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Titolo	A mathematical tapestry : demonstrating the beautiful unity of mathematics / / Peter Hilton, Jean Pedersen ; with illustrations by Sylvie Donmoyer [[electronic resource]]
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Descrizione fisica	1 online resource (xv, 290 pages) : digital, PDF file(s)
Disciplina	510
Soggetti	Mathematics
	Paper work
	Geometrical models
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Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Flexagons : a beginning thread -- Another thread : 1-period paper folding -- More paper folding threads : 2-period paper-folding -- A number-theory thread : folding numbers, a number trick, and some titbits -- The polyhedron thread : building some polyhedra and

defining a regular polyhedron -- Constructing dipyramids and rotating rings from straight strips of triangles -- Continuing the paper-folding and number-theory threads -- A geometry and algebra thread : constructing, and using, Jennifer's puzzle -- A polyhedral geometry thread : constructing braided Platonic solids and other woven polyhedra -- Combinatorial and symmetry threads -- Some golden threads : constructing more dodecahedra -- More combinatorial threads : collapsoids -- Group theory : the faces of the trihexaflexagon -- Combinatorial and group-theoretical threads : extended face planes of the Platonic solids -- A historical thread : involving the Euler characteristic, Descartes' total angular defect, and Polya's dream -- Tying some loose ends together : symmetry, group theory, homologues, and the Polya enumeration theorem -- Returning to the number-theory thread : generalized quasi-order and coach theorems.

| Sommario/riassunto | This easy-to-read 2010 book demonstrates how a simple geometric idea reveals fascinating connections and results in number theory, the mathematics of polyhedra, combinatorial geometry, and group theory. Using a systematic paper-folding procedure it is possible to construct a regular polygon with any number of sides. This remarkable algorithm has led to interesting proofs of certain results in number theory, has been used to answer combinatorial questions involving partitions of space, and has enabled the authors to obtain the formula for the volume of a regular tetrahedron in around three steps, using nothing more complicated than basic arithmetic and the most elementary plane geometry. All of these ideas, and more, reveal the beauty of mathematics and the interconnectedness of its various branches. Detailed instructions, including clear illustrations, enable the reader to gain hands-on experience constructing these models and to discover for themselves the patterns and relationships they unearth. |