Making the Cut: Lattice Kirigami Rules[1] TOEN CASTLE, YIGIL CHO, XINGTING GONG, EUIYEON JUNG, DANIEL SUSSMAN, SHU YANG, RANDALL KAMIEN, University of Pennsylvania — Complex 3D structures can be built by bending and folding a flat sheet, as is done in origami. This paradigm can be extended by cutting and gluing the sheet as well as folding. The principles manifest in manipulating a piece of paper can translate across many length scales, limited only by fabrication methods. We explore and develop a simple set of rules that apply to cutting, pasting, and folding honeycomb lattices. We consider origami-like structures that are extrinsically flat away from zero-dimensional sources of Gaussian curvature and one-dimensional sources of mean curvature, and our cutting and pasting rules maintain the intrinsic bond lengths on both the lattice and its dual lattice. We find that a small set of rules is allowed, providing a framework for exploring and building kirigami - folding, cutting, and pasting the edges of paper.

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