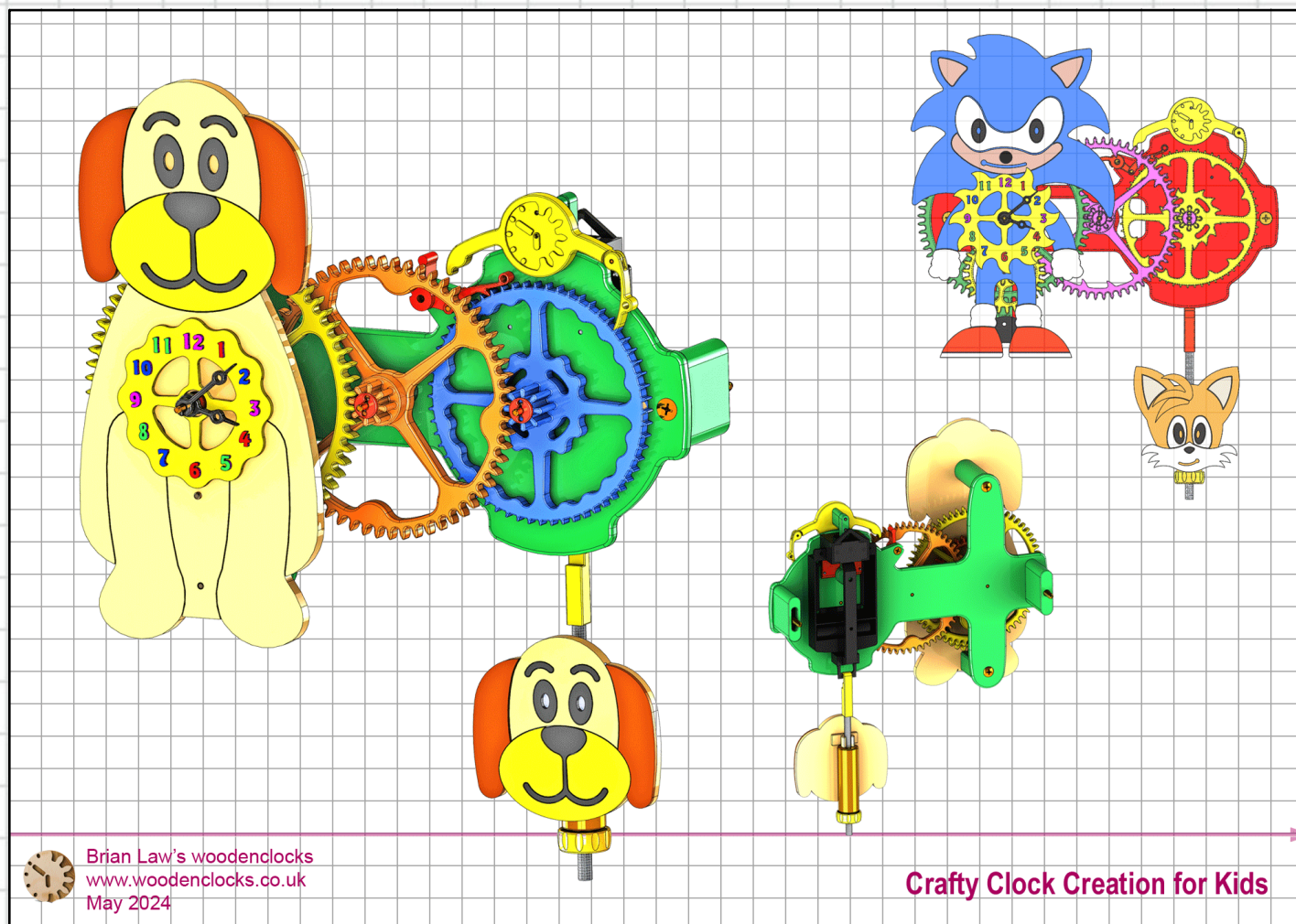


Clock 56 - Pendulum Driven Clock

Construction instructions for Clock 56



Clock 56 has been designed specifically for the young children, with a cartoon Character Dog carried on the clock face. The clock has been designed to be built using 3D printing the files included use separate coloured plaques of the characters features so that you can easily produce fully coloured prints even on the simplest of 3D printers.

The clock uses the Pendulum Drive unit to keep the clock ticking for a couple of months and is driven by a single AA battery. The fact that it has a short Pendulum and no hanging drive weight means that there are no low hanging parts the a child can interfere with.

I have included STL files for your 3 D printer along with STP files if you want to alter or redesign any part of the clock or to incorporate a different cartoon character on the front as suggested in the illustration above.

Also included are illustrated instructions and detail drawings of the assembled clock along with a completed Bill of materials giving details and quantities of all of the parts needed for the complete assembly.

Clock 56 - Pendulum Driven Clock

Construction instructions for Clock 56

Equipment

The following equipment is desirable:

3D Printer using the STL files supplied.

Pedestal Drill or simple drill stand with work holding vice. There is a lot of holes to be drilled and cleaned up after CNC machining and fabrication so the drill is pretty much essential. It may be possible to get away with an ordinary electric drill in a stand but a work holding vice is still necessary.

Drill Bits in the following sizes, Ø3 mm, Ø3.1 mm, Ø3.2, Ø6 mm

Hand tools; all the normal things that are used in the workshop, Files, screwdrivers, hammer, pliers etc.

Consumables

PLA Filament

Sandpaper in various grades from rough to fine

Super Glue

Clock 56 - Pendulum Driven Clock

Construction instructions for Clock 56

Materials

For all the Plastic Parts

The choice of material to build the clocks from is a very personal one and is down to you to decide. I prefer to use PLA but ABS is also suitable but always tricky to get it to stick to the bed, specially on the large components.

For all the other parts:-

Ø3mm Drill Rod or Silver Steel 250mm Long for all the shafts and numerous pins.

No 8 or 10 wood screws 60 mm long for wall fixing 2 required

Ø19 mm Brass Rod 20 mm long for the weight.

Ø6 Plastic tube or wooden dowel for Pendulum Rod

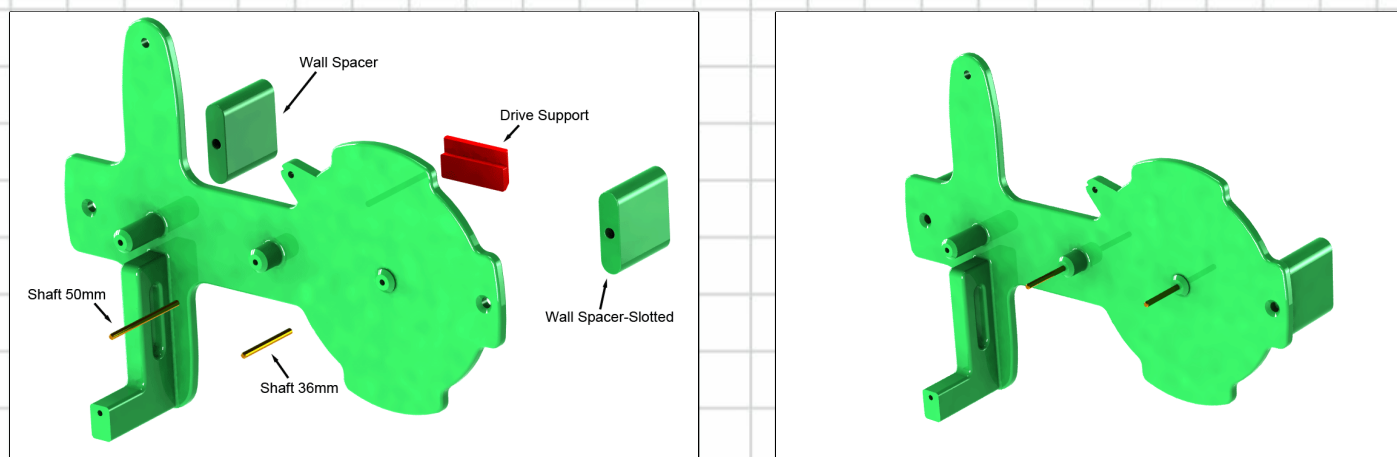
You will of course need a Pendulum Drive unit which can be readily found on the internet from Amazon or other, simply search using 'Pendulum Drive unit'

Note these are the minimum amount of material necessary to build the clock I used more in the prototype and you may well be advised to buy extra to cover those accidental losses that occur. If I have missed anything here, you will find them in the parts list for the clock anyway.

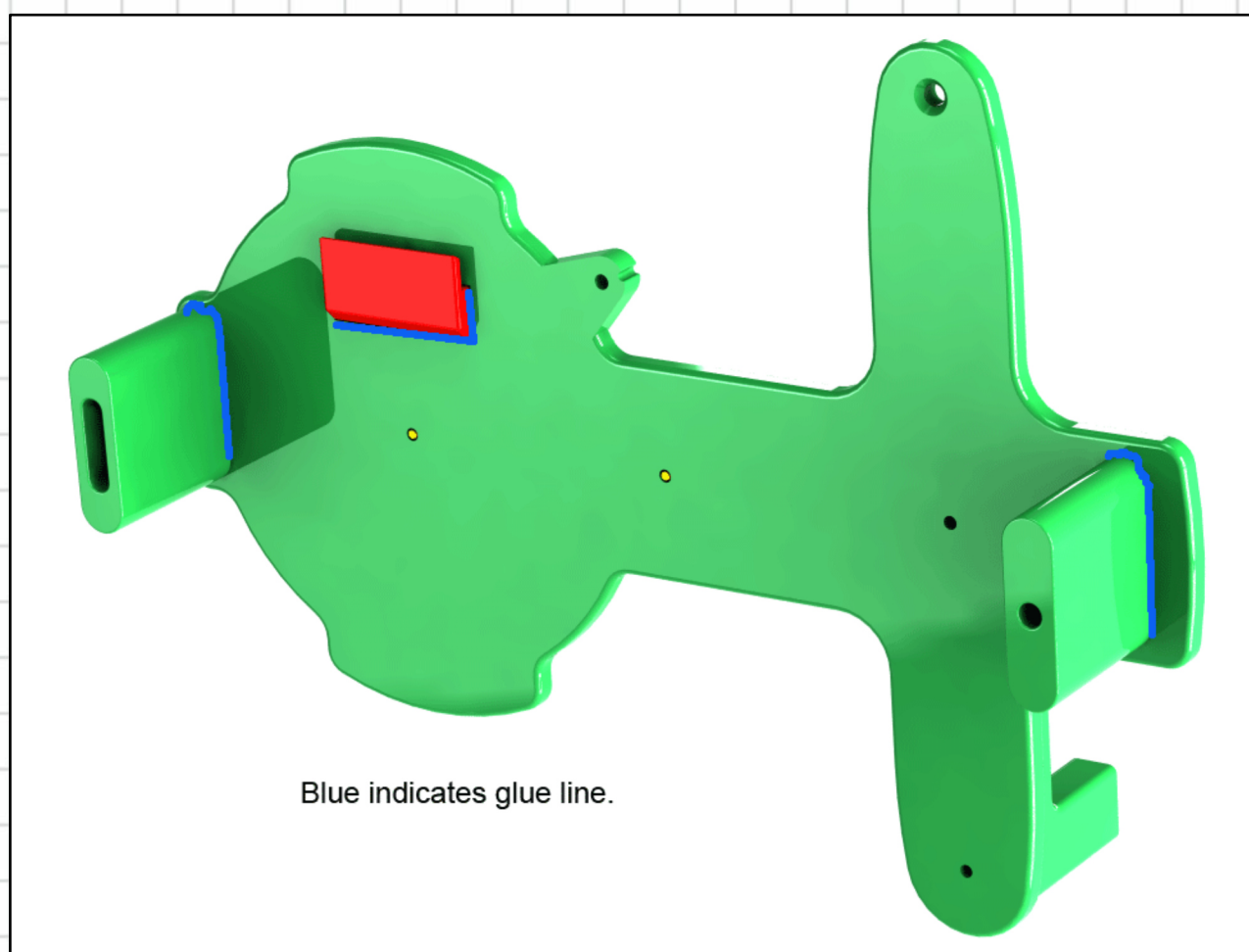
Clock 56 - Pendulum Driven Clock

Construction instructions for Clock 56

Step 1 Preparation of the Frames



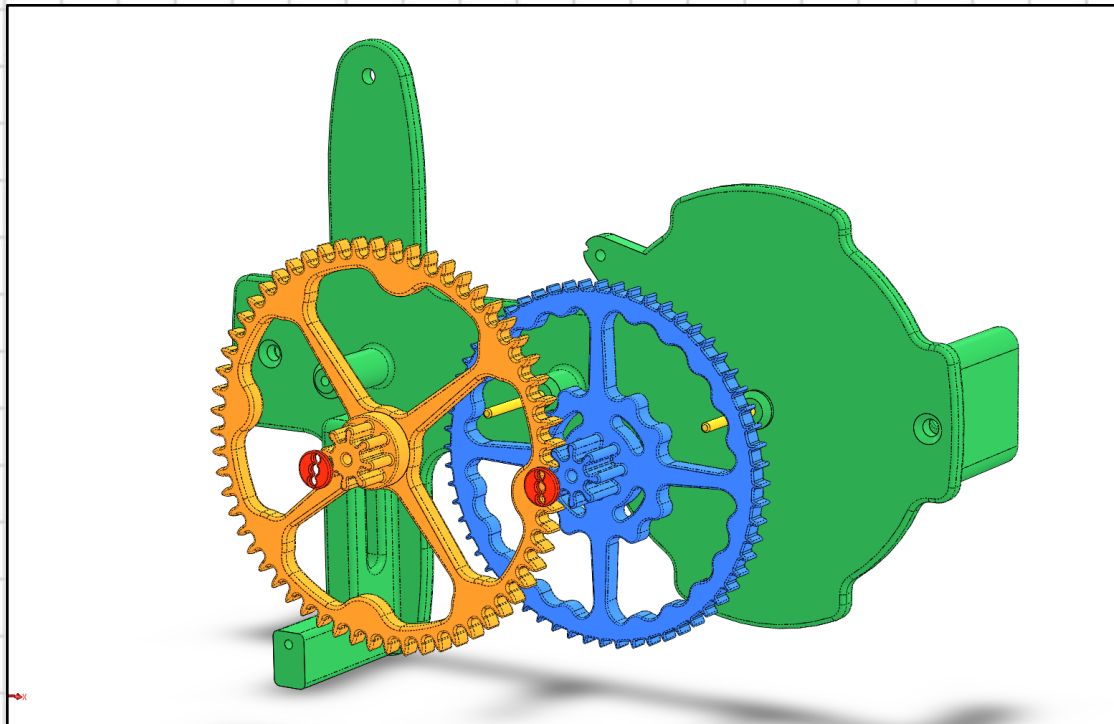
We will start assembling the Back Frame by press fitting the two shafts into the front face of the Back frame. The missing shaft will be fitted later as this is to be a loose fit into the support pillar. Next glue the Wall Spacers and the Drive Support in position on the back face, using the screws to align the holes. Note the Drive support fits into the shallow recessed slot on the rear. The blue lines indicate where to glue.



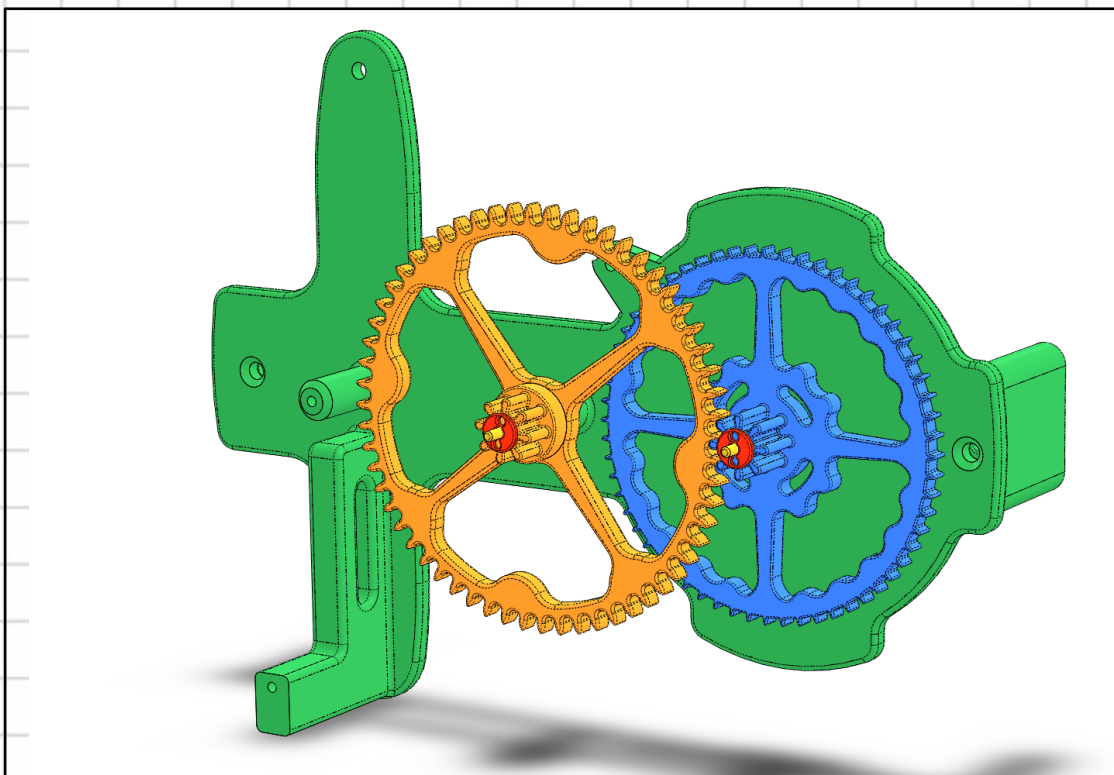
Clock 56 - Pendulum Driven Clock

Construction instructions for Clock 56

Step 2 Fitting the gear train



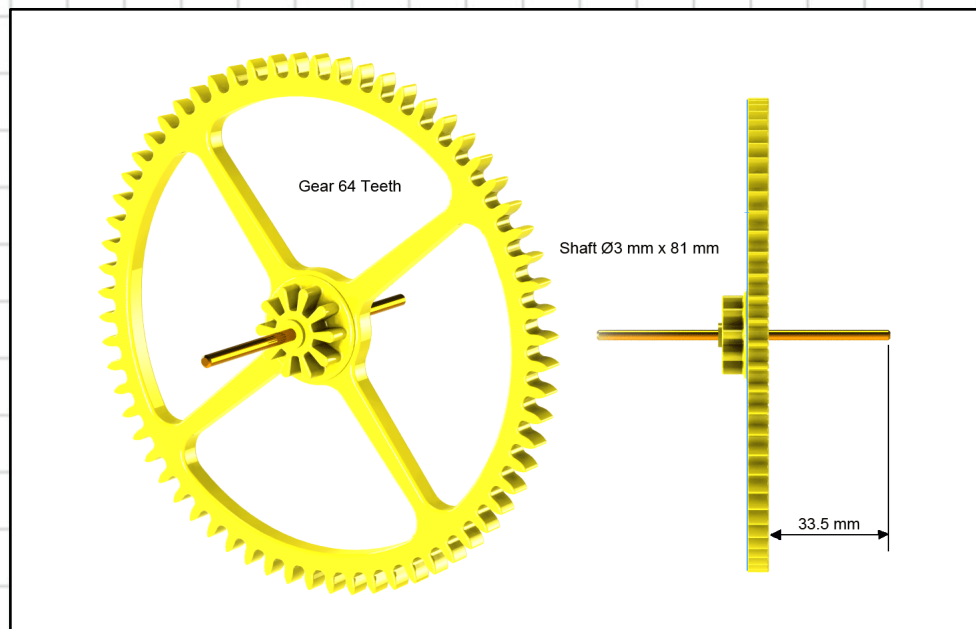
The drive wheel and the 60 toothed gear are the next to be fitted, they should run freely on the shafts and if not drilled out with a $\varnothing 3.1$ mm drill. They are secured on the shaft using the shaft retainer parts which are to be a press fit on the shaft but fitted so the gears can run freely.



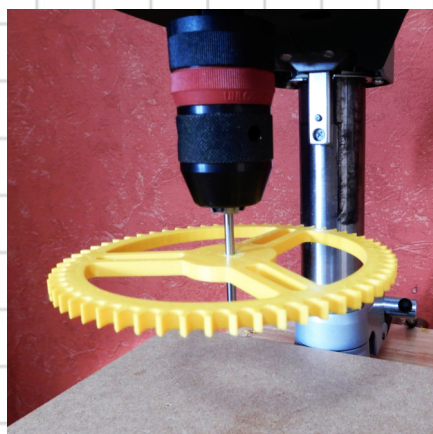
Clock 56 - Pendulum Driven Clock

Construction instructions for Clock 56

Step 2 Fitting the Gear train- 2



Next the 64 toothed gear is fitted with its Ø3 mm shaft, protruding from the rear of the gear by 33.5 mm

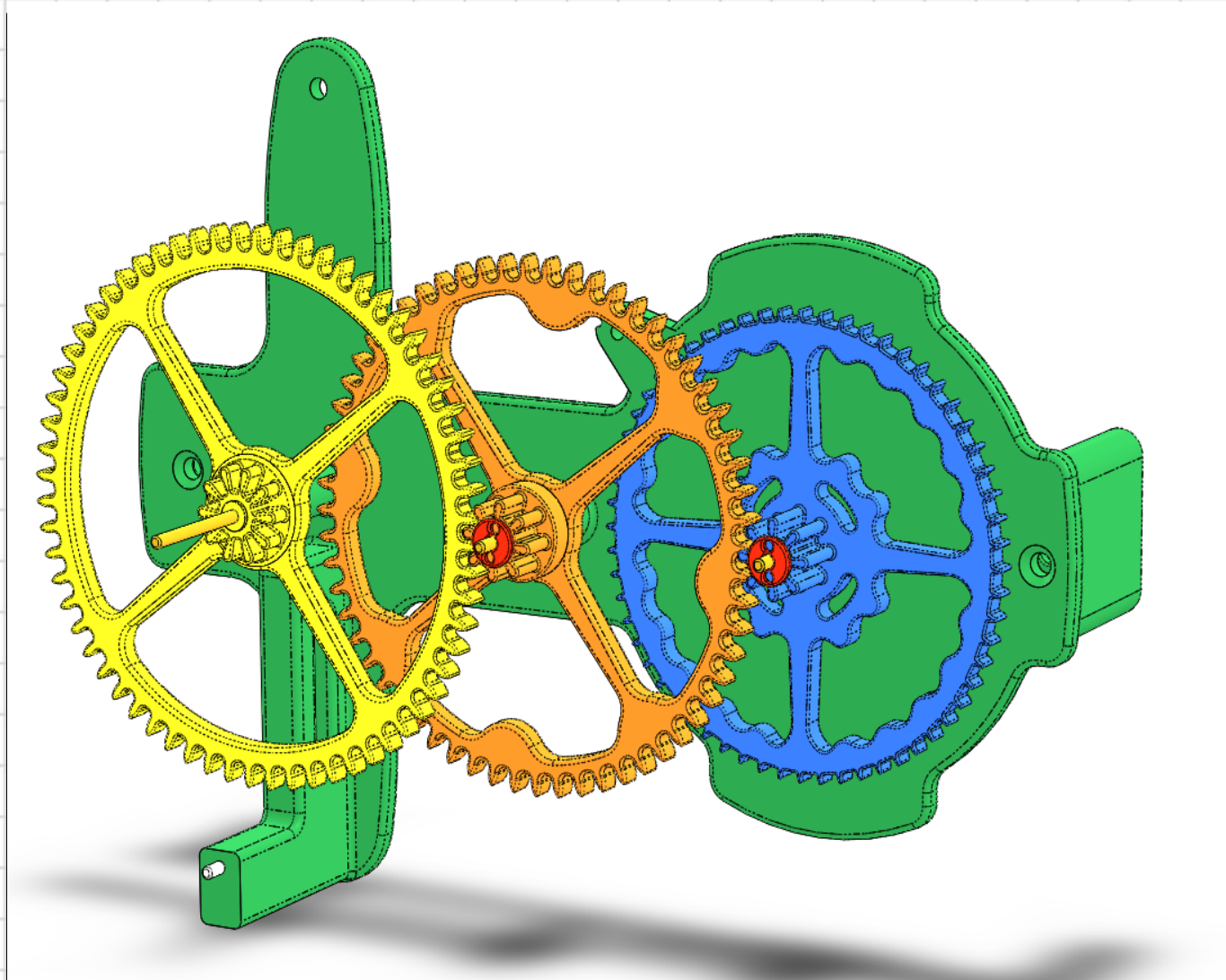


The 64 toothed Gear shown above is required to be assembled with care to ensure the shaft fits square to the gear. I recommend you use a drill press to do this as I have done, as it ensures that the gears are mounted square to the shaft.

Clock 56 - Pendulum Driven Clock

Construction instructions for Clock 56

Step 2 Fitting the Gear train- 2

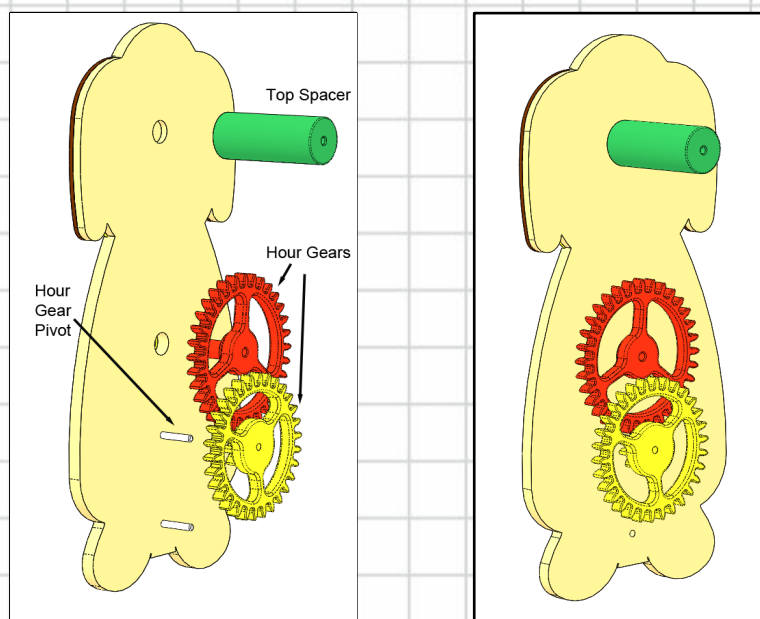


Now load the Shaft on the 64 toothed gear into the Ø3.1 mm hole in the support pillar and again ensure that it runs freely. No shaft retainer this time as the next step is to load the hour gears onto the back of the Dog Dial prior to fitting onto the to the other end of this shaft.

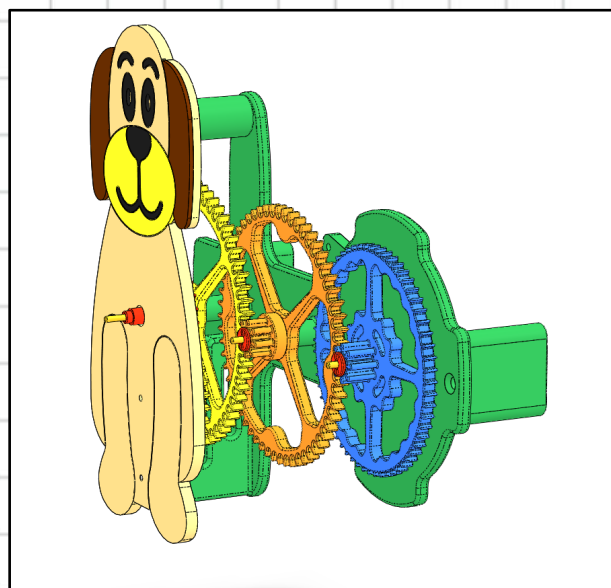
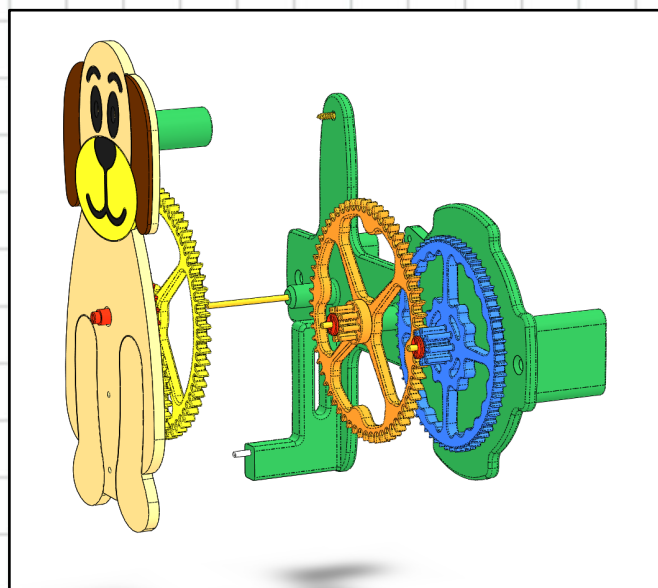
Clock 56 - Pendulum Driven Clock

Construction instructions for Clock 56

Step 3 Fitting the Hour Gears to the back of the Dog Dial.



Start by gluing the Top Spacer into the top hole at the back of the Dog Dial, and then load the Red Hour gear into the large hole in the centre of the Dog Dial and the yellow gear onto the Ø3 mm pin just below it.

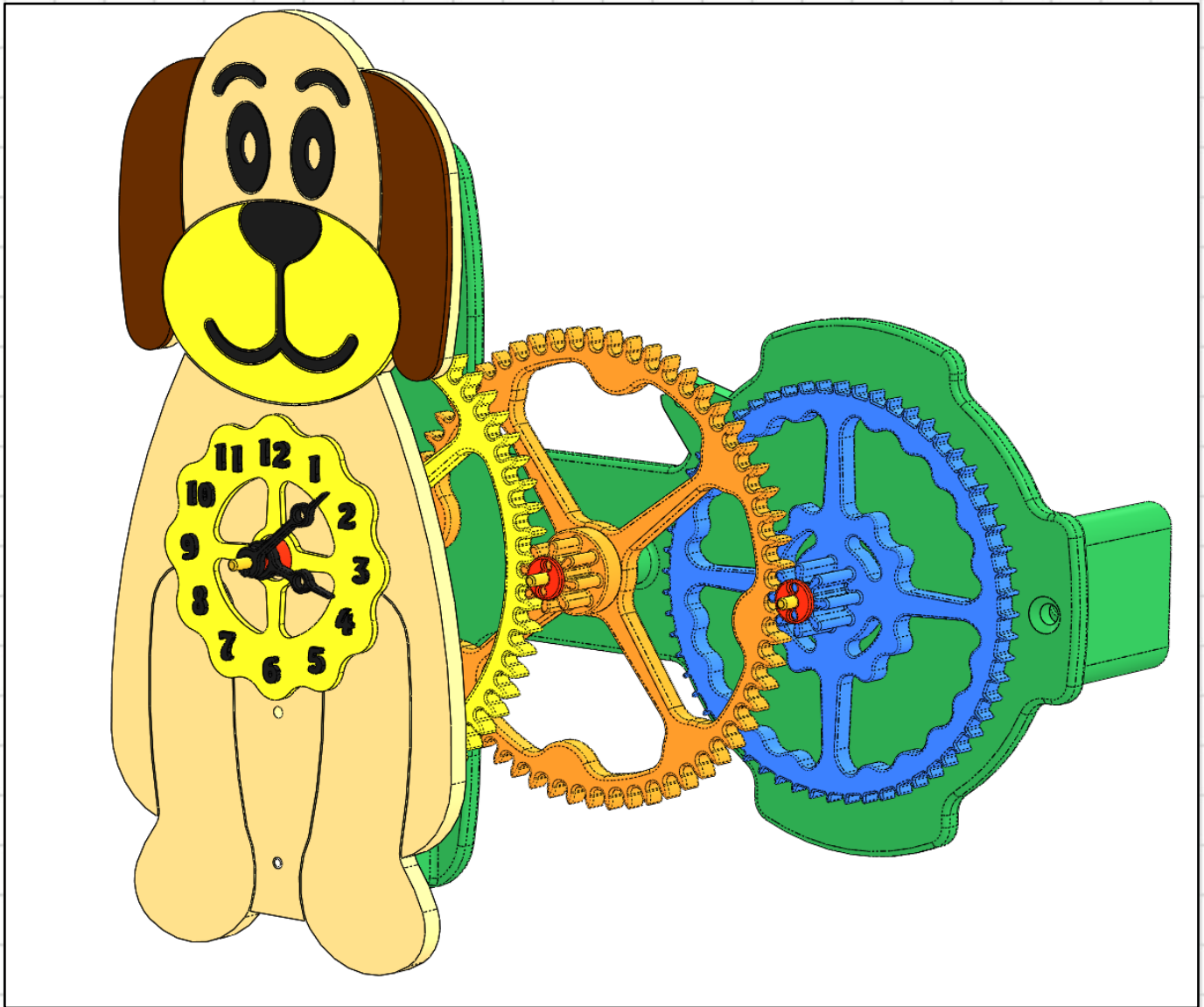


Now you can slide it onto the shaft protruding from the 64 toothed gear and secure it with a screw through the back frame into the Top spacer. Note the Ø3 mm pin at the bottom which engages the hole at the bottom of the Dog.

Clock 56 - Pendulum Driven Clock

Construction instructions for Clock 56

Step 4 Fix the Dial and the hands

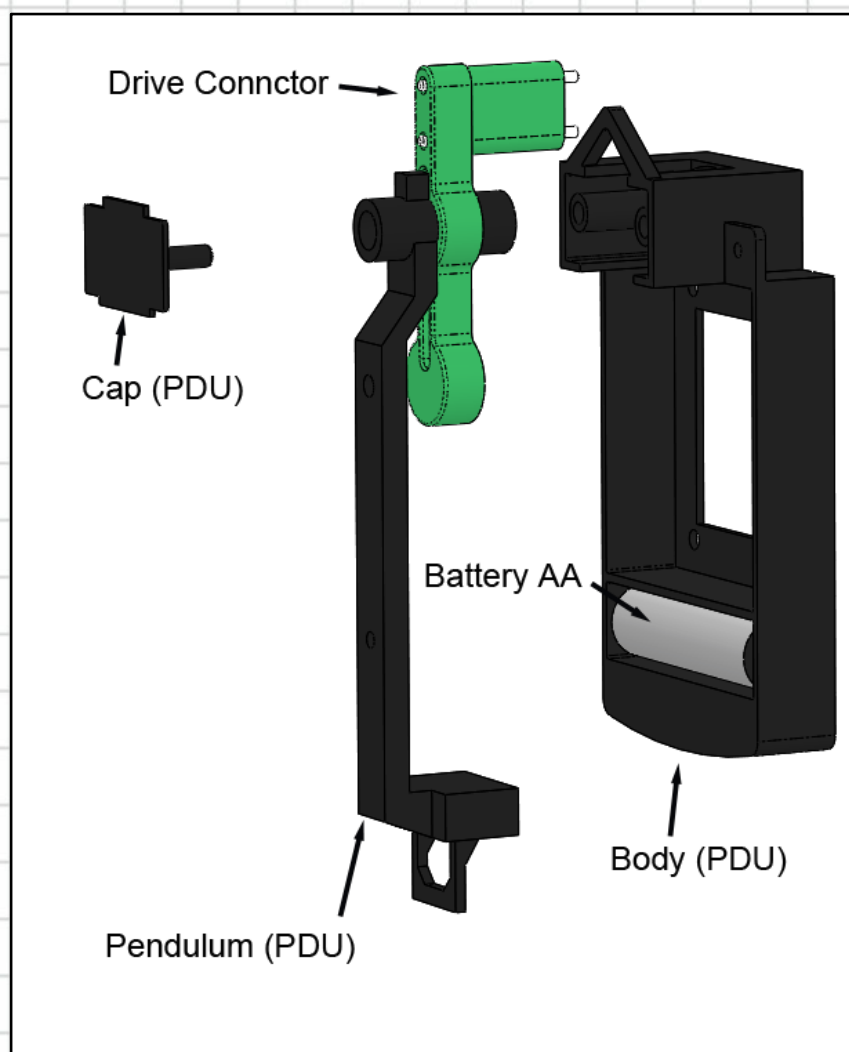


Fit the Dial next to the front of the Dog, centre it around the centre hole that has the red gear protruding and Super glue in position. Finally attach the hour hand to the end of the protruding red gear, and the Minute hand to the protruding shaft.

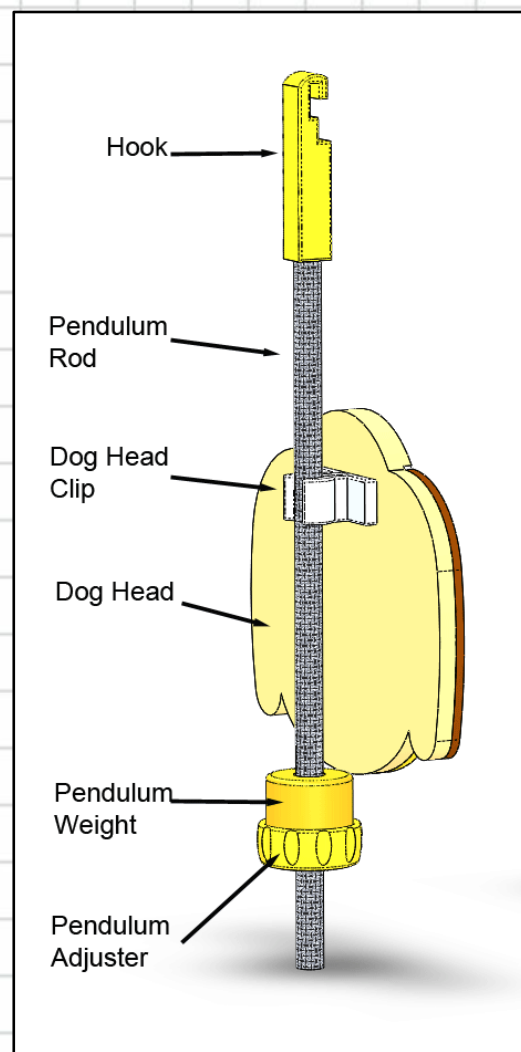
Clock 56 - Pendulum Driven Clock

Construction instructions for Clock 56

Step 5 Assembling the Pendulum Drive unit



The Pendulum drive unit needs to be partially dismantled so that the Drive connector shown above in green can be slid onto the tubular protrusion at the top of the Pendulum. This needs to be a tight fit and hang vertically when initially assembled, but it can be adjusted slightly by swinging slightly side to side if you experience difficulty getting the clock to run.

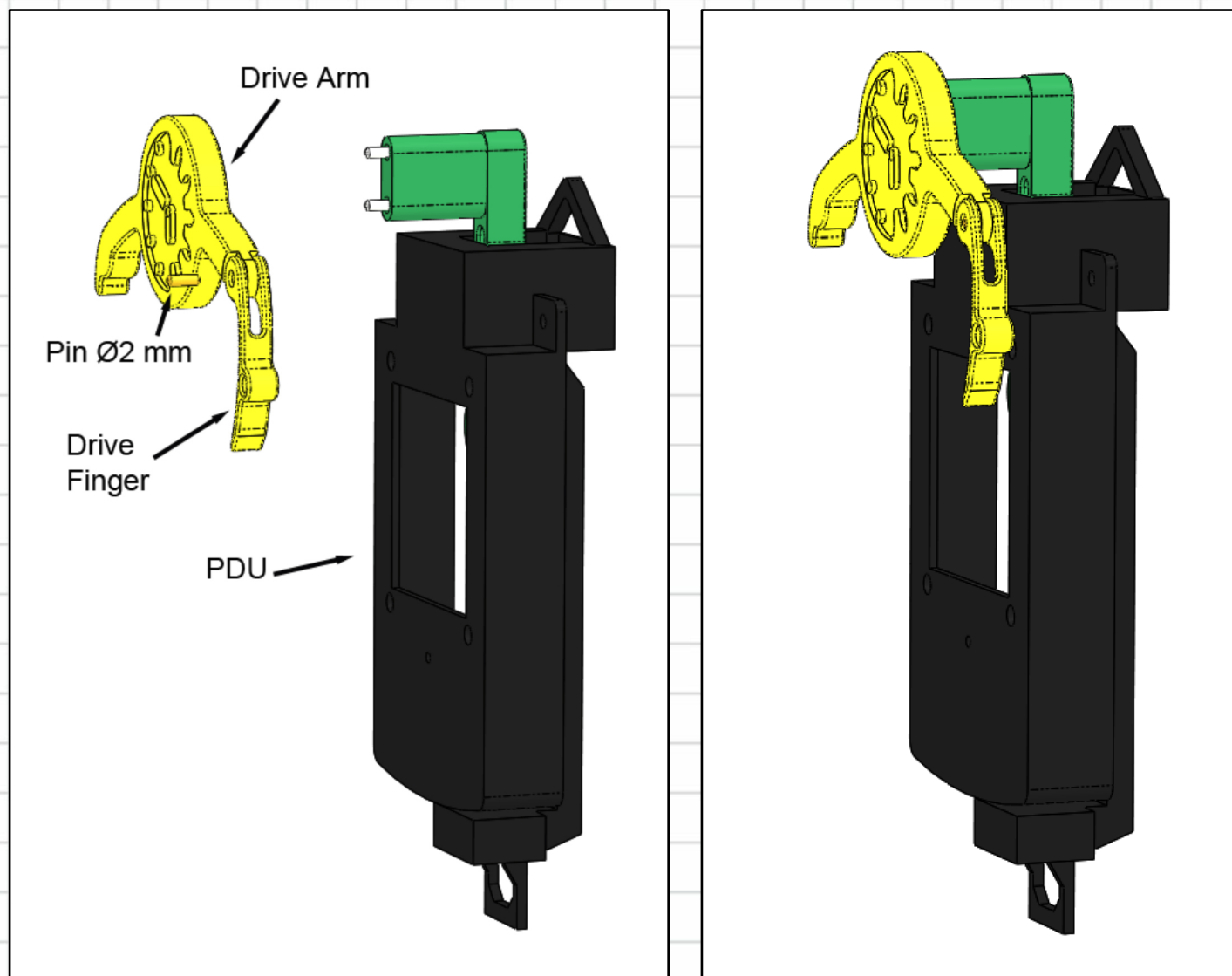


The bottom section of the Pendulum assembly is shown above with the hook at the top being a tight fit or glued onto the Rod. The Dog Head clip is glued to the back of the Dog head and is clipped onto the Pendulum Rod. The Pendulum Weight is a loose fit on the rod and sits in the Pendulum adjuster which is a Press fit on the rod so that it can be moved up and down if needed to adjust the running of the clock.

Clock 56 - Pendulum Driven Clock

Construction instructions for Clock 56

Step 6 Fitting the Drive Arm

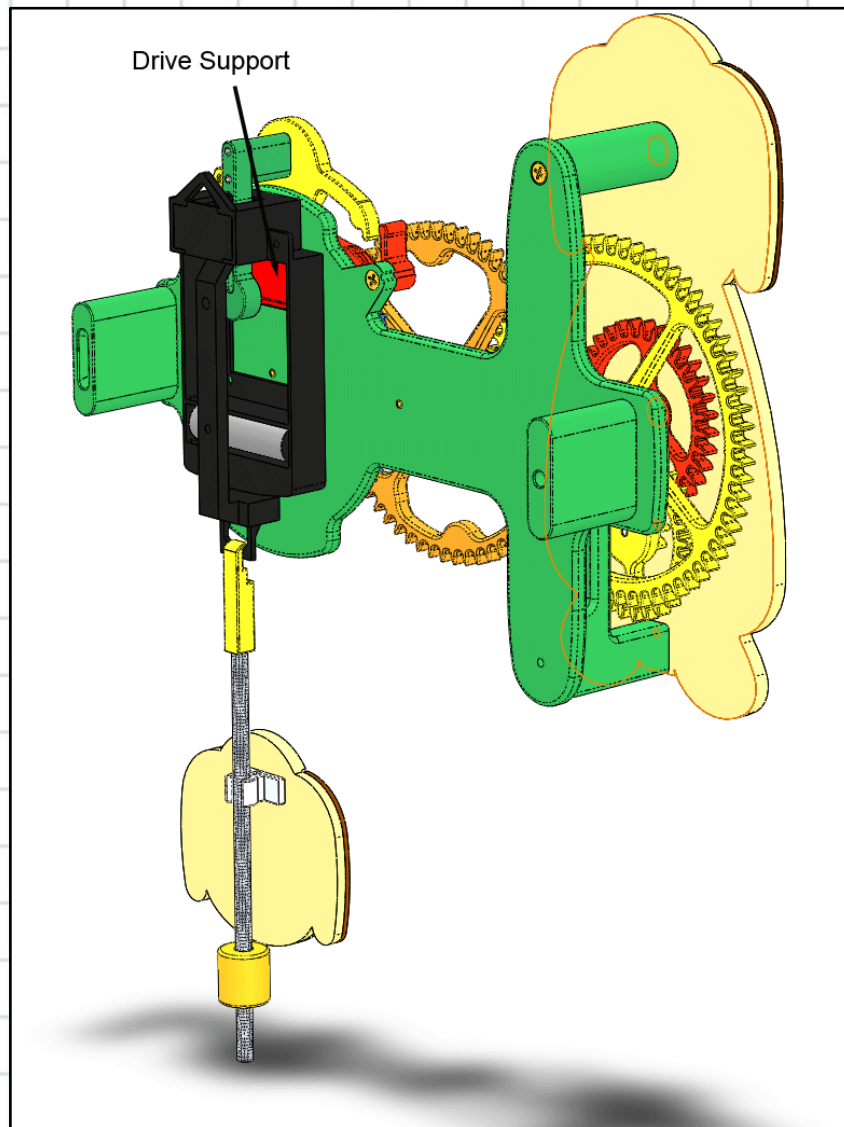


The Drive Arm needs to have the Drive Finger fitted first using a small Ø2 mm pin, it can then be fitted to the Drive Connector shown above in green using the to protruding pins and glue if necessary.

Clock 56 - Pendulum Driven Clock

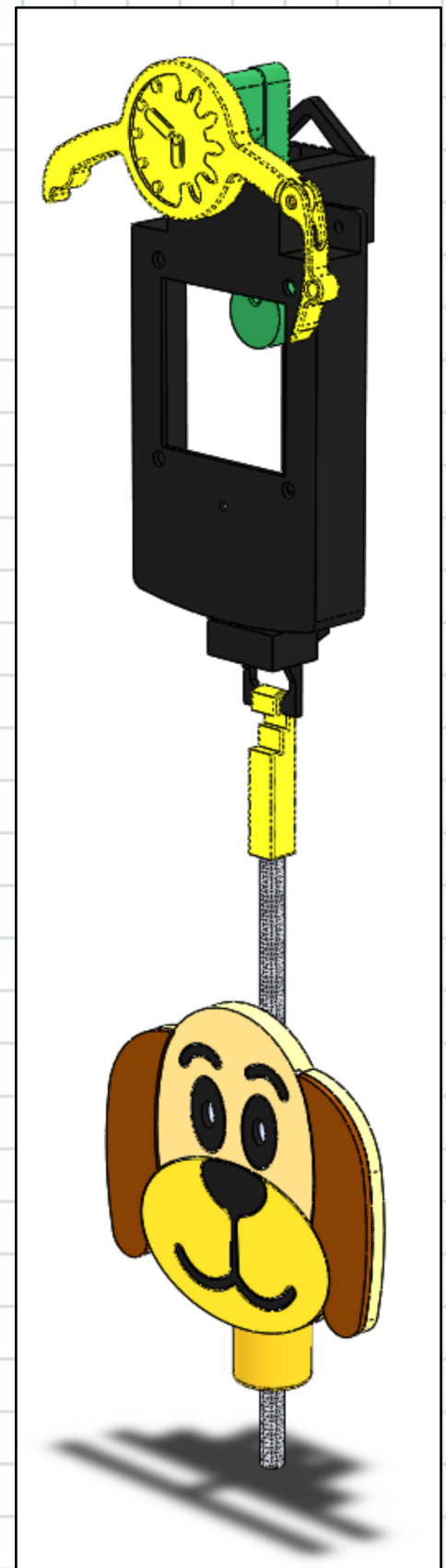
Construction instructions for Clock 56

Step 7 Fitting the whole Pendulum assembly



The completed Pendulum assembly is now simply hung on the drive support shown here in red.

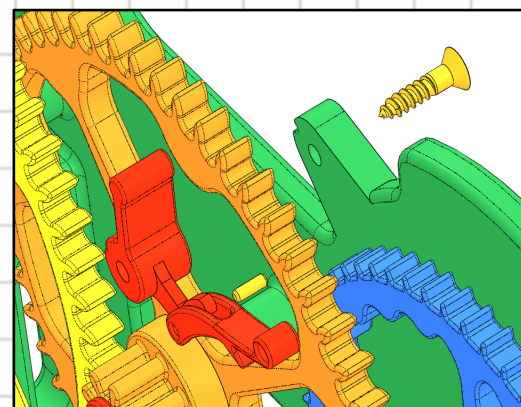
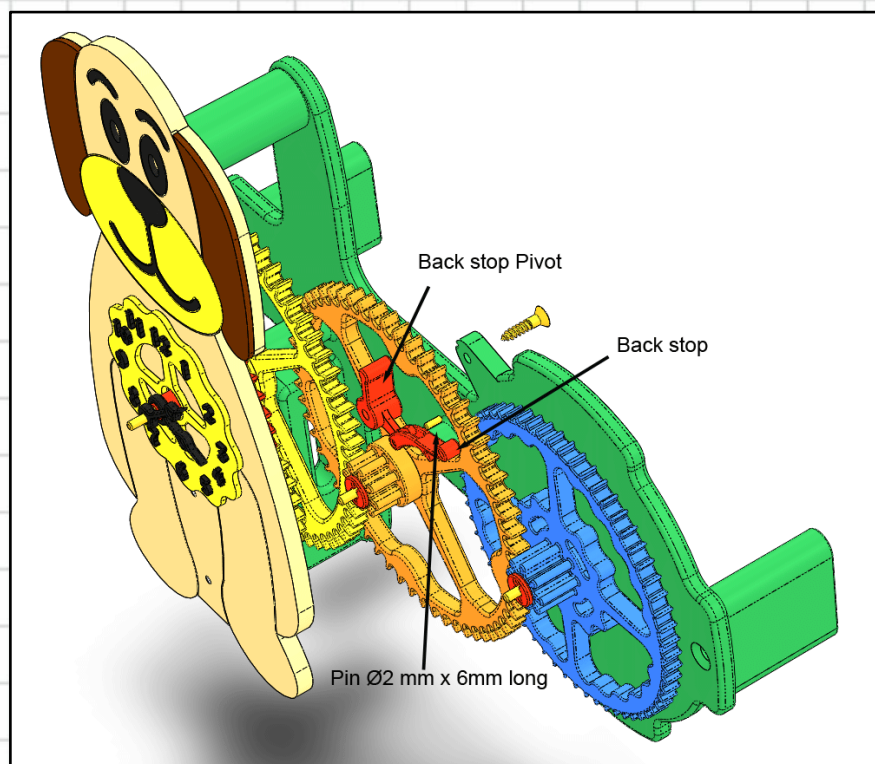
Note the rate at which the clock runs can be speeded up or slowed down by moving the pendulum weight up to speed it up or down to slow it down.



Clock 56 - Pendulum Driven Clock

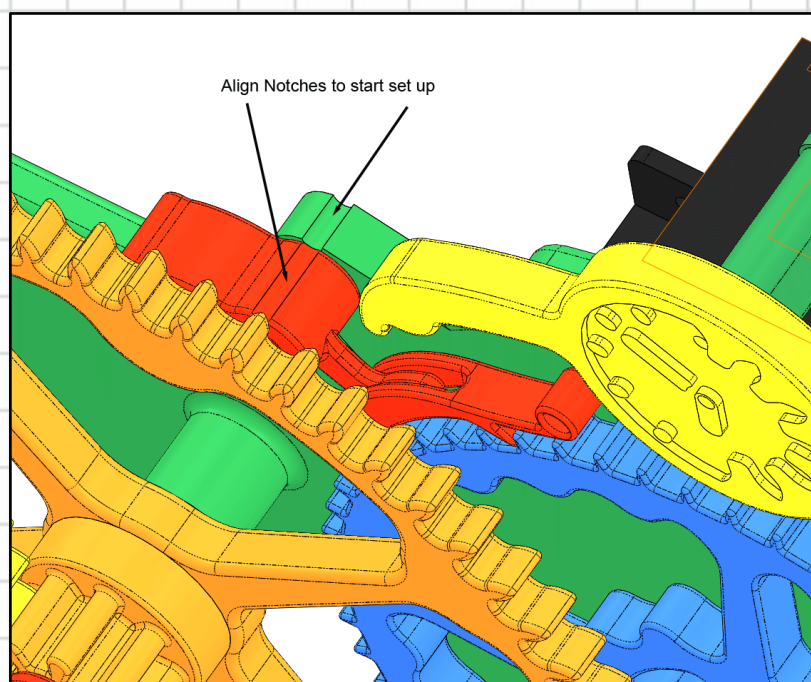
Construction instructions for Clock 56

Step 8 Fix the Back stop.



The two parts of the Back stop are held together with a small Ø2 mm Pin and are held onto the Back plate with a short screw, tighten sufficient so that it can't move accidentally but can be adjusted.

When fitted the Back stop itself shall be able to swing freely so so as to be able to engage with the Drive gear.

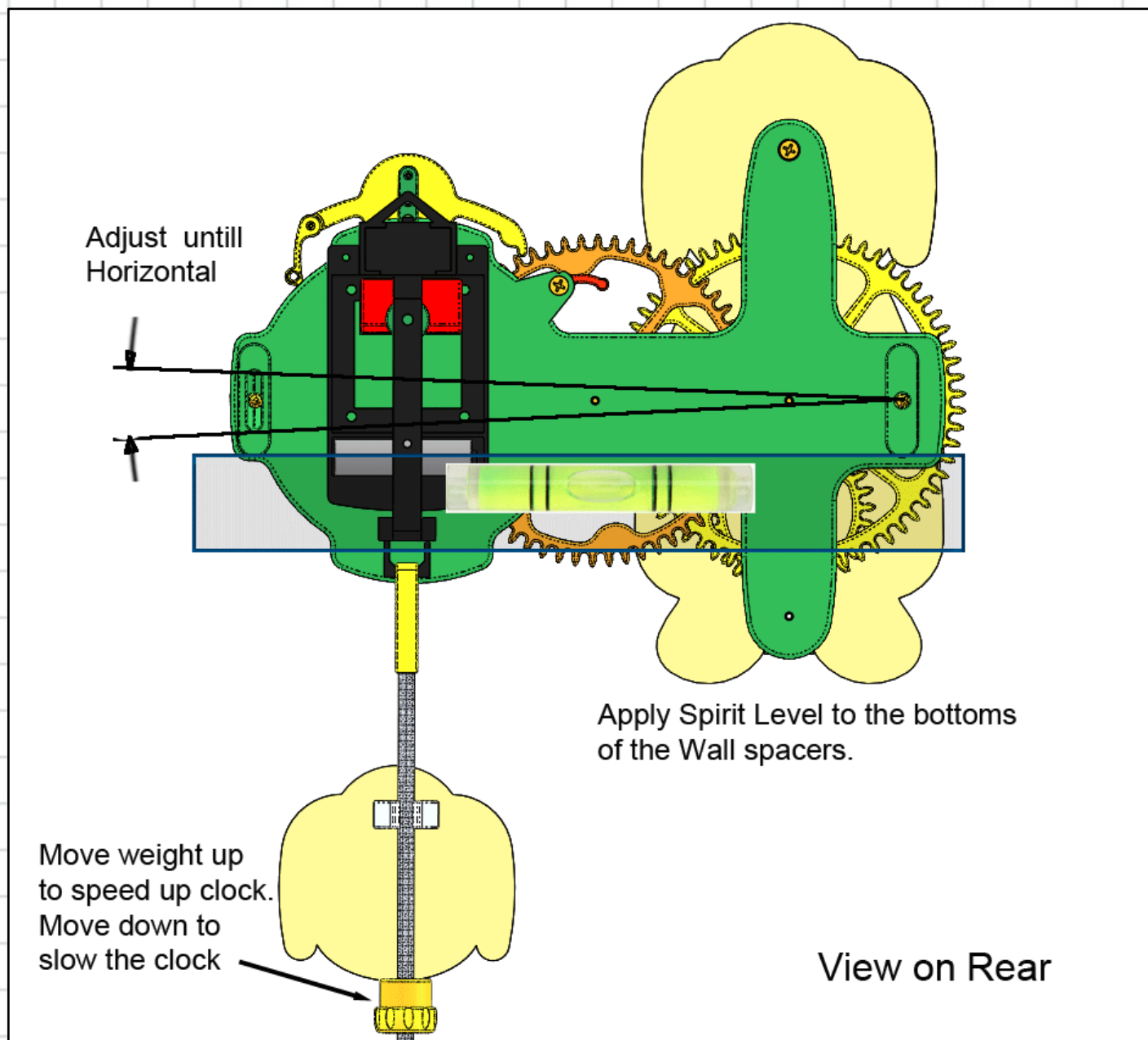


The Back stop should now be adjusted so that the notches line up.

Clock 56 - Pendulum Driven Clock

Construction instructions for Clock 56

Step 9 Fitting to the Wall

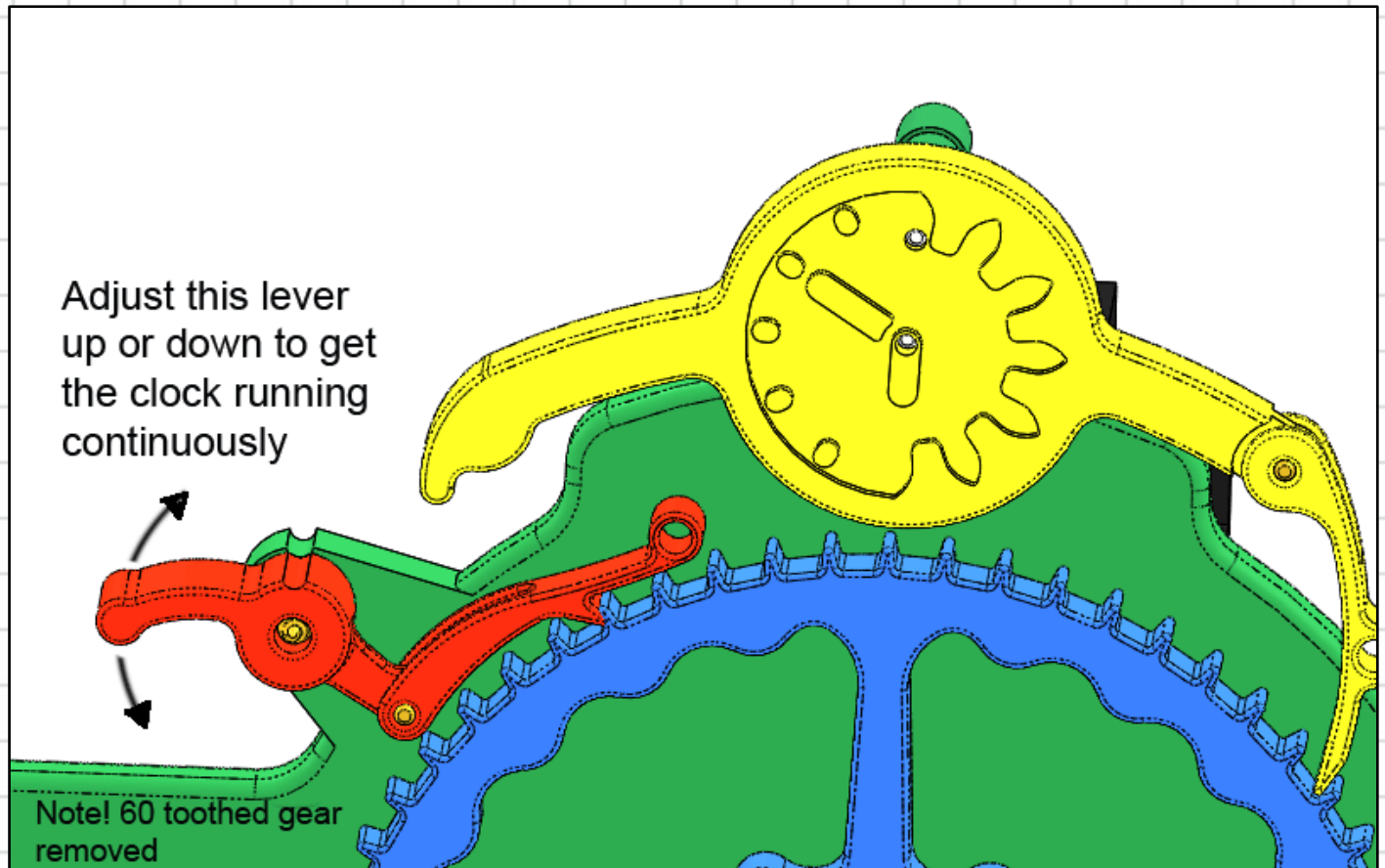


Once all the parts are assembled onto the clock it can be mounted to the wall. The view above shows the back of the clock so you can see the placement of the spirit level on the bottom of the wall spacers more easily. The right hand screw is fitted first and then tightened until the clock can be adjusted to the horizontal. At this point you can mark the position of the second screw, move the clock out of the way drill the second hole and then fit the hole plug and then finally use the last screw to hold the clock in place screw.

Clock 56 - Pendulum Driven Clock

Construction instructions for Clock 56

Step 10 Adjust running



I should have mentioned earlier that the AA battery needs to be fitted into the clock to enable it to start running.

Once the clock is mounted on the wall and the pendulum fitted onto the back the clock can be adjusted so that it runs continuously by moving the Red lever up or down.

Note the empty $\varnothing 3$ mm holes in the Drive Finger and the Back stop can have a small weight fitted if it is deemed necessary to get the clock running continuously.