DESIGNING AND CONSTRUCTING THE "FOX AND GEESE" GAME

STUDENT BOOK	Chapter 12, page 405
TOOLBOX	Pages 81–94

GOAL

Practise techniques such as measuring, laying out, machining, assembling and finishing by designing and constructing a game.

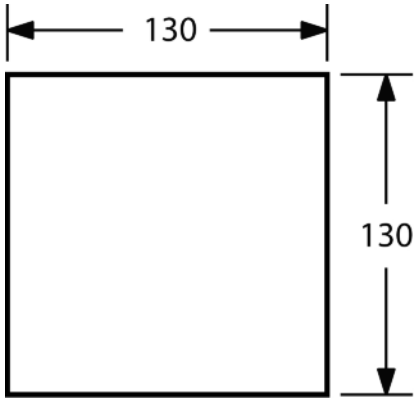
MATERIALS

- wooden plank at least 15 mm thick
- 295-mm wooden dowel (6 mm Ø)
- band saw
- drill press
- red paint
- black paint
- 2 small paintbrushes
- pencil
- combination square
- hammer
- centre punch
- backsaw
- mitre box
- C-clamp
- drill press vise
- 6-mm drill bit
- 120-grit sandpaper
- 120-grit sandpaper mounted on a sanding block
- belt/disc sander
- vise
- ruler
- flat rasp
- permanent felt-tip marker

PROCEDURE

Construct a game following the manufacturing process sheet below.

Manufacturing process sheet
Part: Game board
Materials: Wooden plank at least 15 mm thick

Number	Operation	Illustration	Materials
10	**Measuring and laying out**		
11	Draw a 130 mm × 130 mm square on the wooden plank.		• pencil • combination square

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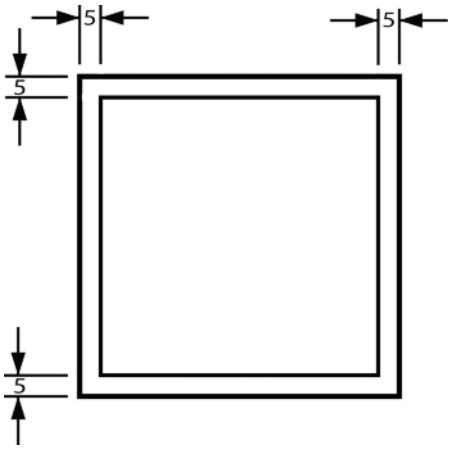
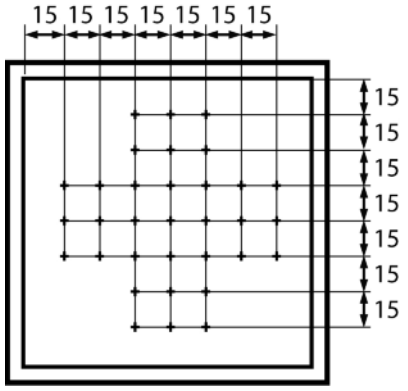
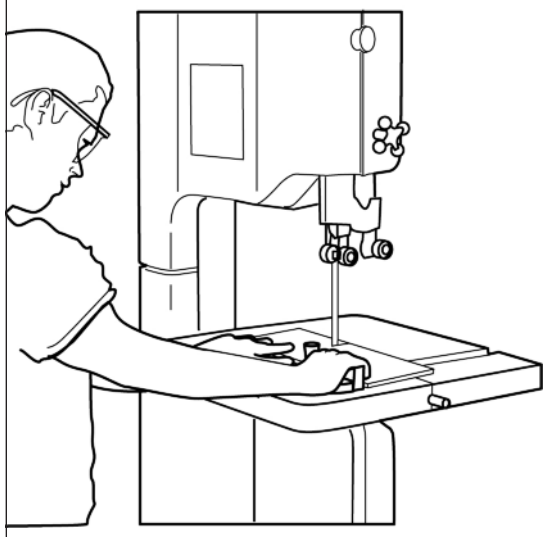
12	Lay out the bevelled edge running parallel to the outline of the part and 5 mm inside its edges.		• pencil • combination square
13	Lay out the 33 holes you will drill in the game board.		• pencil • combination square
20	**Machining**	**Illustration**	**Materials**
21	With the band saw, cut out the game board outline following your layout.		• band saw

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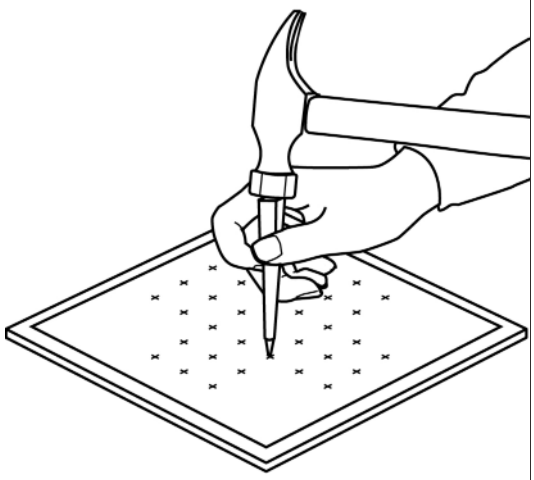
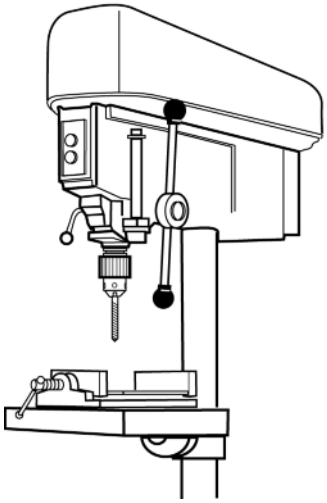
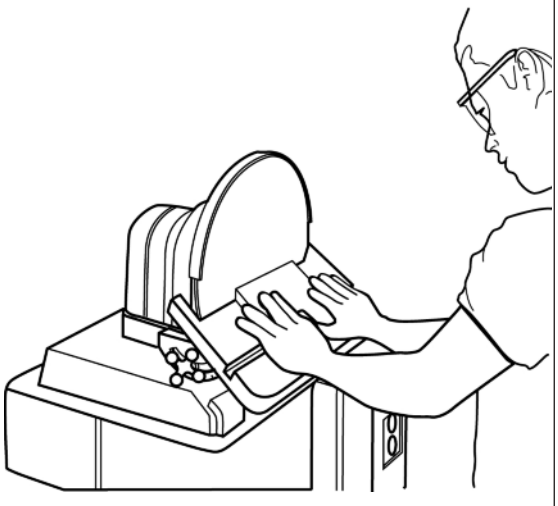
22	Make a small indentation at each of the 33 marks designating holes for drilling.		• hammer • centre punch
23	Drill all 33 holes, each 6 mm in diameter and 10 mm deep.		• drill press • 6-mm drill bit • drill press vise
24	Create 45° bevelled edges on all four sides and sand them with the disc on a belt/disc sander set at 45°.		• belt/disc sander

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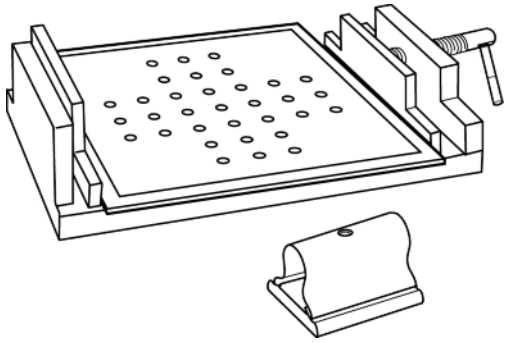
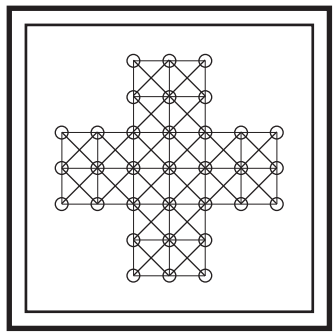
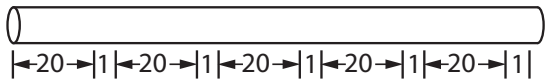
30	Finishing	Illustration	Materials
31	Smooth the surfaces of the game board by sanding them with a piece of 120-grit sandpaper mounted on a sanding block.		• sanding block • 120-grit sandpaper • vise
32	With a permanent felt-tip marker and a ruler, link each hole in the game board to all of its adjacent holes as shown.		• permanent felt-tip marker • ruler

Manufacturing process sheet
Parts: Playing pieces
Materials: Wooden dowel 295 mm in length (6 mm Ø)
Red paint
Black paint

Number	Operation

10	Measuring and laying out	Illustration	Materials
11	Measure out 14 playing pieces each 20 mm long on the wooden dowel, leaving a 1-mm space between each piece.		• pencil • ruler

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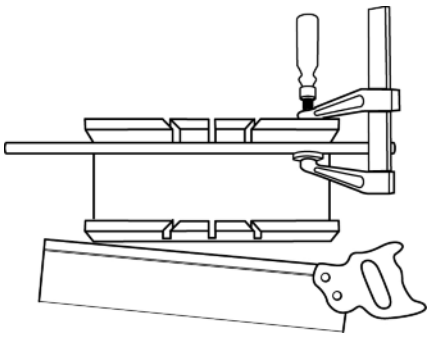
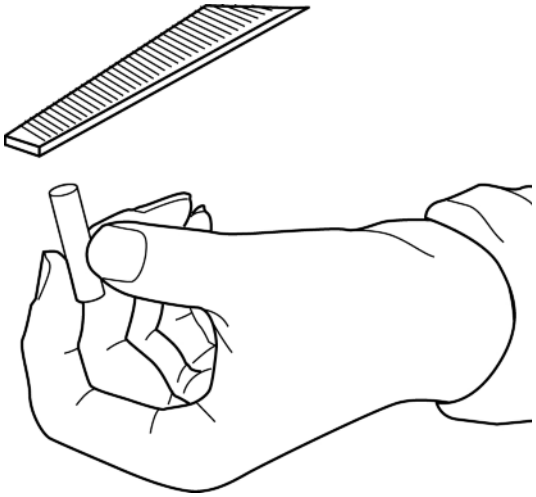
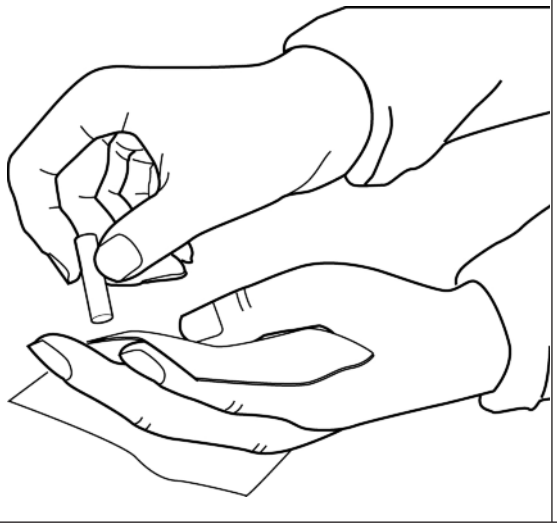
20	Machining	Illustration	Materials
21	Secure the length of dowel firmly in the mitre box and cut out each piece carefully with a backsaw. Make your cuts in the 1-mm spaces at right angles to the dowel.		• mitre box • backsaw • C-clamp
22	Make sure you can insert and remove each playing piece easily from the game board holes. Where necessary, file the pieces to make them fit.		• flat rasp
30	**Finishing**	**Illustration**	**Materials**
31	Smooth each piece by sanding it with sandpaper.		• sandpaper

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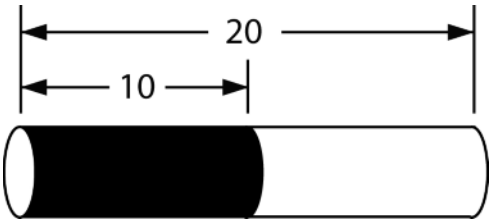
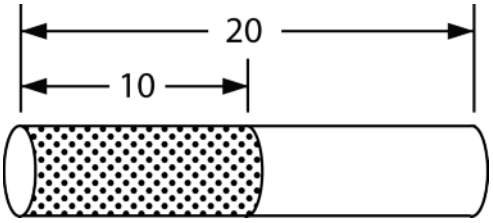
32	Paint half of one playing piece black.		• paintbrush
33	Paint half of the 13 other pieces red.		• paintbrush

Name: _____ Group: _____ Date: _____

REFLECTING ON THE LAB TECHNIQUE

1. Name three machining techniques you used in constructing this game.

2. What machine tools did you use when constructing this game?

3. How would you describe the links between the playing pieces and the game board? Check the appropriate boxes.

Direct	☐	Indirect	☐
Rigid	☐	Flexible	☐
Removable	☐	Non-removable	☐
Complete	☐	Partial	☐

4. Do you have suggestions for improving the manufacture of this object? If so, what are they?