓ Are there fire exits and alarms?
- ✓ Are floors, stairs and rails safe to use?
- ✓ Are there hazards that could cause injury?



**GOOD DESIGN
SAVES LIVES AND
IMPROVES EVERYDAY LIFE.**



★ BUILDING SURVEYORS LOOK AT MORE THAN JUST HOW A BUILDING LOOKS—
THEY CHECK HOW WELL IT **WORKS**, KEEPS PEOPLE **SAFE**, AND **INCLUDES EVERYONE**.

**THINK LIKE A
SURVEYOR!**



Activity 1. Live site audit (10 minutes)

Names: _____ Class: _____ Date: _____

Activity focus

You are acting as a junior building surveyor.

Your job is to observe a real space and find design problems.

What you are looking for

Use the graphic provided to help,

- safety – could someone get hurt in this space
- accessibility – can everyone use it
- usability – does it work well
- emergency movement – can people get out quickly and easily in an emergency

Step 1 – Observe the space

Move through the space with your partner.

Look carefully at:

- | | |
|--|---|
| ☐ how people move | ☐ tight or crowded areas |
| ☐ where people stop or gather | ☐ entrances and exits |

Step 2 – Find 3 issues

Find three real problems in the space.

These should be things that:

- could cause injury
- make movement difficult
- stop some people using the space
- cause problems if lots of people were there

Record your observations.

Activity 2 Handout – Building Surveying and Emergency Safety

BUILDING SURVEYING EMERGENCY SAFETY

DESIGNING BUILDINGS THAT KEEP PEOPLE SAFE

As building surveyors, we review how buildings are designed to ensure people can get out safely and emergency services can get in and respond.

KEY DESIGN ELEMENTS TO CONSIDER WHEN REVIEWING BUILDING LAYOUTS

OUR GOAL

Ensure buildings are designed to:

- Allow safe and efficient evacuation
- Alert and inform building users
- Support access for emergency services
- Protect people, including those with additional needs
- Minimise risk of injury, panic and property damage

TYPICAL FLOOR PLAN – WHAT TO CHECK

WHAT TO REVIEW

- 1 EXIT LOCATIONS**
Are exits sufficient in number and well distributed?
- 2 ESCAPE ROUTES**
Are routes clear, direct and protected from fire and smoke?
- 3 CORRIDOR DESIGN**
Are corridors wide enough and free from obstructions?
- 4 ALERT SYSTEMS**
Are fire alarms and visual alarms located throughout the building?
- 5 FACILITIES & ACCESSIBILITY**
Are toilets and refuge areas accessible to everyone?
- 6 ASSEMBLY POINTS**
Is the assembly point in a safe distance from the building?
- 7 EMERGENCY VEHICLE ACCESS**
Can fire appliances reach the building quickly and safely?
- 8 ACCESSIBLE EXITS**
Are step-free routes and accessible exits provided?
- 9 HAZARD CONTROL**
Are plant rooms and hazardous areas safely located and contained?

KEY DESIGN PRINCIPLES

SAFE EVACUATION
People must be able to get out quickly and safely.

FIRE CONTAINMENT
The building should slow the spread of fire and smoke.

EARLY ALERT
People must be warned of danger as early as possible.

EMERGENCY ACCESS
Responders must be able to reach and enter the building effectively.

INCLUSIVE DESIGN
Everyone, including those with disabilities, must be able to escape safely.

LOW RISK DESIGN
Reduce the chance of panic, injury and secondary hazards.

RELEVANT STANDARDS & GUIDANCE

- Building Regulations 2010 Approved Document B – Fire Safety
- BS 9999:2017 Code of practice for fire safety in the design, management and use of buildings
- BS 8300-2:2018 Design of an accessible and inclusive built environment
- BS 9991:2015 Fire safety in the design, management and use of residential buildings
- Local authority and fire service requirements

THINK LIKE A BUILDING SURVEYOR

Is the design compliant with regulations?

Will the building work in a real emergency?

Could anything make evacuation difficult?

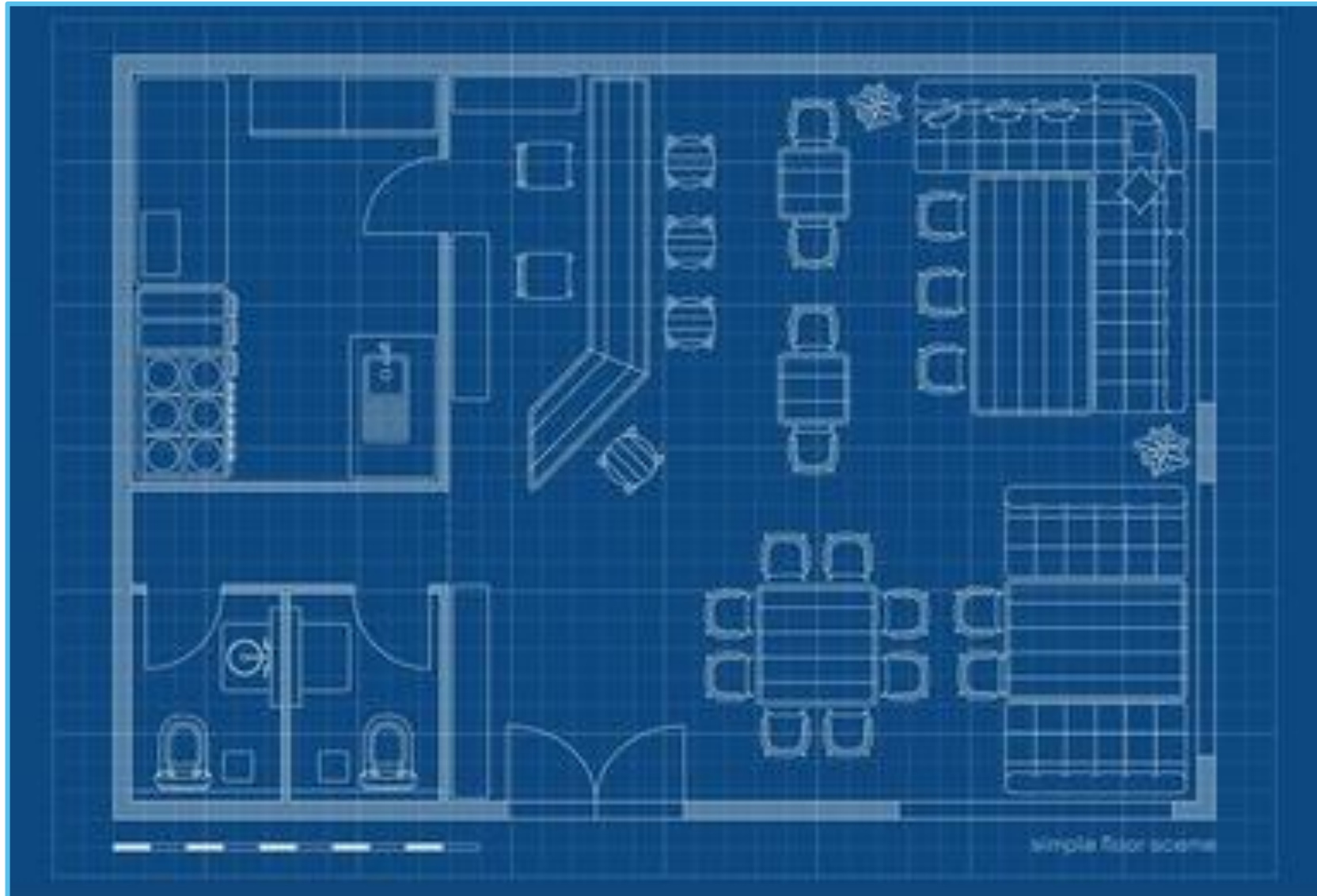
How would emergency services respond?

**GOOD DESIGN SAVES LIVES.
THOUGHTFUL LAYOUTS TODAY
CAN PREVENT TRAGEDY TOMORROW.**

WELL DESIGNED BUILDINGS. SAFER PEOPLE. BETTER FUTURES.

#BUILDINGSAFELY

Activity 2. Building Layout



Activity 2. Worksheet - Assessing a building layout design

Names: _____ **Class:** _____ **Date:** _____

Task

You are a **junior building surveyor**.

You will analyse a building layout and explain how well it works.

Using the building layout provided analyse the design carefully, using the key ideas of:

- safety → could someone get hurt?
- accessibility → can everyone use it?
- usability → does it work well?
- emergency movement → can people get out quickly?

Step 1: Find 3 important problems in the building layout

1. _____
2. _____
3. _____

Step 2: Explain each issue

Issue 1 - What is the problem?

Which type is it?

☐ Safety ☐ Accessibility ☐ Usability ☐ Emergency movement

Who is affected? _____

Why does this matter? (what could go wrong)

Issue 2 - What is the problem?

Which type is it?

☐ Safety ☐ Accessibility ☐ Usability ☐ Emergency movement

Who is affected? _____

Why does this matter? (what could go wrong)

Issue 3 - What is the problem?

Which type is it?

☐ Safety ☐ Accessibility ☐ Usability ☐ Emergency movement

Who is affected? _____

Why does this matter? (what could go wrong)

Step 3. Think about pressure (when it's busy or an emergency)

Answer in one or two sentences:

1. Which issue would get worse if the space was crowded? Why?

2. Which issue could be dangerous in an emergency? Why?

Step 4. What matters most?

Tick the issue you think is the most important to fix.

- ☐ Issue 1 ☐ Issue 2 ☐ Issue 3

Who is affected by this issue?

- ☐ customers
☐ staff
☐ people with disabilities or limited mobility
☐ people unfamiliar with the building
☐ people in an emergency situation

Activity 3. Improving the design

Names: _____ Class: _____ Date: _____

Activity focus

You will now use your analysis to propose justified design improvements.

Use your notes from Activities 1 and 2 to guide your design suggestions.

Step 1: Choose a single focus area

Identify one key area of the building to improve (eg. entrance, seating zone, counter, circulation paths, exits).

Write your focus area:

Step 2: Propose design improvements

You MUST propose

- One improvement that improve everyday usability / accessibility
- One improvement that specifically improves emergency evacuation / fire safety
- For each improvement, clearly explain your thinking.

Example improvements:

- widening exit paths / corridors
- relocating furniture blocking egress routes
- adding secondary exits
- improving exit signage visibility
- ensuring doors open in direction of travel outwards
- adding fire alarm points / detectors (conceptual)
- creating a clear evacuation flow (no dead ends)

Improvement 1: _____

What would you change?

Describe the design change clearly.

Why does this change improve the design?

Explain how it improves safety, accessibility or usability.

Who benefits from this change?

Consider different users of the space.

Improvement 2 _____

This MUST relate to fire safety or emergency evacuation (egress). Examples include:

- improving exit access or visibility
- widening circulation paths for evacuation flow
- removing obstructions from escape routes
- improving wayfinding to exits
- reducing congestion points
- separating movement paths from high-traffic zones

What would you change?

Why does this change improve emergency safety?

Explain clearly:

- how it improves evacuation speed or flow
- how it reduces risk during emergencies
- how it supports safe exit from the building
- whether it improves visibility, access, or reduces congestion.

Who benefits in an emergency?

Consider:

- people unfamiliar with the building
- people with limited mobility
- staff managing evacuation
- crowded conditions

If it helps you explain your ideas, you can annotate your building layout:

- label changes directly on the building layout
- draw arrows or notes to show movement or access improvements

Annotations should match the written explanations above.

Step 3: Prioritising decisions

Answer briefly: Which improvement do you think is the most important? Why?

You must justify your answer using both:

- everyday usability impact
- emergency evacuation impact

Step 4: Explanation

Complete this sentence:

We improved the design by ... This helps because ...

Example: We improved the design by widening the walkway from the front door to the counter so wheelchair users and prams can move safely without bumping into seating.

This helps because it improves accessibility and prevents congestion in emergencies.

Suggested assessment rubric

Criteria	A – Excellent	B – High	C – Satisfactory	D – Partial	E – Limited
Identification of design issues	Identifies several relevant issues including emergency evacuation (egress, exits, congestion) and everyday use.	Identifies relevant issues including some emergency evacuation considerations.	Identifies some issues related to safety, accessibility or usability, with limited reference to emergency conditions.	Identifies a few obvious or superficial issues with minimal recognition of emergency or evacuation considerations.	Shows little or no ability to identify relevant design issues.
Analysis of design issues	Clearly explains issues in both everyday use and emergency evacuation, including impact on movement and users.	Explains most issues with some emergency consideration.	Gives basic explanation of issues.	Limited explanations	No explanations.
Quality of proposed design improvements	Proposes realistic improvements addressing everyday use and at least one evacuation/fire safety issue, prioritised by risk.	Proposes effective improvements including some emergency considerations.	Proposes reasonable design improvements for some issues.	Proposes limited or impractical improvements with weak links to issues.	Proposes few or no relevant design improvements.
Justification of design decisions	Justifies improvements using analysis, clearly linking to risk reduction and safe evacuation (egress and movement flow).	Justifies improvements with some link to safety or emergency use.	Explains design decisions with basic reasoning and limited justification.	Provides unclear or minimal justification.	Is unable to explain or justify design decisions.
Understanding of the design process	Clearly links problem → analysis → improvement including emergency performance.	Shows clear understanding of the design process with some awareness of emergency considerations.	Demonstrates a general understanding of the design process.	Demonstrates limited understanding of the design process.	Shows little or no understanding of the design process.

Note: Students complete activities in pairs; however, assessment can be based on both group artefacts (e.g., annotated plans, proposed improvements) and individual explanations provided during discussion or reflection.

Student friendly assessment rubric

What you are assessed on	A - Excellent	B - High	C - Satisfactory	D - Partial	E - Limited
Find design issues	I identify several important issues including emergency evacuation (exits, blocked paths, crowding) and everyday use issues.	I identify several relevant design issues and include some emergency evacuation ideas.	I identify some design issues.	I identify a few obvious issues.	I do not identify relevant issues.
Explain the issues	I clearly explain issues in everyday use and emergencies, including how people move and what risks could happen.	I explain most issues and sometimes mention emergencies.	I give simple explanations of issues.	My explanations are unclear or incomplete.	I do not explain the issues.
Improve the design	I suggest realistic improvements that fix everyday problems and at least one emergency evacuation/fire safety issue, and I prioritise the most important risk.	I suggest effective improvements, including some emergency safety ideas.	I give simple explanations of issues.	My improvements are limited or unrealistic.	I suggest few or no improvements.
Explain my choices	I clearly explain my choices using my analysis, including how they improve safety and emergency evacuation (getting out quickly and safely).	I explain my choices and sometimes mention safety or emergencies.	I give basic reasons for my choices.	My explanations are unclear.	I cannot explain my choices.
Understand the process	I show how finding problems → analysing them → improving the design includes emergency safety thinking.	I show a clear understanding of the process.	I show a general understanding of the process.	I show limited understanding of the process.	I do not understand the process.

To get an A, I need to identify real design problems, explain how they affect everyday use and emergencies, include at least one fire safety / evacuation improvement, and explain how your changes help people get out safely and quickly if something goes wrong.