

## 1.1 Activities

### 1.1.1 Introduction

**Learning activities** are included for each section (lesson). The answers to these activities can be written directly in the book, on a separate notebook or perhaps even better, as a document or in an electronic notebook. An overview of each activity is outline below.

**Activity sheets** are available that match the learning activities, together with some real-world examples. These really help with the learning process and guide you through the activities. Access them and the interactive tools here:

### 1.1.2 Learning activities

**Information search** Looking in other textbooks or in a library is an effective way to see the subject explained differently. Perhaps even better is to use the online search options on the interactive site



**Information search** Use a library or the web search tools to further examine the subject in this section

**Media search** Searching online for images, animations and videos is an excellent way to see other ways how something works.



**Media search** Use the media search tools to look for pictures and videos relating to the subject in this section

**Bullets** Three great tools for keeping notes electronically are Evernote, Microsoft OneNote, and Google docs. My favourite currently is OneNote, but I find all these tools easy to work with and they can be used online or offline, they also sync to or from a smartphone. Using any word processor is fine – as is using a pen!



**Bullets** Look back over the previous section and write out a list of the key bullet points from this section

**Sketch** Making a simple sketch to help you remember how a component or system works is a good way to learn. You can use a pencil or the online features or any drawing program – even word processors have quite good drawing tools built in.



**Sketch** Make a simple sketch to show how one of the main components or systems in this section operates

**Word cloud** A word cloud shows the most common words in a block of text in a larger font. It is a wonderful way to focus in on the important aspects of a learning screen or paragraph of text. There are a few different options available on the interactive site.



**Word cloud** Create a word cloud for one or more of the most important screens or blocks of text in this section

**Word puzzles** Crossword and wordsearch puzzles are a great way to learn new important words and the associated technologies. A good method is to work in pairs so you each create a puzzle and then swap and try to complete the answers. Hint: Use the eLearning glossary where you can copy the words and definitions (clues!). About 20 words is a good puzzle. Or, construct a wordsearch grid using some key words from this section. About 10 words in a 12x12 grid is ideal. Use the online interactive tools for this activity.



**Word puzzles** Construct a crossword or wordsearch puzzle using important words from this section

**Mind map** A mind map can be created with pen and paper or on the whiteboard. There are also some great online tools to do this.



**Mind map** Create a mind map to illustrate the features of a key component or system

**Information wall** An information wall can be created with pen and paper or on the whiteboard. There are also some great online tools to do this. Alternatively, a flip chart or post-it notes on the wall work well.



**Information wall** Create an information wall to illustrate the features of a key component or system

**Presentation** Preparing and making a presentation to your classmates or workmates is a terrific way to learn about something new because you must study it in detail first. It can be a bit nerve racking at first but is also good fun so don't worry. There are some great online tools for this, or you can use PowerPoint (or similar) to prepare some slides you then explain in more detail.



**Presentation** Using images and text, create a short presentation to show how a component or system

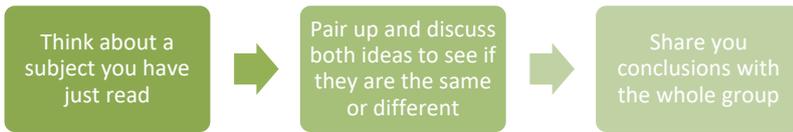
### 1.1.3 Visible thinking

**Introduction** Visible thinking is a method of teaching that encourages learning through observation. It is a way to encourage students to use thinking skills they have already developed outside the classroom. The routines help to promote a deeper understanding of how we think, and allows for better learning. Several different routines are highlighted below, and these are suggested in various places throughout the book. Teachers can help guide students but it is equally possible for a learner use the routines directly. The routines outlined below are described as if used by a teacher.



**Visible thinking** Select a routine from section 1.3 and follow the process to study a component or system

**Think-pair-share** The think-pair-share routine involves posing a question to learners, asking them to take a few minutes of thinking time. After this they share their thoughts with a partner. It can be used when solving a problem, before a repair routine is started, or after reading a section in this book. After discussing as a pair they then share with the whole class.



**Compass points** This routine works well to explore various sides and viewpoints of a proposition or idea prior to taking a stand or expressing an opinion on it. For example, a new idea about a subject can be proposed, a new type of EV battery for instance. The learners can then put their thoughts into four compass-point categories. You can use a whiteboard, flipchart, post-it notes or an electronic equivalent. Whatever works and whatever you have to hand is fine.



**What makes you say that?** This thinking routine that asks learners to describe something, such as a component or how a system works, and then support their interpretation with evidence. It can be adapted for use with almost any subject and is useful for gathering information on students’ general concepts when introducing a new topic.



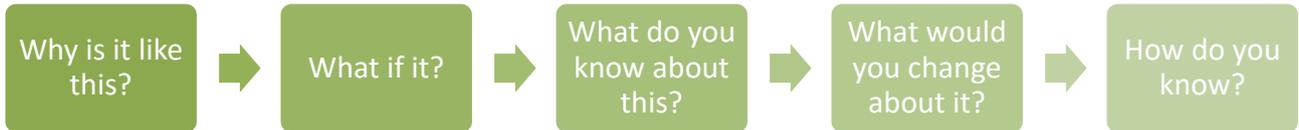
**I used to think but now I think** This routine captures a change of opinion or perspective from what a student used to think to what they now think. It enables students to reflect on their learning, be willing to consider different ideas and to be able to acknowledge when their opinion has changed. It gives students the opportunity to reflect on why their thinking may have changed.



**I noticed this, but why?** This is good for thinking further about a something you have been examining in the workshop. For example, you may noticed the wires connecting a starter motor are much thicker than those connected to the lights. Ask yourself why? It is also a good way to understand how a component works.



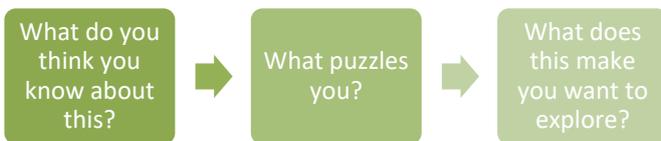
**Question starts** This is a graphic information organiser with spaces for questions which begin: why, what, how or similar. It is a visual guide to help students dig deeper into a question or topic and reach a better understanding.



**3-2-1 bridge** This routine is used to record initial thoughts, ideas, questions and understandings about a given topic. After reading an article or watching a video, students are then asked to rethink their initial opinions after learning more about the topic. The idea is for bridges to be built between ideas when new information is obtained.



**Think-puzzle-explore** This routine works well at the start of a new topic taking what they already know, while opening up new areas of interest. What does a student think about the topic? What puzzles them, or what unresolved questions are in their minds? What and how can they explore more about the topic?



**Connect-extend-challenge** The connect-extend-challenge routine helps students make connections between new and previous knowledge. It then acts as a guide as to how to develop their interest further. Recording students' ideas and using them at a later time can also be useful for reflecting on their understanding.

