







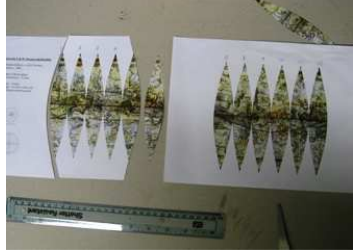
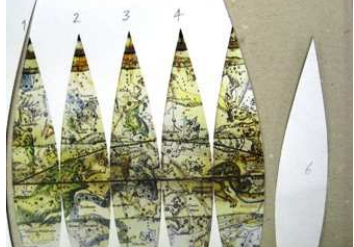
Instructions for making a model globe in 18th-century style stand

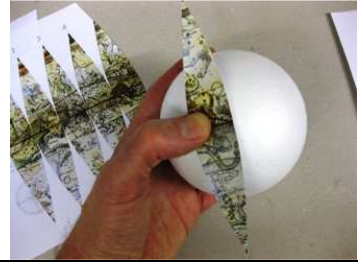



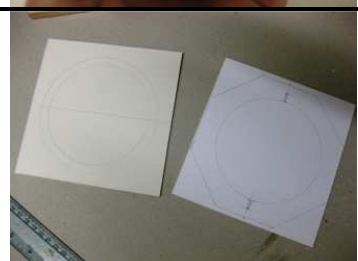

Age guide and safety: Best suited to age 10+ with parental guidance. Use of a modelling knife will need child supervision or be done by an adult to avoid injury. Supervision is also advisable for hammering the posts in and positioning the dress pins.

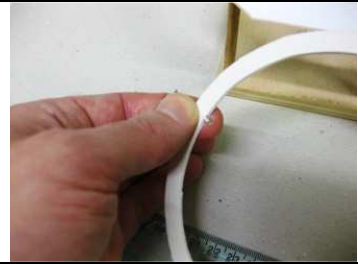

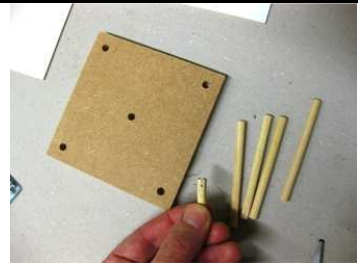
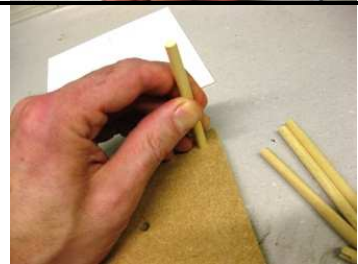


Time: Once you have collected all the resources together, you should allow a couple of hours for the model making.






Resources and equipment:

- Printed set of gores (available as downloads from the web page) – please be aware that these need to be printed to the correct size to fit the polystyrene globe. Depending on your printer, you may have to adjust the size during printing. The correct dimensions are noted on the image or the gores.
- Printed pattern for cutting out the rings that support the globe in its stand
- A polystyrene ball 10cm in diameter (preferably with “equatorial” and polar mould lines)
- Good pair of sharp scissors
- Strip of plain paper tape about 40cm in length
- A sharp soft (HB or B) pencil
- 30cm ruler
- PVA glue
- Mixing palette or small dish for the glue
- A soft brush
- 2 dress-making pins
- 2 small beads approximately 4 mm in diameter with holes for threading onto the pins
- 2 pieces of stiff mount card about 15cm square
- 1 piece of 9mm MDF or plywood about 11cm square for the base of the stand drilled with 4mm holes at the centre and corners (about 1cm in from the edges)
- 4 pieces of 6mm dowel cut to lengths of about 8cm
- 1 piece of 6mm dowel cut to length of 2cm with a 1mm groove cut into one end to about 5mm to hold the supporting ring
- A modelling sharp knife and cutting board
- A lightweight hammer

	<p>1. To begin with you will need to mark up the polystyrene sphere into 12 equal segments as a guide for pasting the gores in the correct position so not to leave a gap or overlaps when the globe is completed.</p>
	<p>2. Wrap the paper strip tightly around the equatorial line. Mark off the point of overlap and cut the strip so that it is exactly the length of the circumference of the sphere.</p>
	<p>3. Divide the strip into 12 equal segments. First, fold in half and mark the half-way point. Then fold each end into the half-way point, fold, open up and mark the quarter points. Finally, measure the quarter length precisely with a ruler and divide each quarter into 3 equal sections.</p>
	<p>4. Wrap the strip around the equatorial line and mark off the 12 equal segments carefully with a sharp soft pencil. Make sure the marks are on the equatorial line.</p>
	<p>5. Print out the set of 12 gores for either the celestial or terrestrial globe. Number them above each gore before cutting out. Each gore needs to be cut out separately and as precisely as possible. Try not to leave any "leftover" white or cut into the gore.</p>
	<p>6. As you cut out each gore, number it on the back in such a way that you can also see clearly the correct orientation, i.e. which end is the "north pole". This will help you to paste them on in the correct order and save any confusion.</p>

	<p>7. Now for pasting the gores onto the sphere. This part of the modelling process requires a good deal of patience to achieve the best result. First of all, wet the brush by dipping it into water and then dabbing it in PVA glue in the mixing palette. Paste the glue mix onto the reverse side of the gore making sure that it is thoroughly “wetted”.</p>
	<p>8. Place the gore carefully onto the sphere making sure that the “equatorial” lines on the gore and the sphere are aligned and that the left side edge of the gore is aligned with one of the pencil marks. As you hold the sphere in your hand, clamp the gore in the equatorial position with your thumb before you press the rest of it down.</p>
	<p>9. Carefully position the poles of the gore in position so that they are correctly orientated towards the poles of the sphere. At this point you will need to “work” the gore by stroking and stretching it slightly so that eventually it sits down snugly on the sphere without any wrinkles. This is only possible with the correct amount of wetting.</p>
	<p>10. Work your way round the globe pasting the gores in a similar way. Take care to stick to the pencil markings even if it means leaving a thin white gap if the gore has been cut too fine. Also, take care to check the number order of the gores and that the image matches up correctly (it is easy to get into a muddle if you go the wrong way round!)</p>
	<p>11. Print out the patterns for the supporting and horizon rings. Transfer the patterns onto the pieces of stiff mount card using a drawing compass and ruler. Take particular care to mark the “slots” and halfway lines accurately. Cut out the rings carefully using a modelling knife. <u>Make sure you have permission or help from an adult.</u></p>
	<p>12. Take the globe mounting ring and carefully insert dress-makers’ pins through the edge of the card along the line of the halfway lines so that the points of the pins just come out the other side a couple of millimetres.</p>

	<p>13. Now thread one of the “spacer” beads onto the point of one of the pins and position the globe within the ring so that the point is aligned with one of the poles.</p>
	<p>14. Hold the globe firmly and carefully push the pin into the pole as straight as possible. Do the same at the other pole making sure that you do not forget the spacer bead. You will find it easiest to do the other pole if you hold it at the bottom whilst you balance the bead on the pin point and position it. Check that the globe moves freely.</p>
	<p>15. Now you will need to assemble the stand for which you will need the square of MDF with 6mm holes drilled into the corners and centre. You can find the centre just by using a rule to draw lines diagonally from corner to corner. Drill the holes right through the MDF and make sure they are drilled at right angles to the base.</p>
	<p>16. Carefully tap the 6mm dowel posts into place with a hammer. Make sure that the end of the post goes right in and ends up flush with the underside of the base.</p>
	<p>17. Do the same with the 2cm grooved centre “anchor” post making sure that the groove is aligned parallel to the edges and NOT diagonally. Take extra care with the hammer when you tap the post into position not to break the weaker edges either side of the groove.</p>
	<p>18. Now position the octagonal “horizon ring” and glue it to the tops of the posts with a dab of PVA. Make sure the edges of the ring are parallel to the edges of the base and the ring is positioned centrally. This can be done by eye or measured.</p>

	<p>19. Now slip the globe supporting ring into position by sliding the edges through the slots in the horizon ring.</p>
	<p>20. Make sure that the sphere is angled slightly to reflect the latitude of the observer (about 52 degrees in Oxford). If the pole star is orientated at the top, then the sphere will show the heavens above the celestial horizon (given by the "horizon ring") in the northern hemisphere as if seen from outside the universe.</p>
	<p>21. Make sure that the bottom of the supporting ring is fitted into the groove of the anchor post. This may require some careful persuasion.</p>
	<p>22. Congratulations if you have reached this far! You should now have a beautiful model of an 18th-century celestial or 19th-century terrestrial globe in its stand.</p>
	<p>23. You may wish to finish off your model by painting the rings. It is best to use standard acrylic paints. You can achieve a varnish effect by putting a coat of PVA glue over the paint making sure that the paint has dried properly first. You might like to do some research into the decorative feature of 18th-century globes which included a calendar around the horizon ring along with a zodiac scale.</p>