THE CHEMISTRY OF GLUE

It’s back-to-school season, which means it’s time to stock up on classroom supplies, including glue. Here, we examine what gives some of the main types of these adhesives their stickiness.

**PVA GLUE**

PVA glue, commonly referred to as Elmer’s glue in the U.S., is a solution of poly(vinyl acetate) in water. The poly(vinyl acetate) dries into a solid mass as the water evaporates, sticking objects together.

**SUPERGLUE & EPOXY GLUE**

Superglue is made of cyanoacrylates, which form polymer chains when they react with a small amount of water from the air. Epoxy glues consist of an epoxide resin (above right) and a hardener, typically a polyamine. When mixed, a copolymer forms. Both of these glues gain extra strength from cross-links between their polymer chains.

**GLUE STICKS**

Many glue sticks previously used petroleum-derived poly(vinylpyrrolidone) in combination with a soap gel to get the glue to stiffen. Sustainability concerns mean some manufacturers have now switched to using plant starch-based adhesives in the sticks.

**GLUE GUNS**

Glue guns melt a thermoplastic adhesive with a heating element. The most commonly used polymer in hot-melt adhesives is a copolymer of ethylene and vinyl acetate (EVA). The adhesive also contains tackifiers, waxes, and stabilizers. For stronger, higher temperature glues, manufacturers include a range of other polymers, including polyurethanes and polyamides.