There are a number of ways STEM can be integrated. These approaches are dynamic, not sequential and movement between the approaches may occur. Just as the shifting roles between teacher and students in consuming and producing knowledge occurs depending on your learning intentions.

**INTER-DISCIPLINARY**

Concepts and skills are learned from integrating knowledge and processes across disciplines using a synthesis of strategies.

People from different disciplines work collaboratively in teams to integrate the concepts and skills of several disciplines in order to solve a real world problem or issue.

**MULTI-DISCIPLINARY**

Concepts and skills are learned separately in each discipline around a common theme.

People from different disciplines work in teams to solve a complex real world problem, each drawing on their disciplinary knowledge and skills; with the goal of getting together to combine their ideas to solve the problem.

**INTRA-DISCIPLINARY**

Concepts and skills are learned separately in each discipline.

People work within their own disciplines to solve a real world problem or an aspect of a problem, drawing on the knowledge and skills from their discipline.

**TRANS-DISCIPLINARY**

Concepts and skills are learned from integrating knowledge and processes across disciplines that can be transferred beyond the disciplinary perspectives to another context.

People from different disciplines work collaboratively in teams to integrate the concepts and skills of several disciplines and non-discipline processes and thinking in order to solve a real world problem or issue, which can then be transferred to answering new questions in new contexts.
INTRA-DISCIPLINARY

WHY? When a concept, knowledge, skill, way of thinking in science, mathematics, technologies, engineering process or entrepreneurship skills require explicit teaching and learning to ensure the learners construct a deeper understanding within a discipline / learning area.

WHEN? You might use an intra-discipline approach when you have some explicit teaching and learning within a discipline / learning area. You might have an intentional discipline problem or question for learners to investigate and solve.

For example:
Mathematics: Learners convert units of time to solve problems that use time duration.
Science: Learners observe the change in time of day and night across different seasons.
Digital Technologies: Learners program and modify projects using ‘Scratch’.
Design Technologies: Learners design, create and evaluate moving systems.

MULTI-DISCIPLINARY

WHY? Learners make connections between two or more of the STEM learning areas. This enables links to be formed between the concepts and the processes of each discipline.

WHEN? You might use a multidisciplinary approach when you exchange knowledge, skills and understanding around a common theme, question, and real world problem. This approach enables a problem to be looked at from different perspectives without crossing discipline/learning area boundaries to create new knowledge and theory.

For example (Task): Create a physical or digital system to record and display time.
Mathematics: How will we record the data and measure time?
Science: What knowledge do we already have that we can use?
Digital Technologies: How can we test predictions using a digital system? What variables can we manipulate?

INTER-DISCIPLINARY

WHY? An interdisciplinary approach fosters engaging learner - directed inquiry. Through the integration of science, technologies, mathematics knowledge, using the engineering process learners develop collaboration and problem solving skills. This involves working in teams through challenging hands-on projects that mirror or directly relate to the real world.

WHEN? You might use an interdisciplinary approach when several disciplines integrate their content and processes across discipline/learning area boundaries to create new knowledge and theory and solve a common research goal. The different ways of thinking from each discipline can create new ideas for solving a complex problem.

For example (Task): Establish the unit of measurement and method for accurately collecting, storing and analysing data
• Design a physical system that can monitor time. Design a physical system that can stop and start the recording of time.
• Design and program a digital system to display time, present a range of data and convert units of measurement.
• Identify a range of variables and integrate them into physical & digital systems.

TRANS-DISCIPLINARY

WHY? A trans-disciplinary approach is based upon ‘real world’, meaningful open ended design tasks that challenge learners to use a combination of logical thinking, creative inquiry and practical hands-on problem solving tasks to develop their design solutions. Through these open-ended design tasks powerful learning can occur which influences learners’ understanding of themselves as ‘designers and creators’ of products, ideas and solutions. Trans-disciplinary approaches develop quality, life -long learning outcomes across STEM and non-STEM disciplines. For example: entrepreneurial skills, empathy, ethics, intercultural understanding, arts and humanities, etc.

WHEN? You might use a trans-disciplinary approach when several disciplines integrate their content and processes across discipline/learning area boundaries to create new knowledge and theory and solve a common research goal. The different types of thinking from each discipline can create new ideas for solving a complex problem and be integrated into unrelated disciplines and applied to new contexts. Sometimes we refer to this approach as STEM+x, where ‘x’ can be consideration of the humanitarian impact, historical perspective, communication through art performance, etc.

For example (Task): Using the Karra Wirra-Parr/ Torrens River footbridge as an example, gather and explore a range of data to understand the design and construction of the bridge, and the impact the development throughout precinct has made to the direct environment, Adelaide CBD and South Australia?