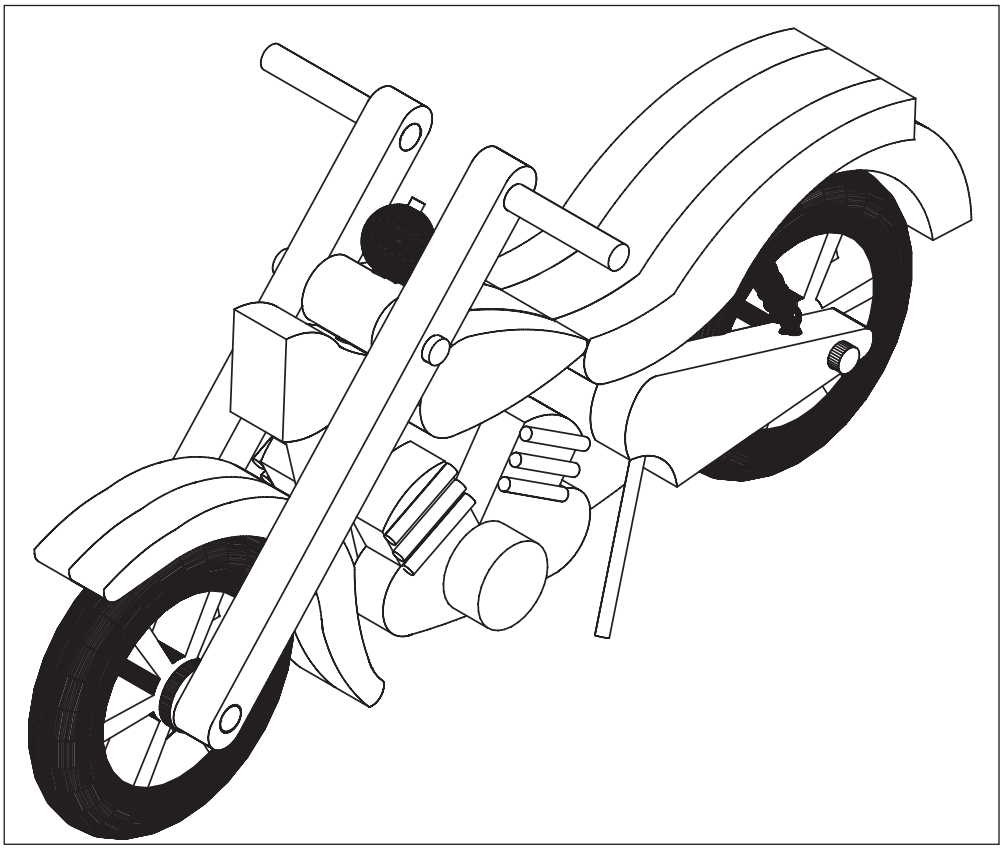
OPITEC

101.980

Chopper Motorcycle



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 Technolo- gy.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. Dan- ger of suffocation!

Warning!
This product contains small parts that can be swallowed. There is a danger of choking

1. Product Information:

Article: Model motorcycle.

Use: In Design Technology, key stage 3 / 4

2. Material Information:

Material: Pine (Coniferous) softwood.
Beech (Deciduous) hardwood.
All wood should be relatively dry before working.

Working: Wood can be sawn, planed , drilled, shaped and sanded.
Measure out according to the plans or use paper patterns.

Joining: Use PVA white wood glue

Finish: Wax (Liquid or solid)
Wood varnish (Undercoat and top coat)
Staining (Coloured-water soluable) finish with clear varnish.
Linseed oil.

3. Tools:

Saws: Use a **Fret saw** for circular shapes and curves that cannot be sawn with a straight backed saw.

Note! Fret saw blades are inserted with the teeth facing forward.

Hold the work on a fret saw board, saw using slow constant stokes turning the work as you go.

Use a **fine toothed saw** for cutting dowels and spar.

Note! Work safely, hold the work on a sawing board!

Rasps/ Files: Use the correct grade of rasp or file according to the work in hand.

Note! Files only cut on the forward stroke!

Sanding: Use a block and glasspaper on all flat surfaces and loose sheet on curves.

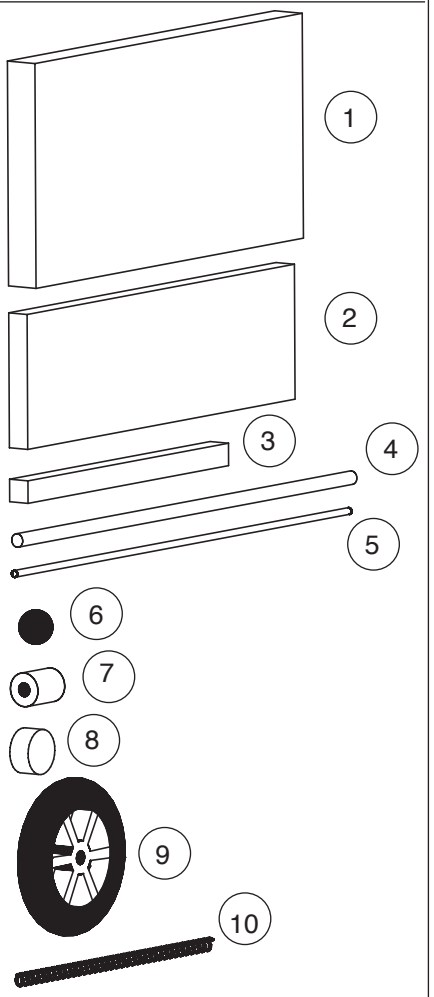
Drilling: Use an electric Pillar drill and hold the work to be drilled in a machine vice

Note! Adhere to the safety rules when drilling, tie all long hair back, remove jewellery, wear safety glasses and an apron, hold the work to be drilled in a hand vice !

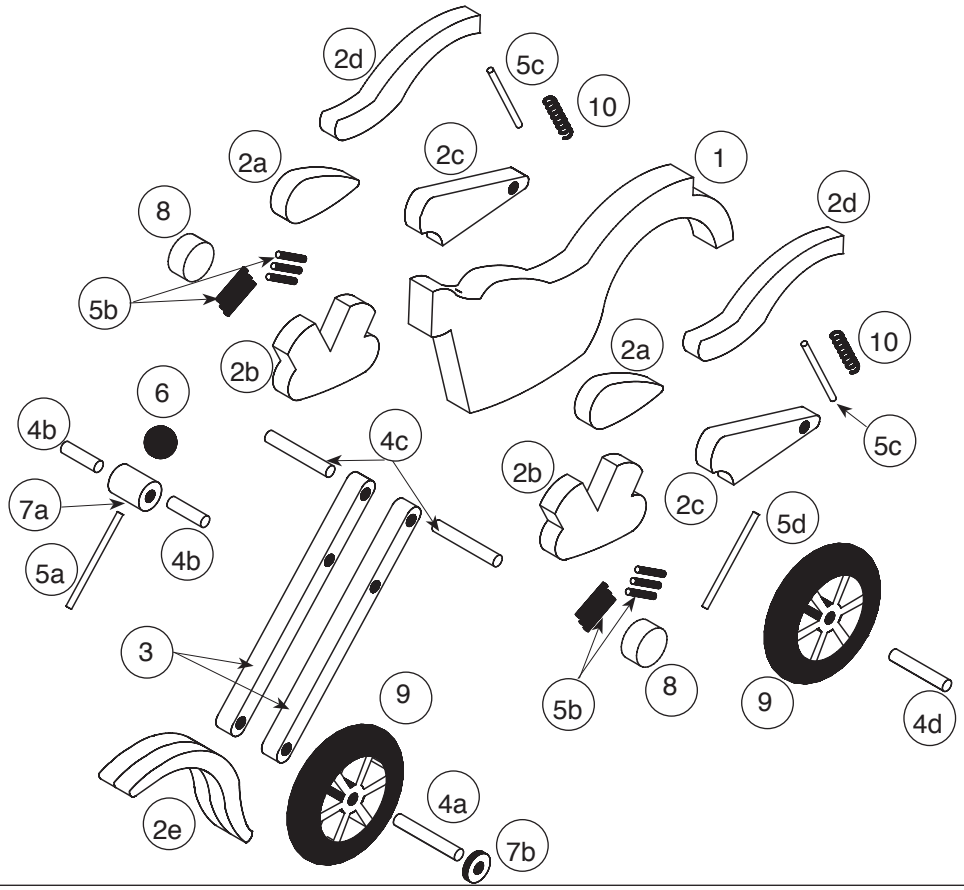
Holding: Use G clamps to hold the work whilst the glue is drying. Do not over tighten them or they may leave marks.

4. Parts list:

Part	Material	Quantity	Size	Diagram
Frame	Pine	1	15 x 100 x 200 mm	
Motor block & parts	Pine	2	10 x 60 x 200 mm	
Forks	Pine	2	10 x 10 x 150 mm	
Axle/Steering	Beech dowel	1	6dia x 245mm	
Handlebars / cooling Fins / dampers	Beech dowel	2	3dia x 245mm	
Steering Adjuster	Beech ball	1	15mm dia, drilled	
Handlebar centre	Beech cylinder	1	15mm dia, drilled	
Motorblock	beech disc	2	20mm dia x 10mm	
Spoked wheel	Beech	2	70mm dia	
Springs	Metal compression	1	6mm dia x 150mm	



5. Exploded diagram



6. Planning overview

6.1. Designing and making the frame.

6.2. Designing and making the smaller the parts.

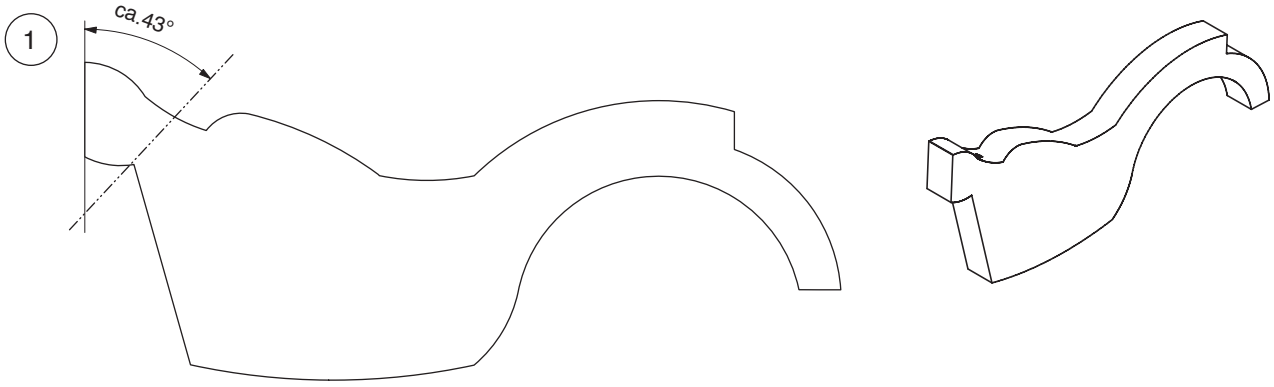
6.3. Making the steering assembly

6.4. Testing

6.1 Designing and making the frame.

6.1.1 Trace the pattern of the frame (Or develop your own shape) (Page 9) on to the pine piece (1). Drill the 3mm diameter hole for the steering and the 2mm diameter blind hole for the stand and then saw out the shapes.

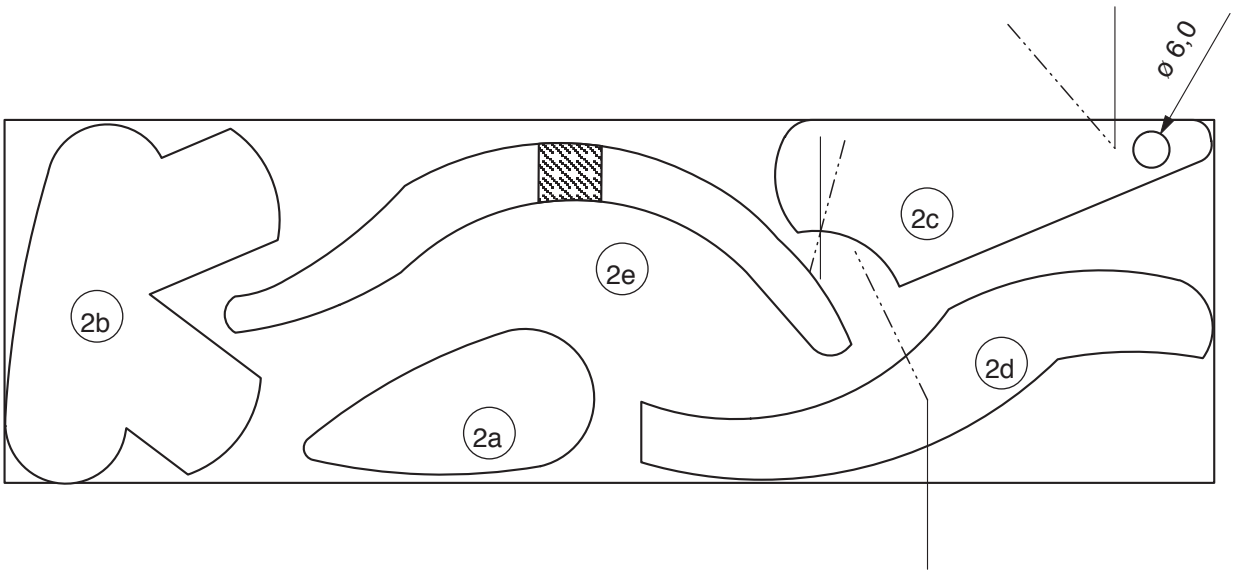
Note: Drill the holes before sawing out the frame, as the wood is easier to hold when it is larger.



6.2 Designing and making the smaller parts.

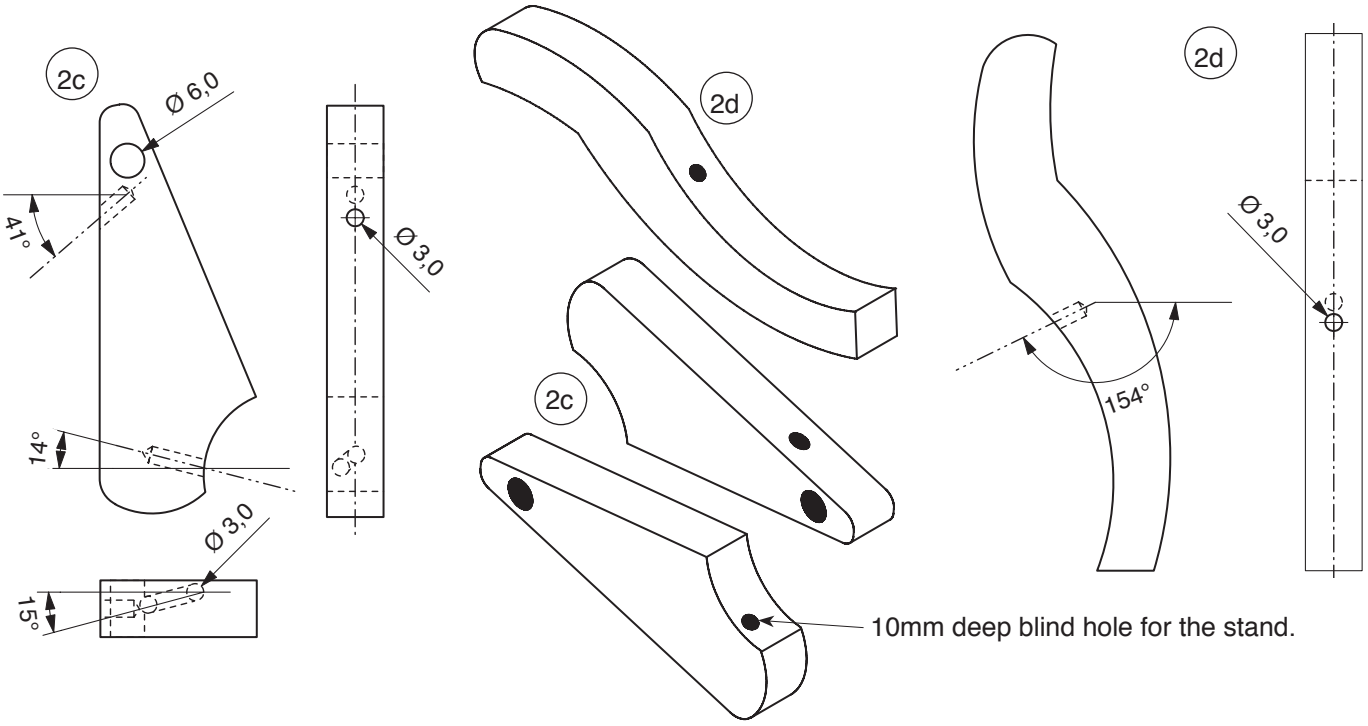
6.2.1 Trace the shapes of the smaller parts (Pattern on page 9) on to a pine pieces (2)

Note: All the parts need to be made twice:
- Either trace the parts on to both pieces of pine
-or join the two pieces of pine together with small strips of double sided tape and saw out both parts at the same time!



6.2.2 Drill the blind holes, 3mm diameter, 4mm deep in the seat (2c) and the swinging arm (2d). Then drill through the swinging arms a 6mm diameter hole for the rear axle. (See page 9). Finally drill the 4mm diameter x 10mm deep hole for the stand.

Note: The 3mm hole for the damper or stroke spring can be drilled out to 4mm. This will make the accuracy easier.

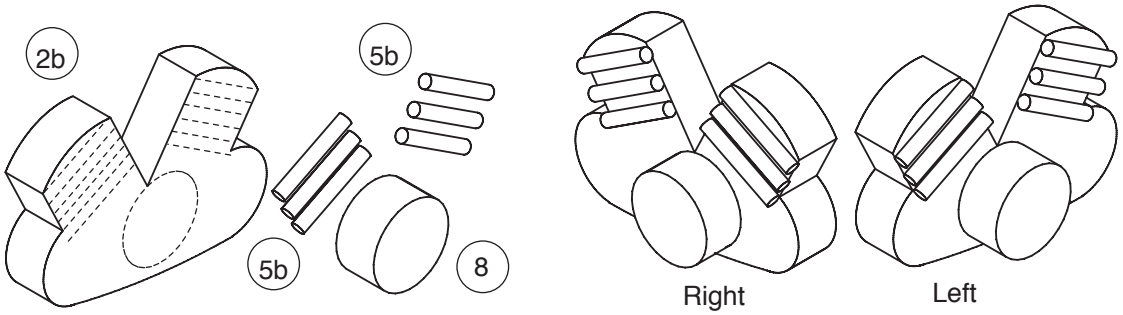


6.2.3 Saw out parts (2a/2b/ 2c/2d) and clean them up.

Note: Where the parts are made in twos, work on both of the parts at the same time!

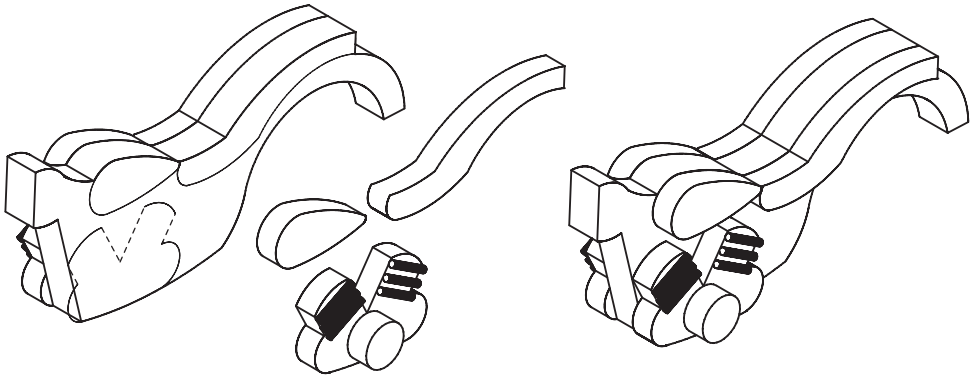
6.2.4 Saw 12 pieces (5b) each 20mm long from the dowel (5) and round off the ends. Afterwards glue the pieces (5b) on to motor block (2b) cylinders to form the cooling fins.

Note: Before gluing the fins to the motor block make sure that you identify a left and right half of the motor.

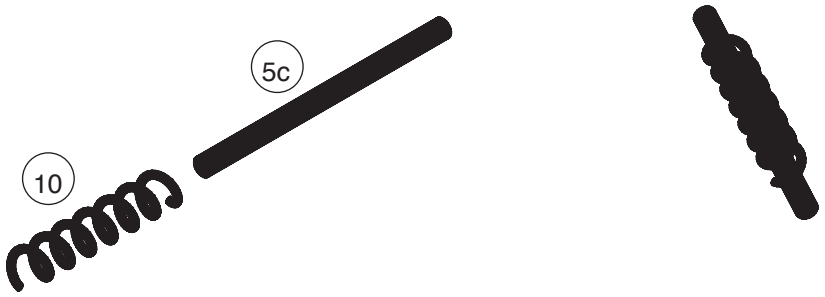


6.2.5 Glue the petrol tank halves (2a) motor block halves (2b) and the seat (2d) left and right on to the frame.

Note: The contours should blend in with the frame!

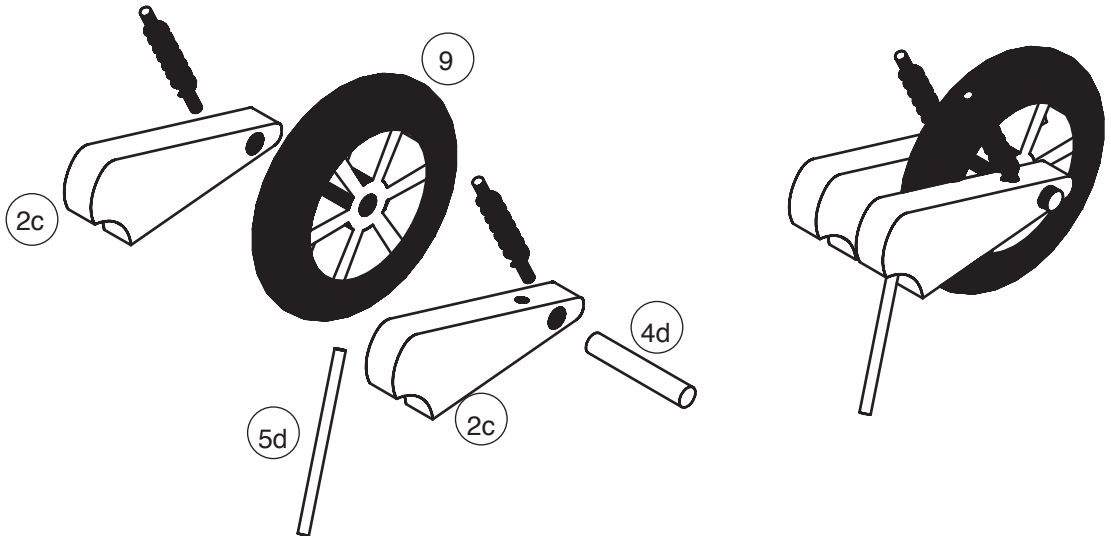


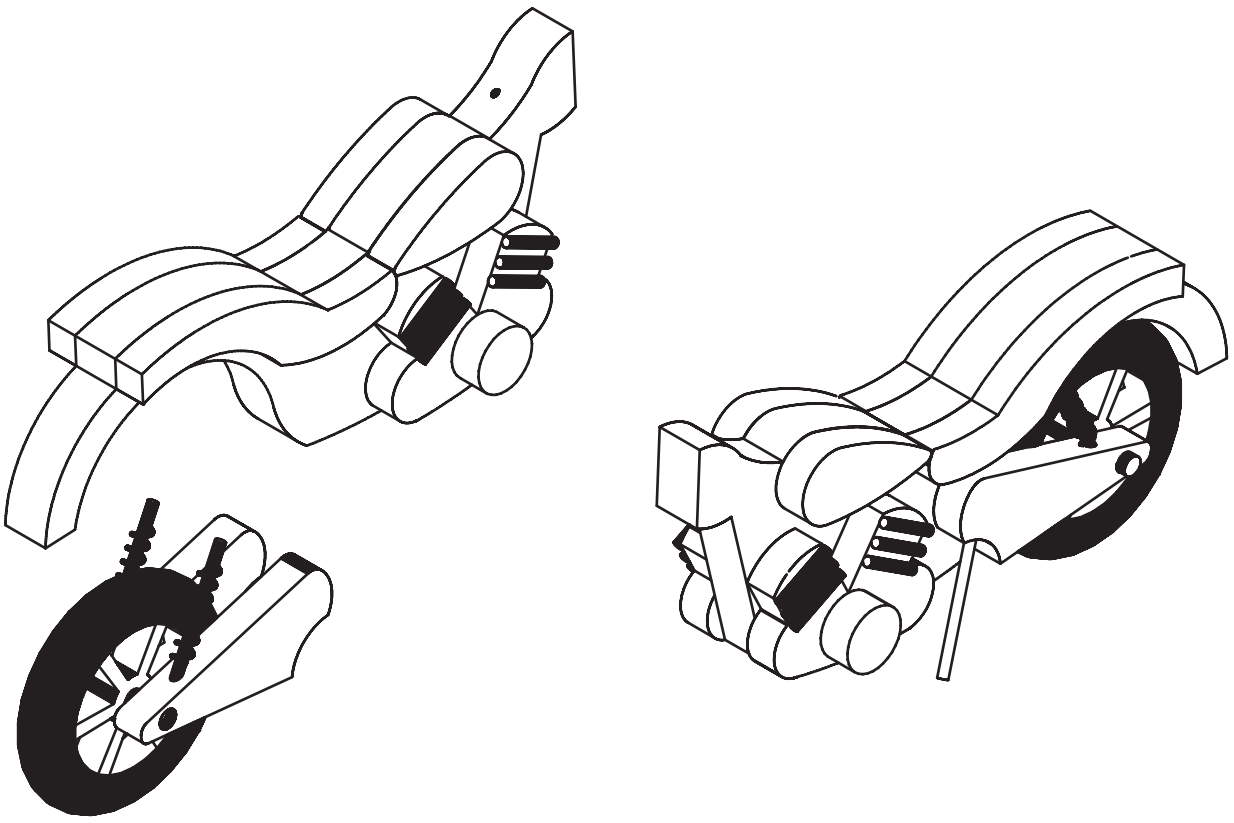
6.2.6 Saw two 45mm long pieces from the dowel (5) and a 50mm long piece (For the stand) and lightly round the ends.
Snip off 2 pieces with approx 11 spirals from the spring (10) Join parts 10 and 5c together to form a damper.



6.2.7 The rear axle (4d) is made from a 35mm dowel (4) clean up this piece and lightly round the ends.
Finally assemble the swinging arms (2c), the spring dampers (5c/10), wheel (9) and axle (4d) along with the frame (1) so that the wheel turns freely under the mudguard and the spring damper is locked into the seat.

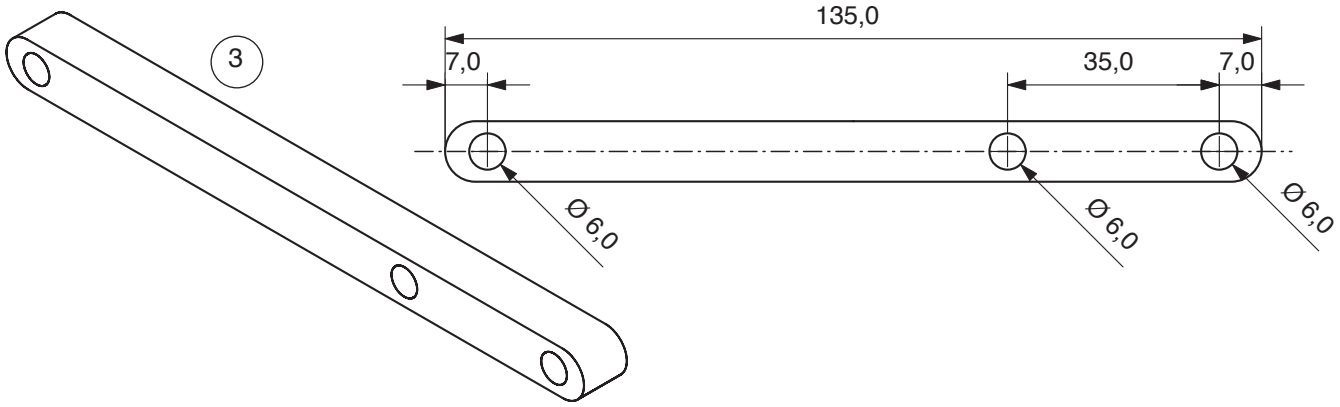
Note: Only glue the swinging arm all the other parts should slot together.





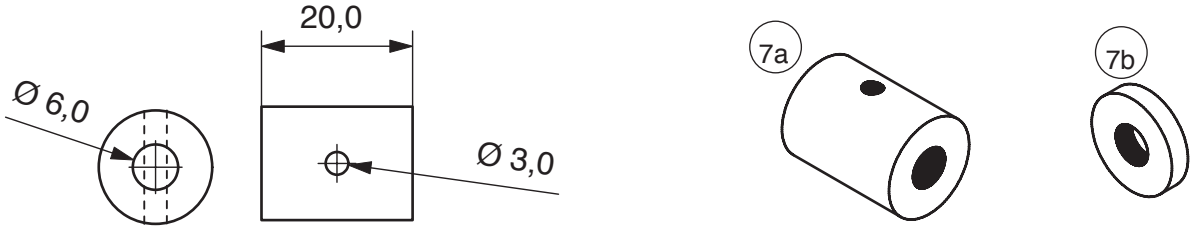
6.3 Making and assembling the steering and handlebars

6.3.1 Saw two 135 mm lengths from the pine strips (3), drill the 6mm diameter holes and round the ends.



6.3.2 Enlarge the drilled hole in the beech cylinder (7) to 6mm diameter.
Shorten the cylinder (7a) to 20mm, use the remainder as a brake disc (7b)
Finally drill the 3mm diameter hole in the middle of the beech cylinder.

Note: The remaining small disc sawn off the cylinder is used as a brake (7b)



6.3.3 Saw the 40mm long front axle (4a) and the two handlebars (4c) each 40mm long, plus the studs (4b) 20mm long from the dowel (4) Sand the ends.

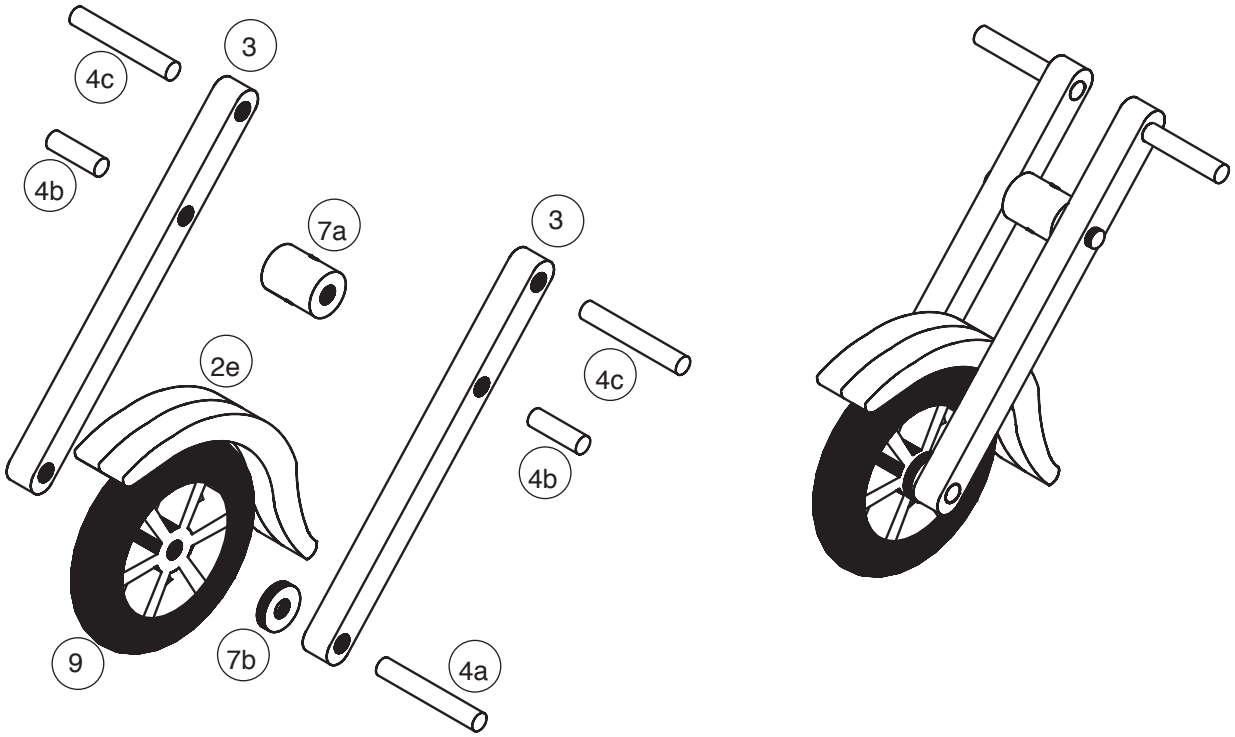
6.3.4 Glue the parts (2e) on top of each other to form the mudguard.

Note: Re-shape them if necessary up so that all the parts align correctly together.

6.3.5 Assemble the front forks (3), Handlebar stubs (4c).Steering head (7a) (4b) Mudguard (2e), Brake disc (7b) and axle (4a) as sown in the diagram

S t u b s

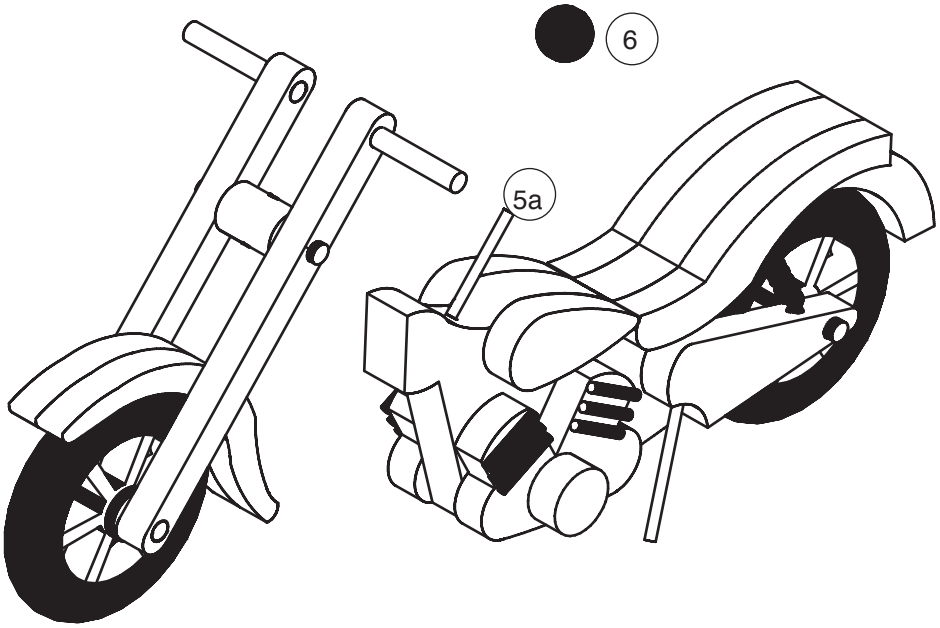
Note: Note all these parts should slot together and do **NOT** need gluing!!!



6.3.6 Saw a 50mm length (5a) from the dowel (5) and clean up the ends. Glue it into the 3mm diameter hole in the frame so that it level with the bottom of the hole.

6.3.7 Align the frame steering pin (5a) and the 3 mm diameter hole in cylindrical dowel spacer (7a / 3mm hole) so that the steering moves freely side to side and the front wheel turns easily.

Note: If you find any points that rub check the shapes against the original drawings !

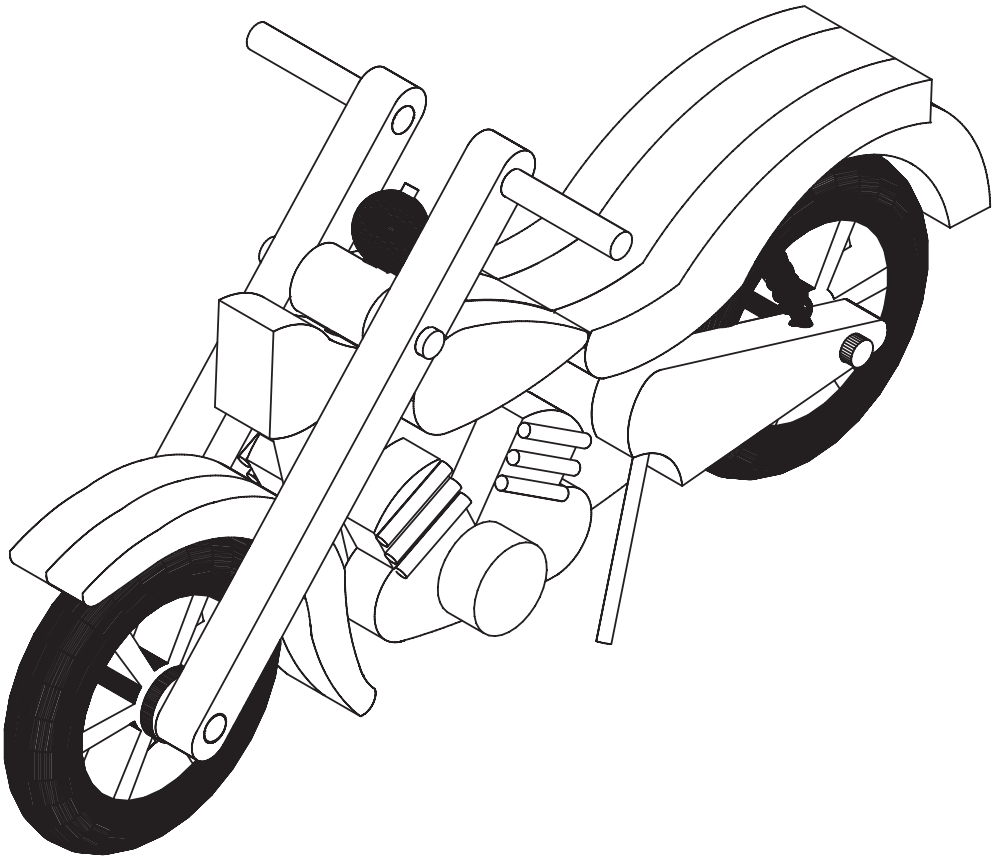


6.3.8 Mark where the steering head (7a) and the mudguard (2e) meet, remove the forks from the frame and glue them in place.

Note: Check that the steering head dowel (7a) and the mudguard do not move out of position whilst the glue is drying.

6.3.9 Once the glue is dry re-hang / assemble the forks on the motorcycle. Check the steering and finally glue the ball on the end of the dowel (5a) to complete the chopper.

6.3.10 To finish we suggest using clear varnish or linseed oil.

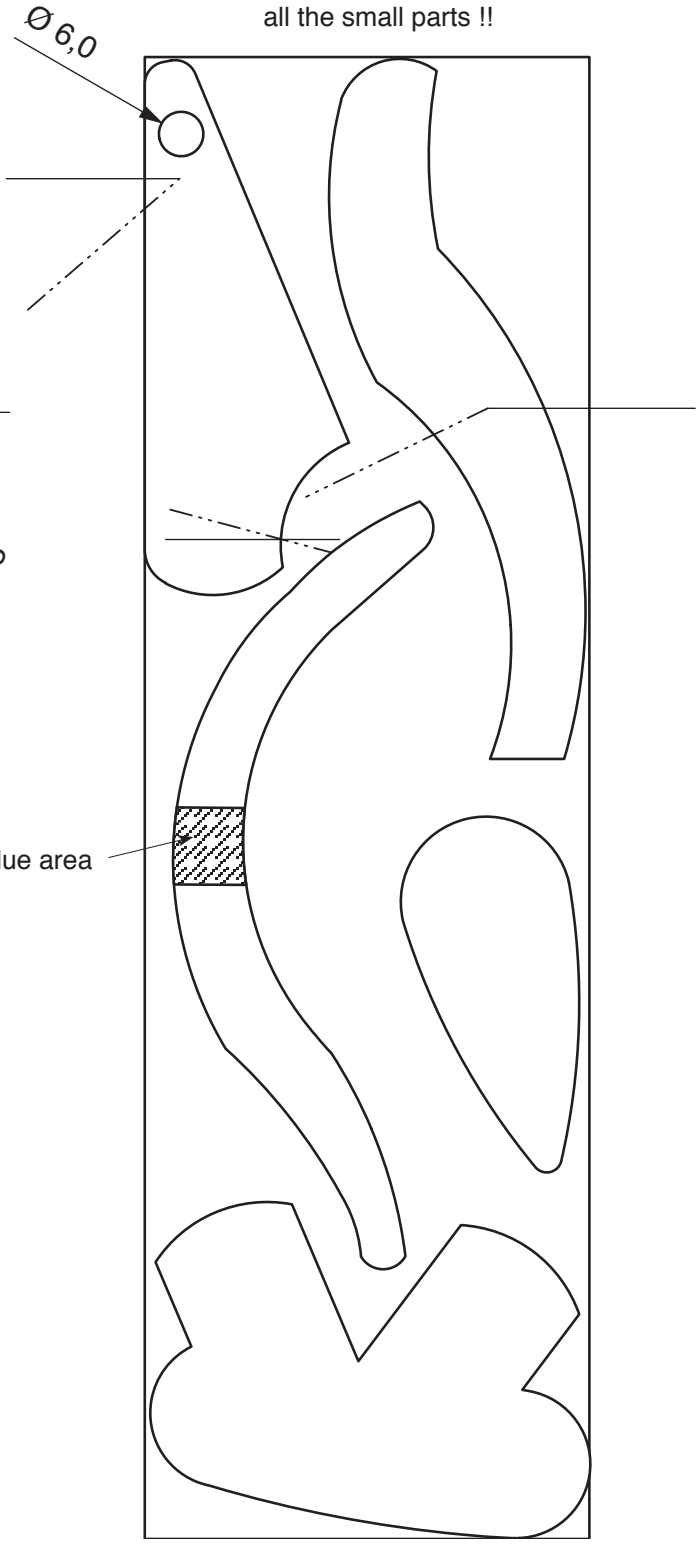


7. Patterns

Scale 1 : 1

Small parts (2)

2 x each are needed from
all the small parts !!



Frame (1)