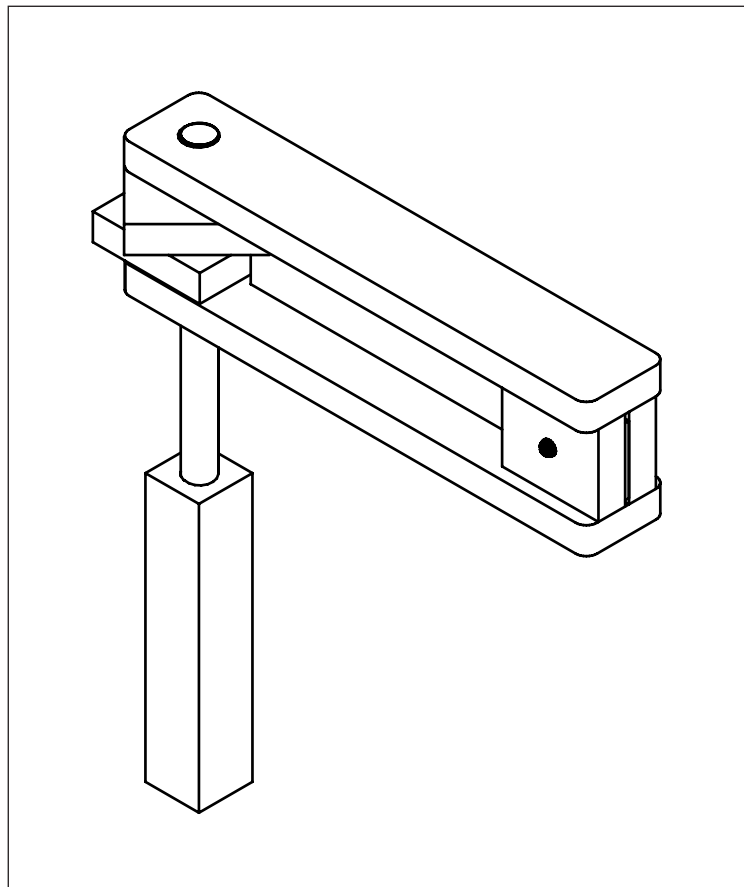


## *1 0 0 . 0 1 0* *Ratchet Rattle*



### **Please Note**

The OPITEC range of projects is not intended as play toys for young children. They are teaching aids for young people learning the skills of Craft, Design and Technology.

These projects should only be undertaken and tested with the guidance of a fully qualified adult. The finished projects are not suitable to give to children under 3 years old. Some parts can be swallowed. Danger of suffocation!

## 1. Product Information:

**Article:** \_\_\_\_ Wood project in construction pack format

**Use:** In Design Technology, Key Stage 3

## 2. Material Information:

**Material:** Pine (Coniferous) softwood  
Wood should be relatively dry before working  
Plywood (modelling type) multi-layered

**Working:** Wood can be sawn, planed, drilled, shaped and sanded

**Joining:** Screws and PVA white wood glue

**Finish:** Wax (solid or liquid)  
Wood varnish (base coat-top coat)  
Staining (water soluble-colour then varnish)  
Linseed oil

## 3. Tools:

**Saws:** Use a **Dovetail saw** for straight cuts in pine and dowel

**Note:** \_\_\_\_ Hold the work on a bench hook!

**Rasps/files** Use the correct grade of tool for the work in hand

**Note:** \_\_\_\_ Rasps etc. only cut on the forward stroke

**Sanding:** Use a block and glasspaper for all flat surfaces and loose sheet for curves and round shapes

**Drilling:** Use a handrill or a pillar drill

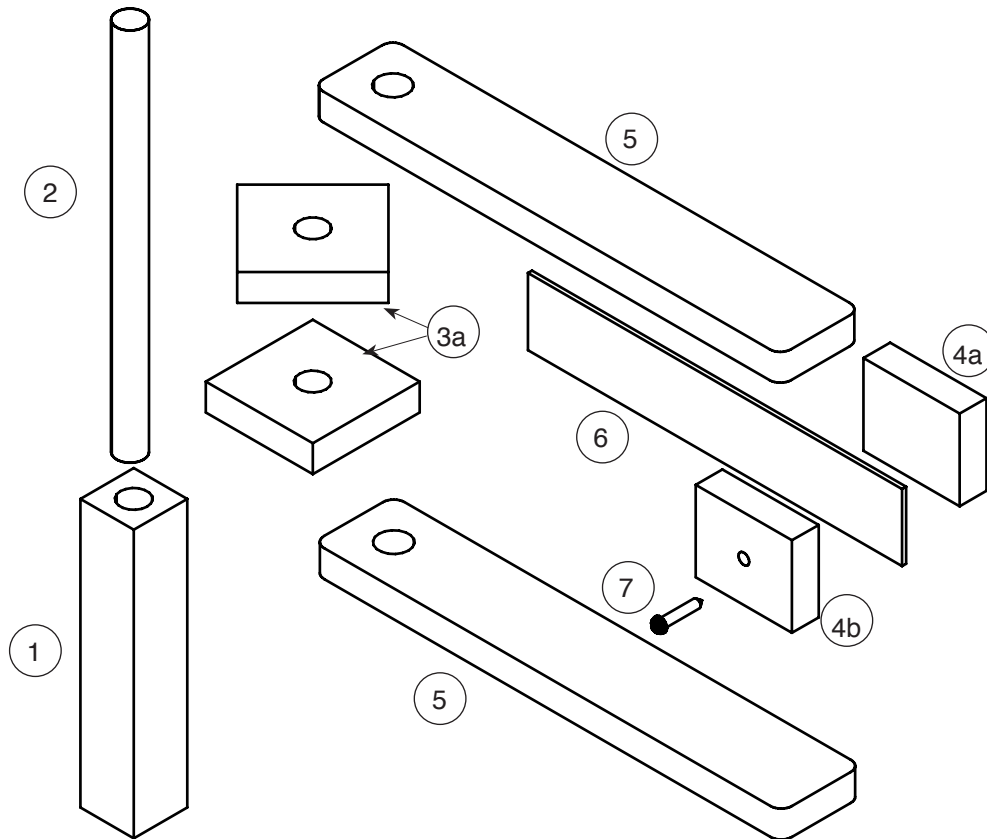
**Note:** \_\_\_\_ Remember the safety rules: tie long hair back, wear safety glasses, remove jewellery and wear an apron. Hold the work to be drilled in a machine vice.

**Clamping:** Use quick acting G clamps. Do not overtighten them as they may leave marks.

## 4. Parts list:

Part	Material	Quantity	Size	Diagram
<b>Handle</b>	Pine strip	1	20 x 20 x 100 mm	
	Pine dowel	1	10 dia x 200 mm	
<b>Ratchet</b>	Pine strip	1	10 x 40 x 100 mm	
	Pine strip	1	10 x 30 x 75 mm	
	Pine strip	2	10 x 30 x 200 mm	
	Modelling plywood	1	1,5 x 25 x 175 mm	
	Screws	1	4 x 16 mm	

## 5. Exploded diagram



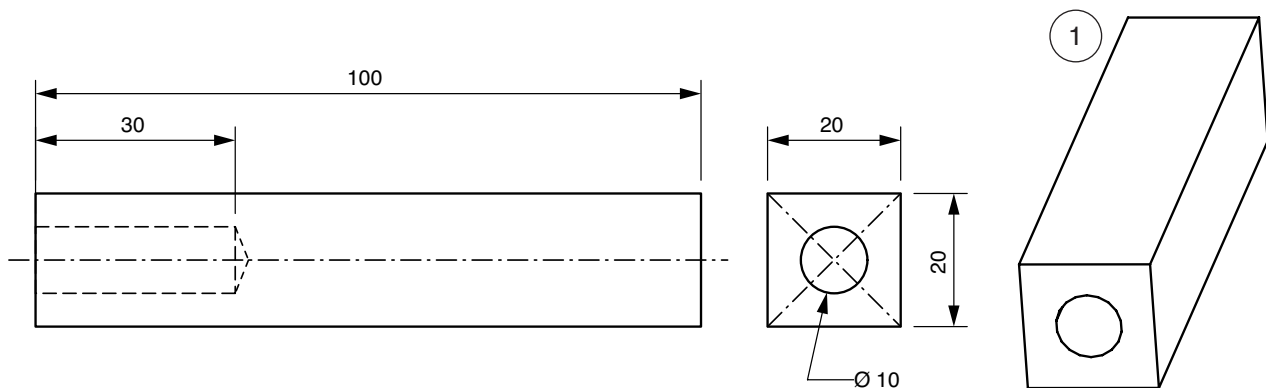
## 6. Planning overview

- 6.1 Making the handle
- 6.2 Making and assembling the ratchet
- 6.3 Final assembly and test

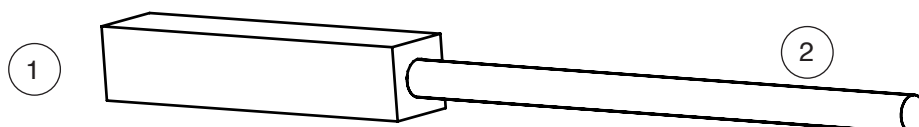
### 6.1 Making the handle

6.1.1 Drill the pine strip (1) 20x 20x 20mm in the end as shown in the diagram

**Note:** Mark out the centre of the wood by drawing diagonals



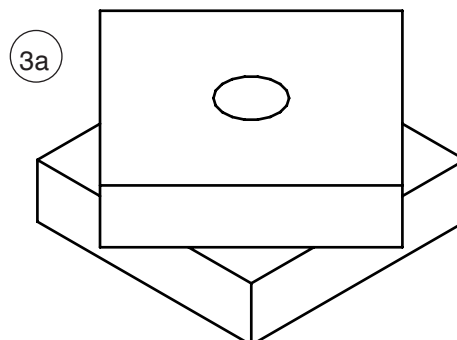
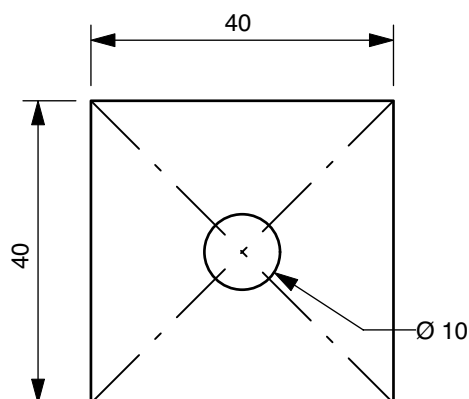
6.1.1 Insert and glue the dowel (2) into the wood block (1)



## 6.2 Making and assembling the ratchet

6.2.1 Saw off two pieces (3a) each 40mm long from the pine strip 10 x 40 x 100mm, mark out and drill the holes in the centre

**Note:** Find the middle by drawing two diagonals!  
Try to drill both the holes at the same time !

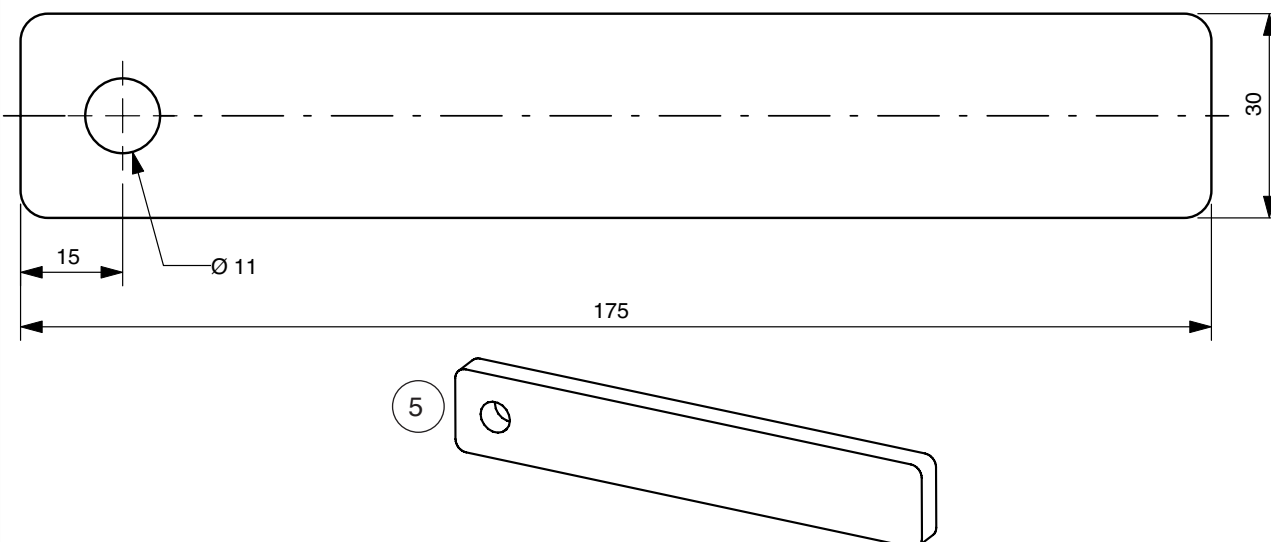


6.2.2 Glue both the blocks on top of each other, setting them at 45 degrees

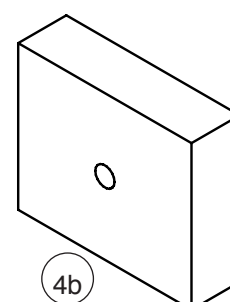
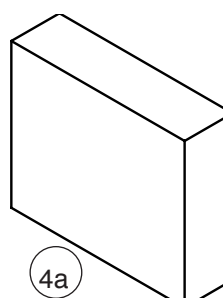
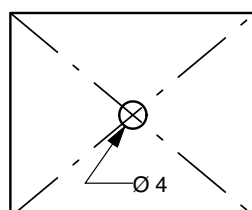
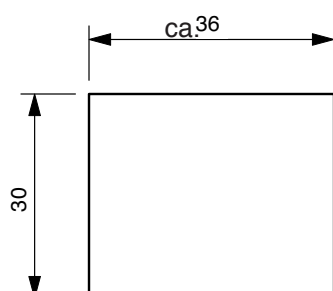
**Note:** To make sure that the holes line up, insert the handle dowel  
Do not leave it in position once they have been lined up, otherwise it will stick

6.2.3 Saw the pine strips (5) 10 x 30 x 200 to 175mm long. Round the ends and clean them up with glasspaper

**Note:** If possible drill of both pine strips at the same time



6.2.4 Saw the pine strip (4) in half. Clean up both pieces 4a and 4b. drill 4b through the middle as shown in the diagram

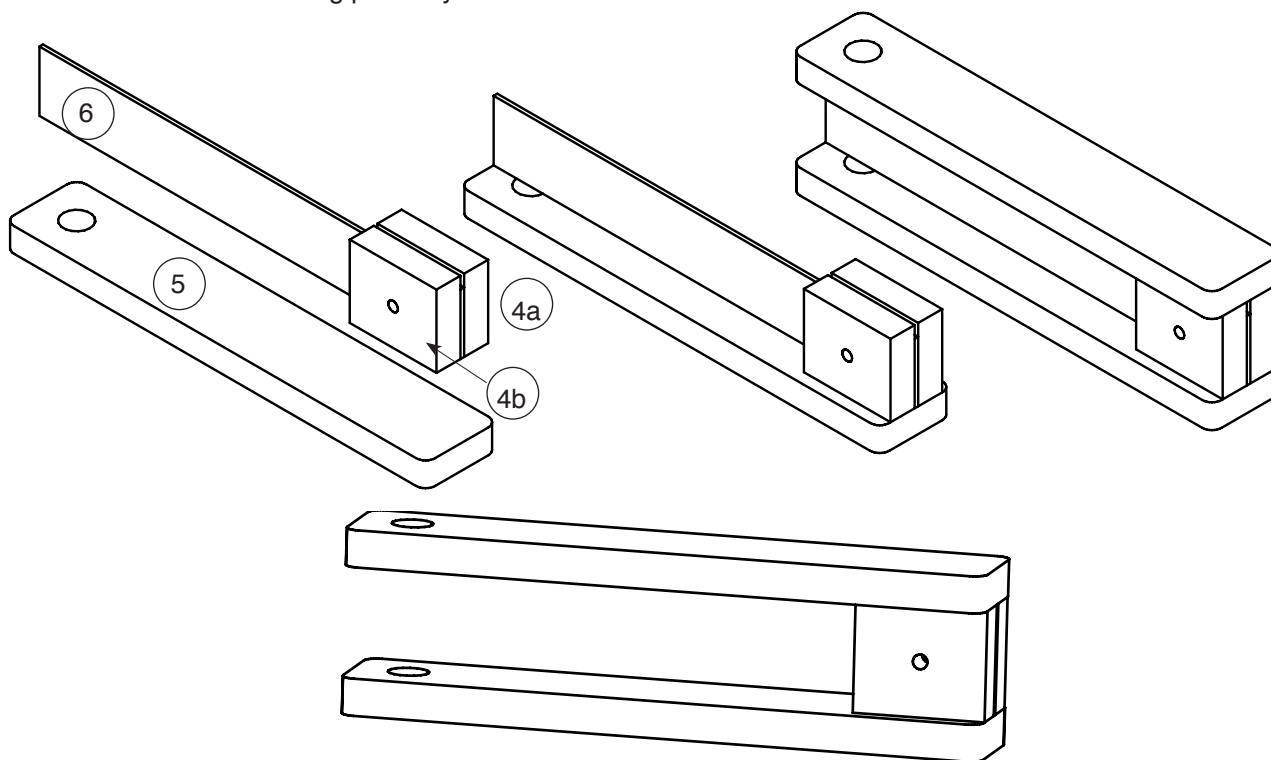


6.2.5 Glue the parts (4a/4b) on the base (5) leaving a gap of 1.5mm in between as shown on the plan

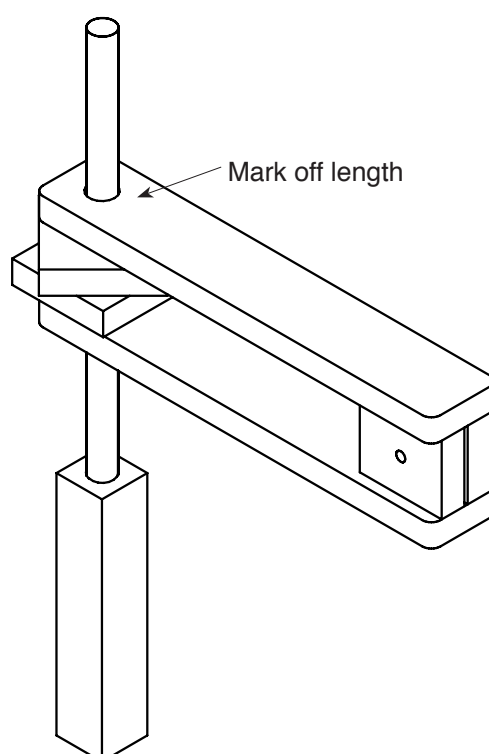
**Note:** To make sure that the distance between the blocks (4a/4b) is accurate simply place part (6) in the gap and clamp the blocks gently together.

6.2.6 When parts (4a/4b) have been set up properly, the top (5) of the rattle can be glued in position

**Note:** Both the top and base (5) must line up with each other!  
Insert the dowel handle to check if they line up  
Finally insert part (6) between (4a/4b) to check the gap, then remove it again, leave the remaining parts dry

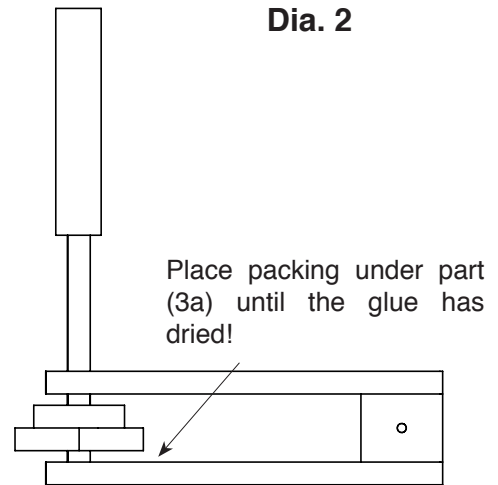
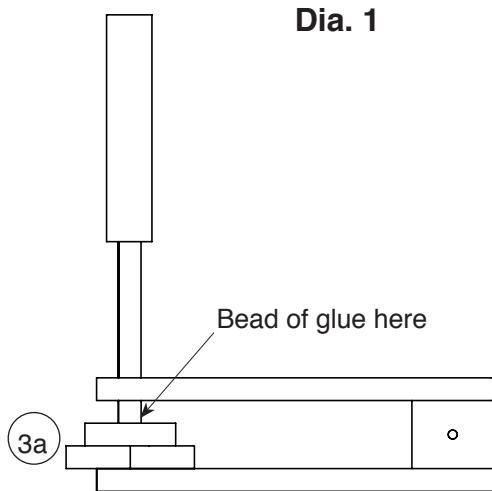


6.2.7 Once the parts (3a) that make up the ratchet are dry, slide them in between the base and top (5) line them up with the holes and finally insert the handle. The length of the handle can now be marked out and sawn off to the desired length.

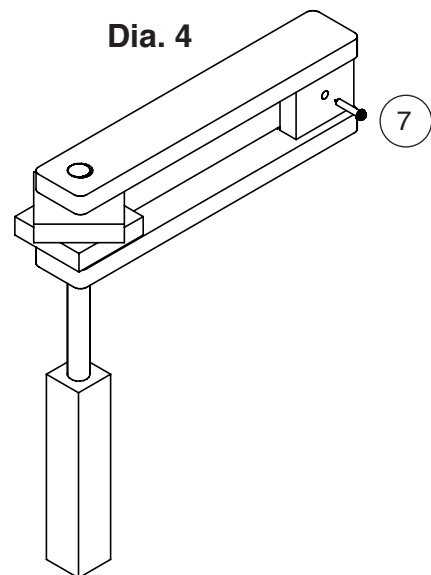
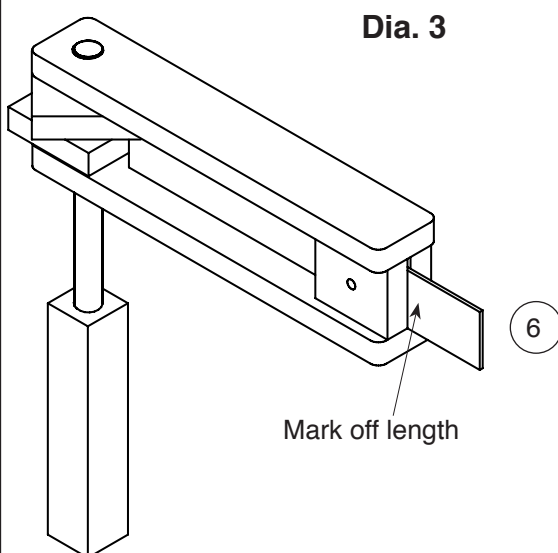


## 6.3 Final assembly and test

6.3.1 Insert the handle once more into the hole and stand the complete ratchet on its head as shown in diagram 1. Push the handle through as far as it will go. To glue it in position insert a bead of glue between part 3a and the dowel. Finally pull part 3a up and set it in a middle position between the two arms (diagram 2). Place some packing under the part (3a) so that it cannot slip back whilst the glue is drying.

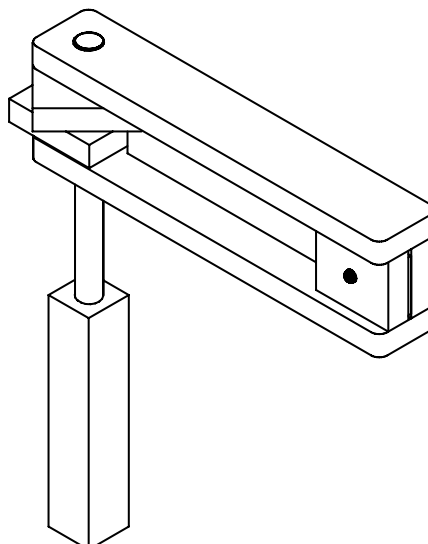


6.3.2 Once these parts have dried, insert the modelling plywood strip in the gap between (4a/4b) adjust it so that it reaches the valley in the two angled blocks (ratchet) (3a). Mark off the length of part (6) and remove it once more, saw it to length and clean up the edges with glasspaper (See diagram 3). Finally re-place it and make adjustments



so that it lies centrally between the two arms, insert the locking screw (7) to hold it in position (diagram 4)

6.3.3 Test the ratchet by twirling in circles to see if it makes the correct amount of noise.



twirling the handle around makes the correct