Standards and Effectiveness Division

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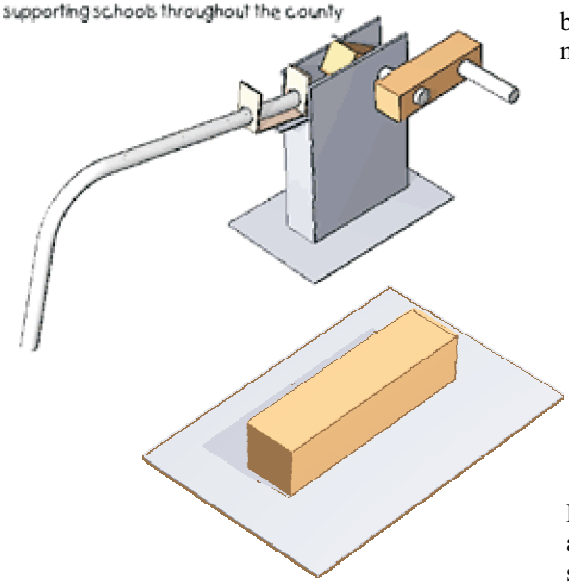
# MECHANICAL HAMMER

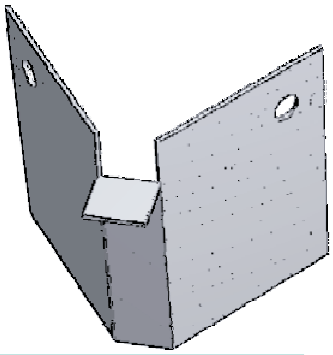
This worksheet describes the building of a single unit mechanical hammer. By building several identical units sharing the same crankshaft you can create exciting multiple hammers like the one shown on the website keypage



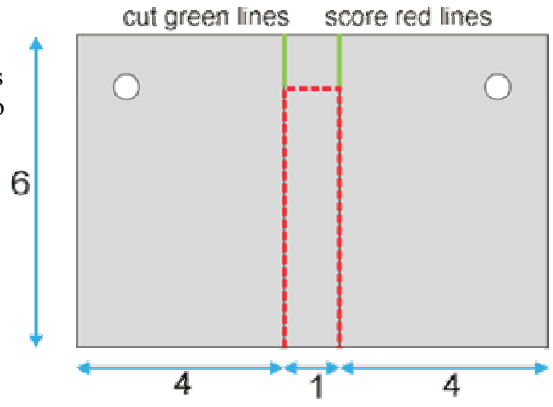
**CUTTING LIST**

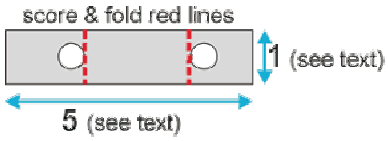
| | |
|---|---|
| Base block | 1cm square softwood 4cm long |
| Crank | 1cm square softwood 4cm long [drilled each end 5mm] |
| Trip | 1cm square softwood 2-3cm long [drilled near one end 5mm] |
| Hammer shaft | Paper stick 5mm diameter, 15cm long |
| Crankshaft | Dowel or paper stick, 5mm dia, 5cm long |
| Crank handle | Dowel or paper stick, 5mm dia, 2½cm long |
| Frame | Stiff card approx. 6cm x 9cm |
| Base | Stiff card approx. 6cm square |
| Bracket | Stiff card 5cm x 1cm |

Begin by gluing the base block to the base card and leaving to set while you are cutting the card frame

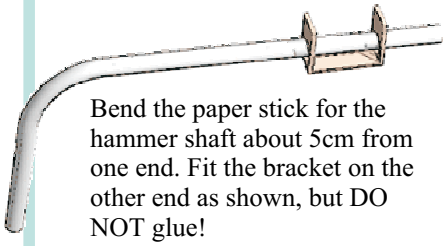


Make the card frame by cutting and scoring a piece of stiff card, as shown here. It is probably better to punch the holes [5mm dia.] with the card folded to help line them up. Don't punch too near the corner or you will weaken the card.
Fold the card, bend down the small square 'hinge', and glut to the base unit

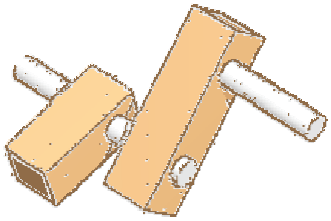



The bracket for the hammer shaft is made from card, the length is not important but the width is. It's better if the width is just a little less than 1cm. Notice that the folds are right next to the holes - this is important Holes need to be a tight fit for the shaft

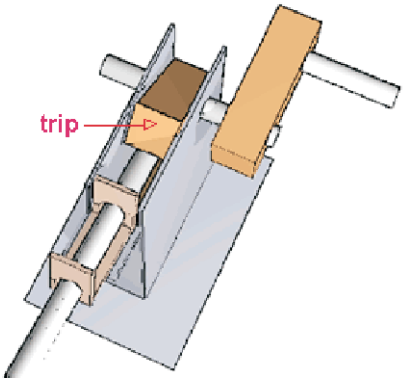


Bend the paper stick for the hammer shaft about 5cm from one end. Fit the bracket on the other end as shown, but DO NOT glue!



This is the crank and trip assembly shown assembled. Of course the trip has to be fitted when it is between the sides of the frame. Take care not to damage the card when you're fitting this in place. It's a good idea to put you finger behind the hole and then try to push the rod through your finger! This provides good support. If you are making a multiple hammer don't glue the trip. [unless it's a very loose fit] This will let you adjust the timing of the hammer.

Assembly should be straightforward.
Glue the bracket to the 'hinge. [all bracket outside the frame] Slide the shaft through the bracket [when it's dry!] until the long end of the trip just overlaps the end of the stick. Make sure that the short end of the trip doesn't touch the shaft. When you're satisfied a touch of glue where the stick goes through the bracket will stop it slipping.
*You will probably have realised by now that if you had a trip with the hole in the centre both ends could operate the hammer and you would get 2 lifts per revolution.*




**TROUBLESHOOTING -** if your hammer doesn't work when you first assemble it, it is probably because the level of the end of the shaft doesn't match the level of the trip. The simplest way to adjust this is to re-bend the paper stick, but you could add a little drilled block to the business end of the hammer - a kind of hammer head. This will lower the other end of the hammer shaft.

Making a double or triple hammer is still very simple. Everything is the same except for the crankshaft. You will need a longer dowel. It isn't necessary to have to fit the crankshaft through 2 holes in every frame. You can cut away all the holes except for the 2 outside ones. [see the diagram on the right] This will make fitting easier and it will reduce unnecessary friction,
[What's friction?]