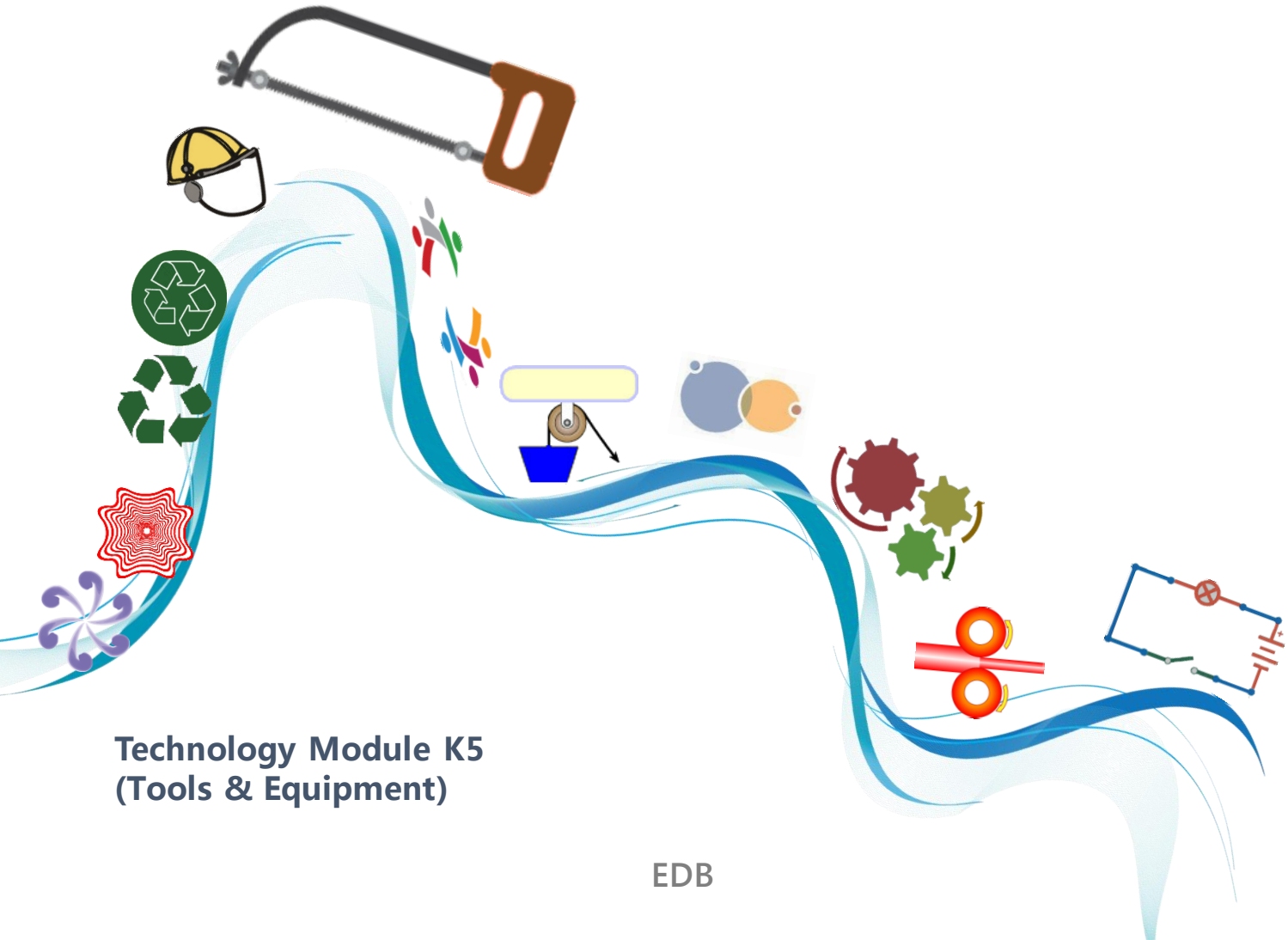
Enriched Technology Education KLA Curriculum

S1 Teaching Material

3b

Workshop Safety & Hand Tools 2



Technology Module K5
(Tools & Equipment)

EDB

Preface

To support the implementation of the Enriched Technology Education Key Learning Area Curriculum (Enriched Curriculum) at junior secondary level, the Technology Education Section of Curriculum Development Institute, Education Bureau, has developed a set of learning and teaching resource materials covering technological subjects learning element modules for teachers' reference and use.

The purpose of providing this set of teaching resource materials is to enable teachers to adopt the related technological subjects learning element modules under the Enriched Curriculum for students to acquire thorough understanding and mastery of the three key aspects in Technology Education Key Learning Area, viz. the technological understanding, technological capability and technological awareness, using a flexible approach with reference to the suggested learning progress.

The content of this learning and teaching resources was compiled with project approach. It gives students a purposeful and meaningful learning context through a series of diversified activities such as design projects, case studies, technological exploration and simulation experiments, and thus arouses their interest in technology and devotion in learning, as well as nurtures their ability in problem-solving, realisation, innovation and spirit of entrepreneurship.

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Relevant Knowledge

1. Commonly used hand tools

(a) Smoothing the surfaces of the materials

(i) Plane

Plane is mainly used to plane timber to the desired size and make the wood surface smooth. It can also be used to plane soft plastics.

(ii) Sand paper / emery cloth

After the preliminary treatment of metal and timber with file and plane, sandpaper / emery cloth can be used to make the surface smooth and fine.

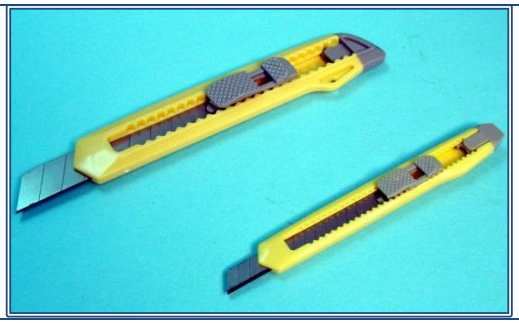
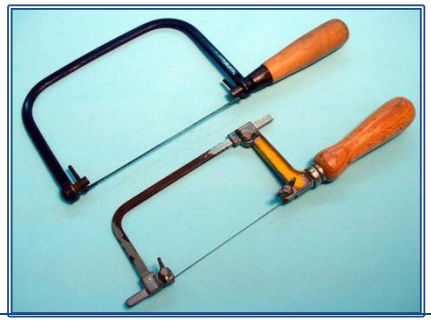
(iii) Hand file

Hand file is mainly used to cut and file metal or plastic parts into various forms. The shapes of commonly used hand files are flat, half-moon, round, triangular, etc. The name of the hand file is determined by its cross-section, and is distinguished by the length and thickness of the file teeth.

(iv) Rasp

Files can be grouped into metalwork and woodwork files. The shape, size and usage for both are similar except that the file teeth for woodwork rasp are coarser.

(b) Cutting tools

	
(i) Scissors Scissors are used to cut those thin and soft materials such as paper, cards and others.	**(ii) Cutter (for linear cutting)** This kind of cutter is used for cutting paper, cardboard and thin timber sheets, etc. Cutting mat must be added under the material when the cutter is being used to avoid damaging the table or the blade.
(iii) Cutter (for chamfer cutting) The purpose of this kind of cutter is to cut cardboards into bevel edges of 45° or 60°. It can also be used to cut out V-shaped grooves on plastic sheets.	**(iv) Hacksaw** Hacksaw is suitable for straight sawing. It can be used to cut metal and plastic materials. The saw teeth should be pointing forward when in use.
	
(v) Tenon saw Tenon saw is mainly used for cutting smaller timber. The back of tenon saw is strengthened with steel or copper to increase the strength of the saw blade. The saw teeth should be kept upright when cutting timber, it is especially suitable for straight line sawing.	**(vi) Coping saw** The saw teeth of coping saw are small and fine, which is suitable for curve sawing on plastic sheet, thin timber and soft metal (e.g., aluminum), etc. The saw teeth should be pointing to the handle in order to reduce the chance of breakage.

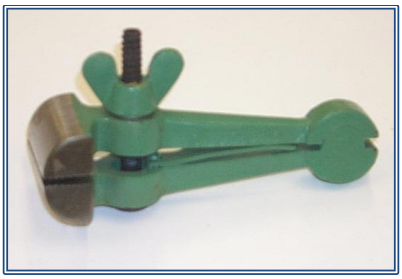
(c) Holding tools

(i) Bench vice

Bench vice is used to fix the workpiece for sawing, filing, chiseling, hammering and other processes. We can use a vice clamp to protect the workpiece to avoid scratches.

(ii) Woodwork vice and bench hook

Woodwork vice is used to fix wooden workpieces for sawing and chiseling. The wooden workpieces can also be placed on the bench hook. Use the left hand to press firmly and have the saw teeth stick to the side of the shim plate, and then start sawing.



(iii) Hand vice

Hand vice is used for holding small or thin workpieces to facilitate drilling or riveting.

(iv) Locking plier / Vice grip

The function of locking pliers is similar to the hand vice, making use of the toggle mechanical principles to clamp thin workpieces.

2. The selection, use and maintenance of tools or appliances

(a) Tools

(i) Students are not allowed to use the tools or equipment without teacher's permission.

(ii) Use appropriate tools or machines to work with different processes.

(iii) Tools or equipment must be used according to the correct methods, and must not be used improperly.

(iv) Tools or equipment must be selected according to their designed usage, and must not be selected improperly.

(v) Tools or equipment must be placed in suitable container when not in use to avoid the knocking with each other.

(vi) Cutting tools must not knock on hard objects when in use or being stored.

(vii) When carrying tools with sharp edges, do not put them in the pockets of clothes or trousers. Handle of the tools should be held with sharp edge pointing downward.

(b) Power Machinery

(i) There should be no rupture on the case of the electrical equipment, and there should not be any damages in the wires.

(ii) Report to the teacher immediately if there are damages in the tools or equipment.

(iii) Each machine can only be operated by a student at a time, do not let two or more students operate simultaneously.

(iv) Must stop the machine operation and cut off power supply before adjusting or cleaning the machine.

(c) Keep clean and tidy

(i) After finished work, students have to help tidy up the tools and clean up the workshop.

3. Selection, use and storage of chemicals

(i) Paints, thinner and other chemicals must be used under teacher's guidance.

(ii) Chemicals cannot be mixed improperly, otherwise it may cause explosion.

(iii) The environment must be adequately ventilated when in use.

(iv) Must store in designated containers after being used.

(v) Dispose according to specifications.

4. Glossary of terms

木鉋	plane	機械虎鉗	machine vice
砂紙	sandpaper / emery cloth	枱式虎鉗	bench vice
銼刀	hand file	木工虎鉗	woodwork vice
木銼	rasp	虎鉗護罩	vice clamp
針銼	needle file	枱墊	bench hook
剪刀	scissors	手虎鉗	hand vice
刀/鈎刀	cutter	大力鉗	vice grip/locking plier
弓鋼鋸	hacksaw	油漆	paint
夾背鋸	tenon saw	稀釋劑	thinner
線鋸	coping saw	化學物	chemical

Lesson Activities

1. Classification of files

Based on examples in the right diagram, draw the cross-sections of appropriate files in the spaces below:

1. Round files: _____

2. Half-moon files:_____

3. Flat files:_____

4. Needle files_____

5. Square files:_____

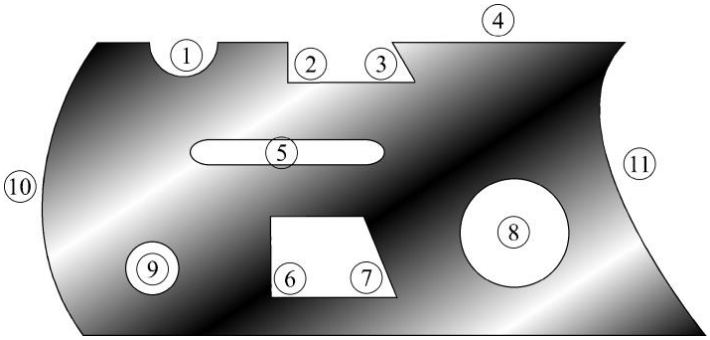
6. Thin flat files:_____

7. Triangular files:_____

Different types of files

2. The usage of files:

Based on the shapes of the numbered positions in the following diagram, fill in the following blanks with names of the appropriate files to cut and file the shapes in the respective positions.



Different shapes of cutting and filing of the workpieces

1. _____ 7. _____

2. _____ 8. _____

3. _____ 9. _____

4. _____ 10. _____

5. _____ 11. _____

6. _____

3. Workshop Safety

1. Write down three kinds of correct attitudes while working in the workshop

   a. _____

   b. _____

   c. _____

2. Why students have to help tidy up the tools and clean up the workshop before finishing class?.

   _____

   _____

   _____

3. Why wastes such as paints cannot be poured into the ditch directly?

   _____

   _____

   _____

4. Why worn out electrical wires cannot be wrapped with adhesive tape and continued to be used?

   _____

   _____

   _____

4. Topics for discussion

Yat Ming is a student with cleverness and willing to help other people. Point out what is wrong in the following scenarios, and what are the correct ways of doing.

1. He saw Yi Fu trying to open a can of paint, immediately he took his file being in use to pry open for him.

   Improper aspects:

   _____

   Correct methods:

   _____

2. Sham Hung, a student in the class grown relatively short and small, had to use the drilling machine for drilling. Yat Ming immediately proceeded to hold the workpiece for him, and informed Sham Hung to drill.

   Improper aspects:

   _____

   Correct methods:

   _____

3. Recently the weather is getting cold and Si Mei felt cold while practicing in the workshop, Yat Ming borrowed a scarf for her to lap around her neck.

   Improper aspects:

   _____

   Correct methods:

   _____

4. Yat Ming helped tidy up the tools when the class was almost ended. He saw Si Tak had almost finished drilling the holes; he then proceeded to clean the machine tool for him.

   Improper aspects:

   _____

   Correct methods:

   _____