



**Video Education
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Program Support Notes

Senior Secondary - Tafe

25mins

Essentials of Design & Technology Skills

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Suitable for:

Design & Technology

Health

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Essentials of Design & Technology Skills

For Teachers:

Brief Outline of Program

This program focuses on the skills required for the use of three common pieces of equipment in the design and technology workshop: soldering irons, a metal lathe, and pillar and hand drills.

Filmed in the Sheffield area in Britain, the program draws on the experience of students and teachers when covering the various skills, and delivers a comprehensive rundown of the basic steps in the three different sections.

Considerable emphasis is given to health and safety, including safe workshop and equipment practices and the wearing of protective clothing.

The program serves as an excellent introduction to the three areas covered, and is also suitable for reinforcing material previously covered during classes.

Other Points for Consideration

A variety of equipment is found in schools. The filming of this program was done in one school using one set of equipment. However, the information included in the program is that of a generic nature, and while types of soldering irons, lathes and drills will differ from school to school, the basic skills covered here are applicable to all or most pieces of equipment typically found.

Timeline for the Program

00.00	Copyright warning, VEA splashscreen, introduction
02.42	Soldering
03.09	Katie (student) on soldering the jitterbug
04.26	Equipment needed for soldering/desoldering
05.05	Safety first
05.20	Timothy Priest (teacher) on important safety points
05.38	Tinning the soldering iron - more safety points
06.44	Preparing surfaces for soldering
07.17	Placing components in circuit board
08.00	Timothy Priest on dry solder joints
08.18	Using heat sinks
08.57	Desoldering
09.56	Checking solder joints
10.08	Summary - soldering
10.58	The centre lathe - Katie on project involving lathe (CD rack)
12.20	Safety first
13.35	Three levels of switching on a lathe
13.52	The parts of a lathe
14.08	Clamping work into chuck, setting up work for lathe use
15.05	Facing off - Ben Barker (teacher)
15.50	Lathe speeds
16.12	Reducing the diameter of a bar along its length
17.08	Drilling using the lathe
18.20	Summary - the centre lathe
19.13	Using hand and pillar drills
19.26	Katie on using drills for projects
20.01	Safety first
20.49	Ben Barker on placing work on pillar drill (safety)
21.38	Types of drill bits
22.29	Setting work up on a pillar drill
22.59	Ben Barker on using the pillar drill
23.55	Summary - using hand and pillar drills

For Students:

Suggested Activities Before Viewing the Program

1. Design a list of instructions outlining how an electronic component should be soldered in to a circuit. Write the instructions as if they are for someone who has never soldered before.
2. Repeat the above, but this time for de-soldering.
3. Design a list of instructions outlining how the school lathe should be properly used. Write the instructions as if they are for someone who has never used a lathe before.
4. Design a list of instructions outlining how a pillar drill should be properly used. Write the instructions as if they are for someone who has never used a lathe before.

As you watch the program, have your lists handy. Tick off the points you made that are also made in the program, and add any further points you see on the program to your lists.

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Suggested Activities While Viewing the Program

Soldering

1. What percentage of faults in electronic projects are estimated to be due to poor soldering?

2. List the equipment needed for soldering.

3. List the equipment needed for desoldering.

4. What safety considerations need to be made when soldering? Which one is the most important according to Timothy Priest?

5. What is a tinned soldering iron mean? Why is it important to tin a soldering iron before use?

6. What is the temperature of a typical soldering iron tip?

7. What happens if a surface to be soldered isn't clean?

8. Why should you be careful to ensure that components don't move when soldering?

9. How can you identify a dry solder joint?

10. Why does a dry solder joint have to be replaced?

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11. What is the purpose of heat sinks when soldering?

12. Why does solder need to be placed on iron when desoldering?

13. How does a solder sucker work?

14. How can you check if solder joints are sound?

The Centre Lathe

15. How are lathes different from other machines in the workshop?

16. Outline the safety measures that should be taken before using a lathe.

17. Why are yellow lines painted on the floor around lathes in a workshop?

18. Identify the three levels of switching on the lathe.

19. List the parts of a lathe.

20. Why shouldn't excessive force be used when tightening the chuck?

21. Why is removal of the chuck key crucial when using a lathe?

22. What are some of the uses of centre lathes?

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23. What is facing off?

24. What lathe speed should be set when starting?

25. When reducing the diameter of a bar along its length, how should long pieces of metal be secured?

26. How should roughing and smoothing tools be used?

27. How do you measure the diameter of a bar to check it's correct?

28. How much should the work protrude when drilling with the lathe?

29. What does a centre drill do?

30. What does a twist drill do?

31. How is the depth of a drilled hole checked?

Hand and Pillar Drills

32. When are hand drills typically used in preference to pillar drills?

33. When using a pillar drill, why does the workpiece have to be placed to the left hand side of an operator?

34. What protective clothing should be worn when using the pillar drill?

35. What is the most common type of drill bit used?

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36. What are the three ways of turning the pillar drill on and off?

Suggested Activities After Viewing the Program

In each of the areas covered by this program, there is an emphasis on health and safety considerations. These are paramount when using any workshop equipment.

- For each of the equipment and techniques in this program, design either a suitable safety poster, or a list of step-by-step instructions which focus on safety.
- If you choose to prepare a list of instructions, present them in such a way that they could either be placed on the wall in the workshop for all students to follow, or could be used as a handout to be given to students.

Other Relevant Programs available from VEA

Safety in Technology Workshops: Working with Wood, Metal and Plastic
Forklift Safety
Safety at Work: OHS & W Generic Fundamentals CD-ROM
Safety on Work Experience: A Practical Guide
Lifecycle Assessment
Student Design Project: Two Case Studies

Please visit our website for many more relevant programs www.vea.com.au

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