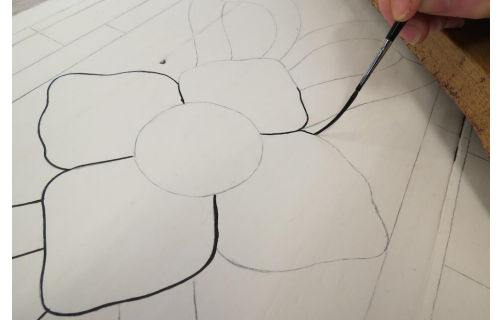


The six basic steps in the production of stained glass

1. Cartoon

An artist would initially make a sketch of the overall composition of a window. Then full-sized drawings for the whole window or for different sections (panels) of the window were made. These full-sized drawings are called cartoons. Generally, the shapes of the individual glass pieces, the details to be painted, and the colors of the glass were indicated on the cartoon. In the early Middle Ages these were drawn on whitewashed boards.



2. Cutting

Cutting the glass into rough shapes with the dividing iron. Different colors of glass were chosen for separate parts of the design, and the outline of each piece was then painted on the surface with white lime wash. Pieces were cut into rough shapes using a dividing iron, the heated tip of which was applied to the surface of the glass, causing it to break. Using a grozing iron to create exact shapes. The pieces were further reduced to the desired size with a grozing iron—an iron bar with a slot at each end that was used to chip away at the edges of the glass until the exact shape was created.



Stained Glass Handout #3

3. Painting

After the glass pieces were cut and shaped, they were painted with a pigment formed by mixing iron oxide and ground copper with powdered glass. Painting the glass with vitreous paint. Wine, urine, or vinegar was added to help apply the pigment to the glass. This vitreous paint ranged from brown to gray to black. Once painted, the separate pieces of glass were placed in a wood-fired oven called a kiln. The heat of the kiln causes the vitreous paint to fuse permanently to the surface of the glass.



What is vitreous paint? Glass painters used a special paint made of glass particles suspended in a liquid binder—vitreous means "consisting of glass"—to paint the side of glass that would face the interior of the building. During firing, the glass particles in the paint melted and merged with the glass surface to create a range of brown and black tones.

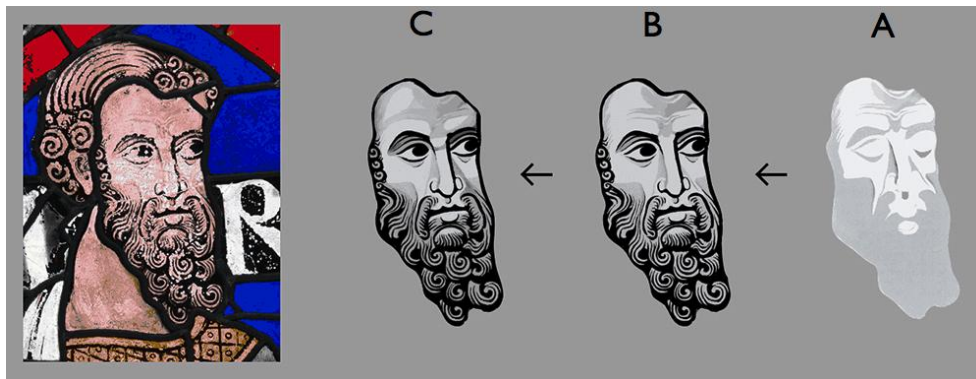
Stained Glass Handout #3

The image below illustrates the main steps in painting more detailed sections of a window, such as the face of a figure. These examples copy the face of Jared from the Ancestors of Christ windows and were made by the Stained Glass Studio at Canterbury Cathedral for this display.

Step A: For detailed pieces such as faces, guidelines are painted on the back then broad layers of thin vitreous paint are added to the front with a wide brush.

Step B: The guidelines on the back are rubbed away and thicker paint is added over the thin washes on the front with a liner brush to create detail.

Step C: Thin washes are painted on the back to reinforce shading and give the illusion of greater depth. Once finished, the piece is placed in a kiln in order for the paint to fuse to the glass.

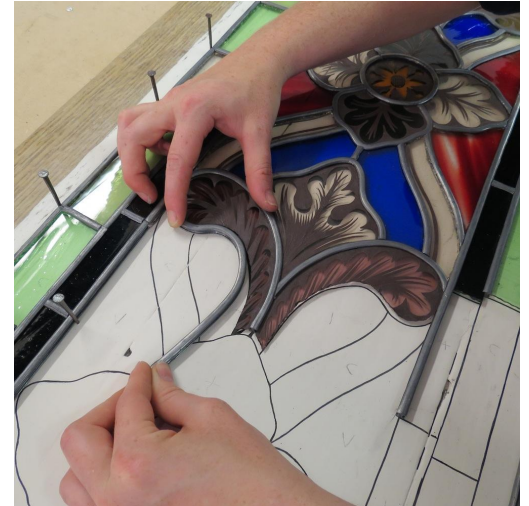


Jared (detail), from the Ancestors of Christ Windows, Canterbury Cathedral, 1178–80. © Robert Greshoff Photography

Stained Glass Handout #3

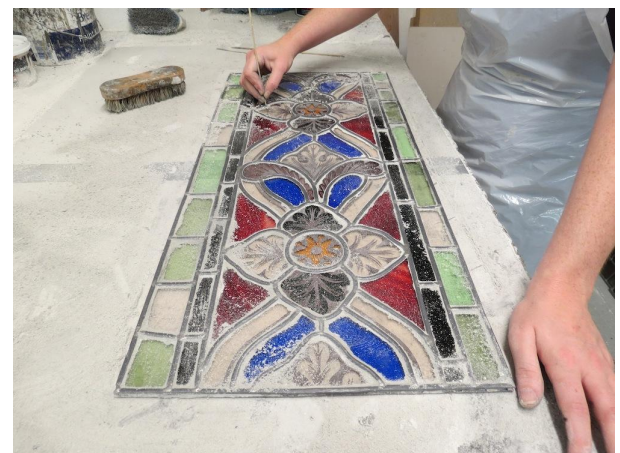
4. lead

Pieces of glass are held together with narrow strips of lead to form a panel. These strips are referred to as “lead came.” Lead is used because it is flexible and provides the adaptability needed for fitting around the various shapes of the glass pieces.



5. glazing

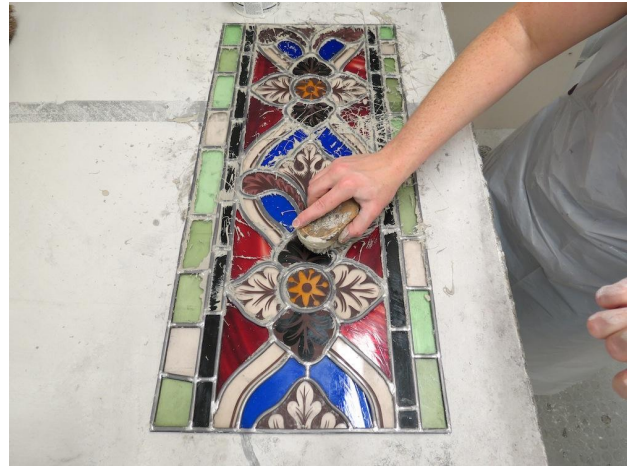
“Glazing” is the term for assembling a panel of stained glass that can then be set into a window. After separate pieces of glass are painted and fired, they are placed in position on the cartoon and joined together with lead came to form a panel. In the Middle Ages, a combination knife and hammer was used for this process. The knife edge was used to cut the pieces of came and the hammer end was used to secure nails to the work board to hold the edges in place during assembly. Lead came being joined with solde. The sections of came are then joined together with solder, an alloy of lead and tin that melts easily at a low temperature and sets quickly. Applying the semi-liquid cement with a brush.



Stained Glass Handout #3

6. cementing

The panel is then cemented to help secure the glass within the leads and to waterproof the window. A semi-liquid cement is applied with a brush and then is covered with a layer of chalk or sawdust to absorb excess liquid. The medieval recipe for this cement is not known, though the main ingredients were probably crushed chalk and linseed oil. The panel is then scrubbed down with a dry brush until the cement only remains under the lead. Scrubbing the panel with a dry brush



All images courtesy Dean and Chapter of Canterbury



Stained Glass Handout #3

