



Engineering and Manufacturing T Level support Design and Development Pathway

Essential Skills Guide



This guide has been produced by [Skills Builder Partnership](#) to support teachers with identifying and utilising opportunities within the T Level curriculum to develop and progress their students' essential skills. It can be used in a variety of ways including in curriculum planning, schemes of learning and/or lesson plans.

What are essential skills?

At Skills Builder, we define a skill as a repeatable action whereby the more you do it, the better you become. It's something that can be taught.

Essential skills are those highly transferable skills that everyone needs to do almost any job, which make specific knowledge and technical skills fully productive. They are therefore distinct from basic skills (literacy, numeracy and digital skills) and technical skills (specific to a particular sector or role, sometimes drawing off a particular body of knowledge).

Essential skills can unlock learning in the classroom, boosting academic outcomes, perseverance and self belief. They halve the likelihood of being out of work, and increase earnings across a lifetime. They even boost wellbeing and life satisfaction. You can read more on the research around essential skills on the [Skills Builder website](#).



The Universal Framework: The Skills Builder Universal Framework is a tool for measuring and building essential skills. It breaks the 8 essential skills down into a sequence of steps, starting from absolute beginner through to mastery. It is supported by research and was developed with leading businesses, academics and educators. It consolidates an array of different skills frameworks into something comprehensive and practical.



The Universal Framework was Developed by the Essential Skills Taskforce: for more information see [Towards a Universal Framework for Essential Skills](#)


Building your students' essential skills:

Students can complete an online self-assessment using the [Skills Builder Benchmark tool](#) to discover their initial skill score. Alternatively, you can use the [Universal Framework](#) as a useful tool to explore what progress in a particular skill might look like for your students.


- You may find that your students have different starting points and will develop their essential skills at different rates and through different experiences, such as industry placements and classroom activities. Students' progress through the skill steps may not be linear.
- You may wish to use some of the suggested activities in this guide to support your students in their learning journey and to build their essential skills as they progress through the T Level course.
- The activities suggested in this guide are not an exhaustive list and there will be other ways to develop these core skills.

In the T Level specification for **Design and Development for Engineering and Manufacturing**, there are four core skills identified, with the main essential skills supporting development of these core skills below:

Core Skill A:
Planning and preparation



Core Skill B:
Communication



Core Skill C:
Developing proposal
and concepts



Core Skill D:
Evaluation





Why developing planning and preparation skills is important for students to progress in their future career:

- Engineers need to be able to consider different solutions to complex problems.
- They need to analyse and evaluate complex problems and develop long-term strategies and clear targets.
- Engineers need to work effectively as part of a team, often across sectors, to come up with solutions to complex problems.
- They may need to consider multiple time frames in a supply chain across different teams, and factor in opportunities to monitor progress, adapting plans accordingly.

Core Skill A: Planning and preparation

To develop planning and preparation skills, building essential skills in problem solving, teamwork and aiming high are important.

Examples this may be evidenced through:

- interpreting and confirming project requirements;
- planning and scoping project parameters (e.g., timescales, resources, costs);
- developing project plans.



Build students' Problem Solving skills

Can students explore problems by thinking about the pros and cons of possible solutions?

STEP 5

Example activities to develop this:

- **Share** two possible solutions for an engineering or manufacturing problem.
- Students **evaluate** the different options by writing a pros and cons list for each.

Can students explore complex problems by analysing the causes and effects?

STEP 8

Example activities to develop this:

- **Describe** a scenario where a piece of equipment is not functioning properly.
- Students **list** as many potential causes behind the equipment breakdown.
- **Discuss** the importance of the potential causes and the effects they will have.



Build students' Teamwork skills

Can students work well with others by understanding and respecting diversity of others' cultures, beliefs and backgrounds?

STEP 5

Example activities to develop this:

- Provide a relevant scenario, students **suggest** ideas to make engineering workplaces more inclusive.

Can students contribute to group decision making?

STEP 6

Example activities to develop this:

- Students **research** a relevant manufacturing process.
- Students **share**, in groups, what they have learnt.
- Groups must reach a **unanimous consensus** on which process to use in different scenarios.



Build students' Aiming High skills

Can students create plans that include clear targets to make progress tangible?

STEP 11

Example activities to develop this:

- Students **create** SMART targets for a project brief.
- Students **peer assess** targets for the project brief against the SMART criteria.

Can students create plans that are informed by external views, including constructive criticism?

STEP 12

Example activities to develop this:

- Employers **review** progress made by students in their industry placement and give constructive feedback on how students can make even more progress.
- Students **review** the feedback provided and create a plan to make even more progress on their industry placement.



Why developing communication is important for students to progress in their future career:

- Engineers need to [communicate engagingly](#) about a variety of engineering problems.
- They need to [adapt their method of communication](#) and visual resources to suit the needs of the stakeholder.
- Building on [problem solving](#) and [teamwork](#), engineers need to create visual aids, such as technical drawings, sketches, and presentation slides to [communicate their ideas and solutions](#).
- They also need to consider [how to communicate their ideas effectively](#) when working as part of a team.

Core Skill B: Communication

To develop communication skills, building essential skills in speaking, listening and aiming high are important.

Examples this may be evidenced through:

- interpreting, using and producing engineering representations and drawings following graphical language and industry conventions;
- interpreting and using technical information and media;
- communicating with technical and non-technical audiences using technology.



Build students' Speaking skills

Can students speak effectively by making points in a logical order?

STEP 3

Example activities to develop this:

- Students **create** a presentation for a non technical audience on a manufacturing process.
- Students **focus** on the sequence in which they present information and how this might impact their audience's understanding.

Can students speak engagingly by using facts, visual aids and examples to support their points?

STEP 7

Example activities to develop this:

- Students **create** two presentations on the same topic, one for a technical audience and one for a non-technical audience.
- Students **focus** on how their use of facts, visual aids and examples might differ between the two presentations.

STEP 8



Build students' Listening skills

Can students listen to others and record important information as they do?

STEP 5

Example activities to develop this:

- Students **listen** to a video or audio recording and record key pieces of information.
- Students **compare** what information they recorded and how they recorded it, e.g., bullet points, mind maps etc.

Can students show they are listening by using open questions to deepen their understanding?

STEP 7

Example activities to develop this:

- Students **listen** to a video or audio clip.
- Students **create** a list of questions based on the clip that would improve their understanding.
- Students **identify** any closed questions and try to rewrite them as open questions.



Build students' Aiming High skills

Can students set goals informed by an understanding of what is needed?

STEP 6

Example activities to develop this:

- Ask students to **consider** what the objectives may be for different roles within a project planning team e.g., workforce, budget, stock and asset management and waste disposal.
- Students **consider** how the different objectives may impact each other in project planning.

Can students create plans that include clear targets to make progress tangible?

STEP 11

Example activities to develop this:

- Students **review** a project plan and evaluate the targets or objectives using the concept of SMART targets.
- Students **rewrite** targets to meet the SMART target criteria.



Why developing proposals and concepts is important for students to develop to progress in their future career:

- Understanding what success looks like for a project is vital.
- Engineers need to be able to interpret what a client is asking for and share the proposed solutions clearly.
- Engineers need to be able to innovate and adapt existing ideas to solve new problems.

Core Skill C: Developing proposals and concepts

To develop proposal and concept skills, building essential skills in creativity and problem solving are important.

Examples this may be evidenced through:

- designing proposals to meet set requirements;
- developing, modelling and revising concepts.



Build students' Creativity skills

Can students generate ideas when they have been given a clear brief?

STEP 3

Example activities to develop this:

- Students **create** a list for what success looks like for an employer brief and produce 3 different designs based on their success criteria.
- Students **peer assess** other designs based on their success criteria.

Can students generate ideas by combining different concepts?

STEP 5

Example activities to develop this:

- Students **create** a design idea based on a design brief. In groups students share their ideas and combine them to come up with a new design.

Can students develop ideas by considering different perspectives?

STEP 10

Example activities to develop this:

- **Share** an engineering design or idea with students, they must **consider** what the priorities would be for different stakeholders and discuss how these priorities might affect the end product.



Build students' Problem Solving skills

Can students explore problems by creating different possible solutions?

STEP 4

Example activities to develop this:

- **Present** students with an engineering problem.
- Students **produce** three different solutions to the problem.
- As a class **discuss** the different options and select a potential solution.

Can students explore complex problems by building their understanding through research?

STEP 7

Example activities to develop this:

- Set students a **complex** engineering problem.
- Students **identify** a set of smaller questions that will help them address the larger problem.
- Students **research** one of the smaller questions and discuss how this supports solving the overall problem.

Can students explore complex problems by analysing the causes and effects?

STEP 8

Example activities to develop this:

- **Describe** two different solutions to an engineering problem.
- Students **identify** the different possible effects each solution may cause and justify which solution is the most appropriate.



Why developing evaluation skills is important for students to progress in their future career:

- Some engineering projects operate over a long period of time. Using effective evaluation techniques and strategies makes sure projects stay on track and delivers the intended outcomes. .
- After a project has finished, evaluating how well it was executed and learning from any challenges will help with future projects.

Core Skill D: Evaluation

To develop evaluation skills, building essential skills in problem solving and creativity are important.

Examples this may be evidenced through:

- carrying out tests, evaluation and analysis;
- evaluating how well project requirements have been met.



Build students' Problem Solving skills

Can students complete tasks by following instructions?

STEP 0

Example activities to develop this:

- Students **write** a set of instructions to maintain high levels of health and safety in the workplace.
- Students **compare** their instructions with peers and give feedback.

Can students explore problems by creating different possible solutions?

STEP 4

Example activities to develop this:

- Students **produce** multiple ways to test a product suitability at different stages of manufacturing.
- Students **reflect** on why it is important to consider different solutions to a problem before acting on one.

Can students explore complex problems by building their understanding through research?

STEP 7

Example activities to develop this:

- Students **evaluate** the suitability of a manufacturing process they are not familiar with by finding at least 3 different sources of information.
- Students **compare** the sources and discuss the reliability of the different sources identified.



Build students' Creativity skills

Can students generate ideas when they have been given a clear brief?

STEP 3

Example activities to develop this:

- Students **review** a set of designs and draw the common features.
- Students **write** the design brief they believe these designs are for.
- Students **compare** their design briefs to the original.

Can students generate ideas to improve something?

STEP 4

Example activities to develop this:

- Students **read** the reviews of an engineering product.
- Students **suggest** ways the product could be improved based on the reviews.

Can students generate ideas by combining different concepts?

STEP 5

Example activities to develop this:

- Students **evaluate** three versions of the same engineering product.
- Students **produce** a new design, taking at least one aspect of each version.
- Students **peer assess** the new designs.

For more information on building your student essential skills please visit the Skills Builder website at <https://www.skillsbuilder.org/>

For more resources and support for this T Level please visit <https://www.technicaleducationnetworks.org.uk/engineering-manufacturing/>

