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Lesson Plan (Outline):
Hands-on geomtry proofs using $1-Origmai.

(Partly based on ideas from: **"Unfolding mathematics with Unit Origami"**, by Betsy Franco.)

Overview

This can be used for a 10-minute lesson activity. As indicated below, it can be extended to encompass various concepts, depending on the available time and the level of the course.

Learning Objectives (very flexible: Depending on time and level).

- Familiarity with shapes: Rectangles, squares, triangles.
- Definition of Square, right-angle triangle, isosceles and equilateral triangle.
- Congruent triangles.
- 'Hands on' proofs.
- Angle chasing, parallel lines, and so on.

Prior Knowledge needed

See learning objectives: It ranges from basic familiarity with shapes, to definitions, and into geometry and finally formal proofs.

Materials needed

Rectangle piece of paper: possible letter-size, or dollar size, and all variations in between.
(Available are power-point slides that explain this lesson plan, and can be used during class).

Instruction and activity

1. **Hook** (possible) – An unfolded consumer-box. To discuss the marvels of geometry in real world applications.
2. **Warm up: Making a square out of rectangle** –Idea of triangles, what is a square, and so on…
    a. **Build:** Ask students to find it on their own. Compare their results with neighbors.
    b. **Discussion**: How do we know it is a square?
3. **Folding a dollar-bill into equilateral triangle** – The main activity.
    a. **Build:** Guide students through the steps, preferably using power-point slides.
    b. **Discuss:** Is this an equilateral? How do you know?
        i. **One way:** put your neighbor's triangle on top of it, and rotate, and see all angles are the same.
        ii. **Other ways:** Fold yours to see the sides are congruent.
    c. **Unfold, and look at the creases:**
        i. **Counting triangles:** How many equilateral triangles do you see?
        ii. **Congruent triangles:** Why do we say 'congruent' rather than 'equal'?
        iii. **Which are congruent? ;** iv. **Chasing angles**. ; v. **Proofs**.
        iv. Can we prove the first triangle we created is an equilateral? What are the ways to attack it?
    d. **Possible extension**:
        i. **If we took another bill** - Would we get equilateral? The same equilateral? How many?
        ii. **Predict** - Can we know in advance what we will get?
4. **Wrap-up**: Squares, triangles, and their properties. Cool trick with a dollar-bill (not only for $1).Geometry is everywhere, has aesthetic value, and many applications!

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