Weather for Schools

Building a Louvred Weather Station

This design is simply a guide. It is intended to be made by adults taking sensible safety precautions. The user is responsible for his/her own wellbeing and safety.

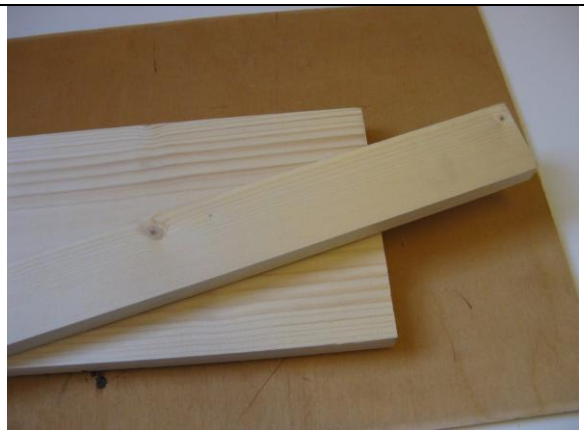
This Stevenson Screen design is intended to come as close as possible in its functions to a purchased Stevenson Screen given the limitations of average DIY skills and materials. The weather station provides for circulation of air whilst stopping most rain and wind. The whole should be painted white to reflect sunlight. The whole should be mounted on the north facing side of a post so that the bottom of the thermometer is 125cm from floor level. A balance has been struck between the requirements of a Stevenson Screen and the practicality of making one from scratch. Similarly a balance has been struck between expense and a desire to get the best conditions for good quality weather data collection. Naturally all work must be carried out carefully with regard to safety.

The chart below attempts to summarise these points clearly.

Pros	Cons
It is made from materials which are obtainable in DIY stores.	Some of the materials work out rather expensive, costing before starting is essential.
Only basic tools are required for the construction.	An ability to measure, saw, drill, screw and keep things fairly square is needed.
The double louvres allow air to circulate but do not let in the rain or wind	Because the plastic vents used are available in different makes precise measurements cannot be given in the design. It will be necessary to work these out once the vents are purchased. The design means that the side louvres are vertical – which is a little unusual. In very heavy rain some water may get in. This is remedied by drainage/ventilation holes in the base.
The framework is put together using metal corner joints of two types. These make complicated woodwork unnecessary.	Because the metal plates have to be screwed in, the wood can split if the holes are not drilled. Where the metal plates overlap, at times they have to be staggered so that they fit.
There is a double roof and a slatted base as required for good weather data collection.	The roof, centre back and base sections are made from larger pieces, and may mean you have to buy more wood that you need. If possible these could be purchase as offcuts from a timber yard.
The instruments are hung centrally to the space. This means that the air can circulate round them.	
It is post mounted which means that there is no heat radiating from walls and the weather station can be set at the correct height.	The fencing post will need to be securely set into the ground.

Materials

These materials can be quite expensive. Use this page as a shopping list to go and check availability and to try to estimate the final cost. It may also help to check the tools (and therefore skills) which are needed. Tools and materials should be used with full regard for safety.



Wood

For sides, door and some of the back – planed timber - 44mm x 18mm x 2100mm

For the base and centre back - planed timber - 144mm x 18mm x 2100mm (offcuts of a similar thickness would be better)

For the roof (inner and outer) -

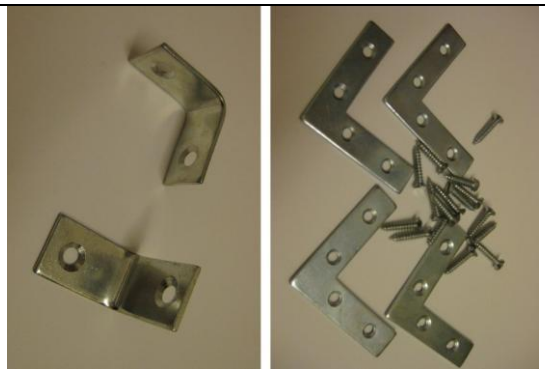
Louvred Vents

These work out quite expensive as they are put on the outside and the inside. This double loured effect is the main advantage of the design. When louvres were just on the outside were used the rain got in.

2 x large (approximately 270mm x 170mm.)

10 x small (approximately 270mm x 90mm.)

(NB – use the ones without fly screens, they allow the air to flow better for this purpose)



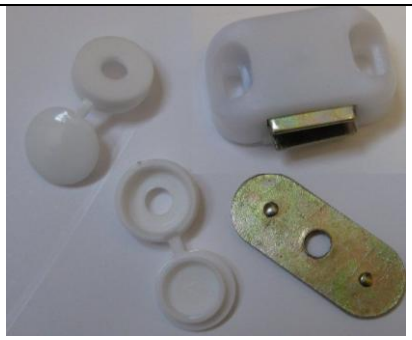
Two types of metal fittings – the two parts in the image are not to the same scale.

The L shaped fixing plates are used in the construction of the different sections.

The small angled brackets are used to join the sides to the back.

18 x L shaped fixing plates

4 x small angled brackets

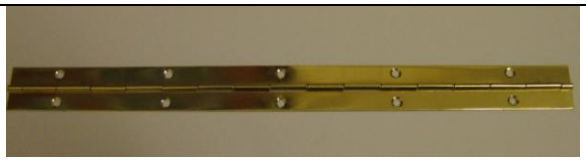
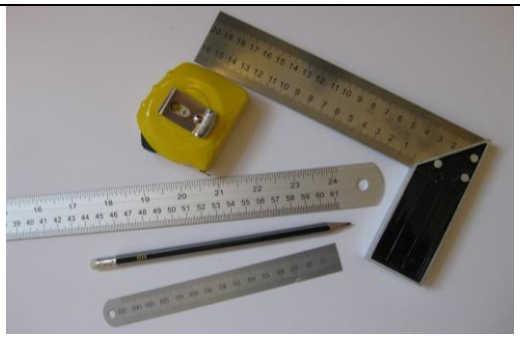


Fittings

1 x magnetic catch

24 x screw covers

The screw covers were only used on the outside. They covered the screws which were used to attach the vents.

	1 x length brass chain to stop the door from dropping down 2 x eyes to secure chain
	1 x continuous hinge (300mm) (aka piano hinge) These can be cut to length using a junior hacksaw
	Glass paper and sanding block
	Materials for weatherproofing – if this is done carefully the weather box will last longer Primer Undercoat White gloss Paintbrush Brush cleaner
	Tools and materials for filling screw holes Wood filler Filling knife Used for securing the inner vents - Glue gun Glue sticks
	Measuring tools – to measure sizes, and for keeping the construction square Tape measure Metal ruler(s) Pencil Set square

	Tools Screwdrivers (to match screws) Hammer Panel pins Screws (the size depends on the thickness of the wood etc.)
	Saw NB – The saw you use will depend on your requirements and experience. The wood needs to be cut with minimum damage, so the teeth of the saw should not be too big.
	Drill Bradawl Countersinking tool

Making

Do read the introduction sheet carefully before embarking on this project. This will help you decide if this weather box meets all of your requirements.

These instructions are a specific as they can be, but as the design is built around the vents, and these may be slightly different in size, there is a certain amount or flexibility in the design. Although this may sound complicated, it will mean that the design will fit whatever vents you are able to purchase.

Zoom in to look more closely at the photographs, and look at more than one photograph. Read ahead so that you understand the sequence for putting the box together. The plans, used in conjunction with these instructions may help in giving an insight into how the pieces are arranged.

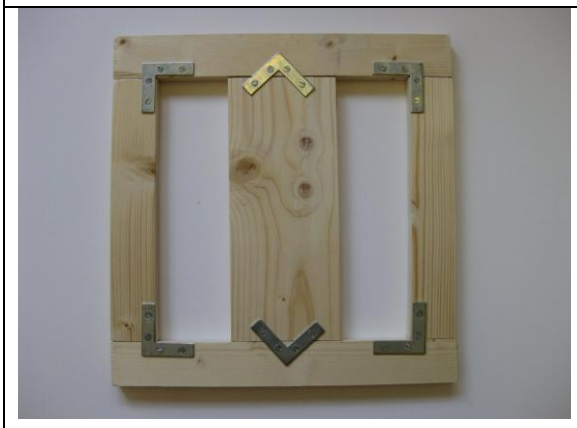
	The measurements need to fit round the vents. Place two strips of 44mm x 18mm planed wood under the long sides of the small vent. Make sure the wood is in a position to receive the screws which will secure the vent. Check that the vent is flat against the wood. Measure the gap between the two pieces of wood. This will give you the length of the wood needed for the **horizontal** parts of the sides. Do the same to work out the distance between the top and bottom sections. This will help you to work out the gap between the top and bottom pieces of the sides. (However see the note below regarding the extensions at the top of the sides.)

Sides

Build the sides using the L shaped fixing plates and the 44mm x 18mm planed wood. Each side needs to be a mirror image of the other.

The fixing plates go on the inside and are staggered as seen in the picture. Although the screws will go in easily when a starter hole is just bradawled, if it is close to the end of the wood the wood may split. It is a safer bet to drill the holes first.

The upright pieces have been extended to provide a sloping support for the external roof. In this example the roof is a little too sloping, it may be better to make it a little less steep.



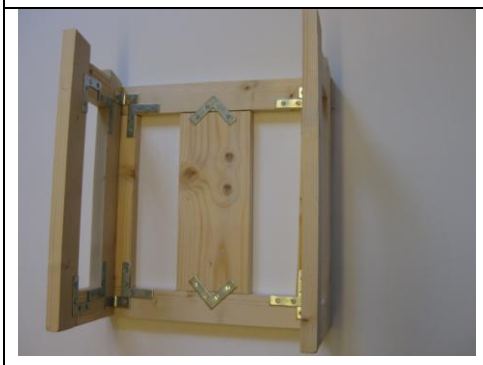
Back
Making this need some careful thought and measuring.
Read the instructions on the right carefully.

The outer strips of the back are made from the 44mm x 18mm planed wood.

The back is constructed to fit two small vents placed vertically. The centre section is used to hang the Stevenson Screen onto the post, which is why it is not made from a vent.

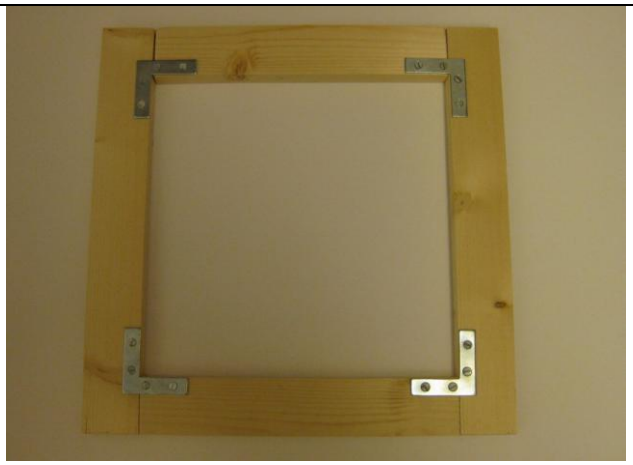
The back needs to have the same sized gaps vertically as the sides. The overall width of the gap needs to be the same as the width needed for a horizontal vent. (This will be the same width as for the door.) Make this outer frame first.

The centre section is made from the 144mm x 18mm wood or off cuts, cut to size. Place the two vertical small vents in place. Measure the size of wood that is needed to fill the gap. Fix it in place as shown in the picture.



The sides are joined to the back using 4 x small angled brackets. See the pictures below for more detail of how the sides are positioned in relation to the back.

The two sides are positioned on the back. Make sure that the sides are level with the edge of the back, and hold them at right angles as the brackets are screwed in place.



Door

Build the door using the L shaped fixing plates and the 44mm x 18mm planed wood.

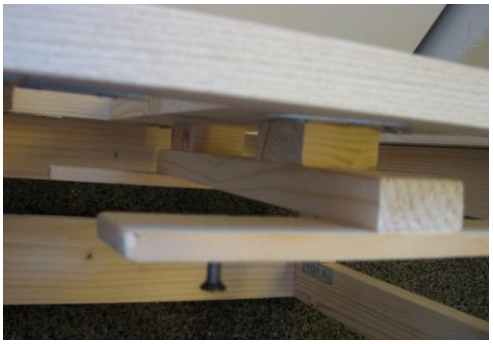
The gap in the centre needs to be made to fit one horizontal large vent and one horizontal small vent. It will be the same width as the back, but it is not quite as tall as the back. Again try it out and see that the screw holes of the vents are clearly on the wood, and that the vents are sitting flat on the wood.

Having worked out the measurements, the longer sections of wood need to be the vertical sections, and the shorter ones the horizontal sections.

The base is made from the 144mm x 18mm wood or off cuts, cut to size. It is cut to correspond with the width of the back and the depth of the sides and back. It is made in two pieces leaving room for air to circulate. See below for a modification suggested for the base.

The two pieces are secured in place with four screws screwed upwards as shown in the picture.

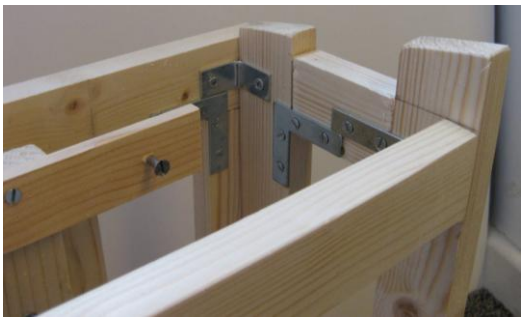
The instrument stand is constructed from 44mm x 18mm planed wood. It is a capital I shape. Look at the pictures to see how it is mounted onto two blocks of wood. The two screws which are not fully screwed in are for hanging two thermometers. The wood is kept thin so that there is still access to the back panel for drilling a pair of holes for hanging the box onto a post.



These two blocks place the instruments in the centre of the box, so that air can circulate round them.

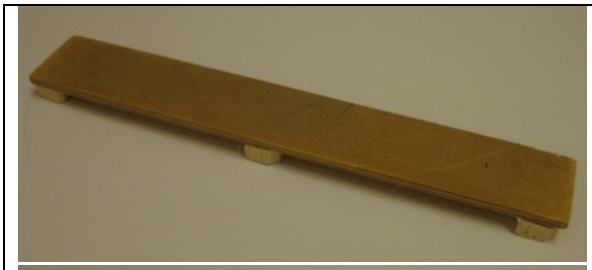
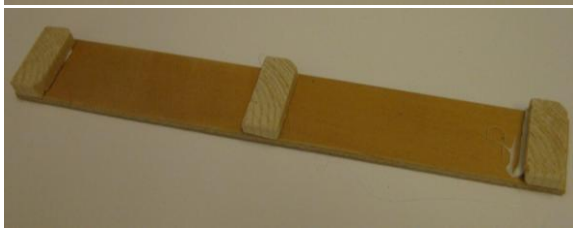
Two holes have been drilled in the back panel ready for hanging the box on a post. They have been countersunk. Zoom in to see them.

The front crossbeam has been measured and sawn from 144mm x 18mm wood. It has been placed level with the horizontal sections of the sides. It is screwed in place through the sides with two screws at each side.



Inner roof

This is made from off cuts of exterior plywood. It is made in two pieces, so that there is a ventilation space in the middle. The roof is tacked onto the horizontal side sections.

 	Inner floor This is made from off cuts. It is rather like a little bridge which sits over the gap in the outer floor. In this instance it was made using a glue gun, and secured in the box using a glue gun. On the left it is shown the right way up at the top, and upside down at the bottom.
	In this picture both the inner floor, and the outer roof are being tried in place. The roof is screwed in place from the top. This construction was then painted, with primer, then undercoat, then gloss. White is the only colour that can be used, so that it reflects the heat. The more effort that is put into careful painting, the longer the wood will last out in the elements. **After this had been painted a modification was made to reduce the gap at the front. See this in the final pictures. Also remember that drainage holes in the base are not shown in this picture.**
	Once the paint is dry the outer vents are screwed into place. Each screw is threaded through the screw cap before being secured in the wood. The cap is then pressed into pace to cover the screw head.
	The door is secured with a continuous hinge, cut to the required length. Put the box on its back, place the door in place. Position the hinge and check that the door will open. In this picture a piece of card has been placed as a spacer to keep the door level.

	Chain and magnetic catch The chain has been cut to length so that the door lowers down to a horizontal position. Two eyes have been used to secure the chain to the door and to the frame. A catch has been placed on the frame, and the magnetic plate is on the door.
	The inside vents are secured using holes drilled half way along each edge, as the metal plates stop them from being fixed with the existing screw holes. They are positioned so that the vents are facing in the opposite direction, meaning that the rain and wind cannot pass straight through.
	*This picture shows the narrow strip of wood just under the roof at the front that was added as a final modification. This reduced the gap at the front between the two roofs.* *The picture below shows a further adaptation.*

Under testing extremely rainy conditions showed that the vertical vents did let in a little water. For this reason some drainage/ventilation holes were drilled in the bottom. These seem to have remedied the problem.

The Stevenson Screen is fastened to a post. To see the correct height, and useful facts about where to position a Stevenson Screen visit ;

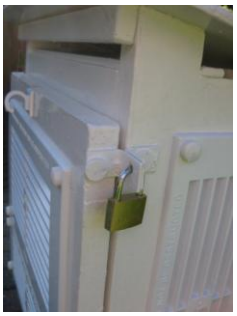
http://www.weatherforschools.me.uk/html/settingup.html

and

http://www.weatherforschools.me.uk/html/moresettingup.html

Security

You may wish to add some sort of token security. Two corner braces were used, and were secured with mirror screws which have caps which do not present a slot for unscrewing.



Plans