Geometry – Unit 5 Activity
Properties of Triangles with Paper Folding
G CO C 10

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Activity: To fold the perpendicular bisectors, angle bisectors, and medians of a triangle. **Materials:** Patty Paper, ruler, and pencil

Steps:

- Step 1: Draw a large acute scalene triangle on your patty paper with a pencil.
- **Step 2:** Make three copies of your triangle.
- **Step 3:** Fold the patty paper to construct the perpendicular bisectors of each side of your triangle.
- Step 4: What do you notice about these three perpendicular bisectors?
 - Mark this point of concurrency as the circumcenter, using the letter **C**.
 - Place a second patty paper over the triangle.
 - Mark the distance from the circumcenter to one of the vertices.
 - Compare this distance with the distance to the other two vertices.
 - How do they compare?
- **Step 5:** Take another copy of your large acute scalene triangle and fold the three angle bisectors.
- **Step 6:** What do you notice about these three angle bisectors?

Mark this point of concurrency as the incenter, using the letter *I*. Slide the edge of a second patty paper along one side of the acute triangle until an adjacent perpendicular side of the patty paper passes through the triangle's incenter. Mark this distance on the patty paper.

Compare this marked distance with the distance to the other two sides.

- **Step 7:** Take another copy of your large acute scalene triangle and fold the three medians of the triangle.
- Step 8: What do you notice about these three medians?

Mark this point of concurrency as the centroid or center of mass, using the letter **M**.

- **Step 9:** Take another copy of your large acute scalene triangle and fold the three altitudes.
- Step 10: What do you notice about these three altitudes?
 - Mark this point of concurrency as the orthocenter, using the letter **O**.
- Step 11: Place the four triangles on top of each other and notice if points *C*, *I*, *M*, and *O* are all identical.
- **Step 12:** Repeat steps 1-11 using a large obtuse scalene triangle.

Place the obtuse triangle so it only takes up about ½ of the paper diagonally.

Place the longest side of the triangle toward the middle of the paper.

Step 13: Repeat steps 1-11 using a large right scalene triangle.

To create a right triangle, first fold a right angle, draw two sides on this right angle and then add the hypotenuse.

Step 14: Repeat steps 1-11 using a large isosceles triangle.

Step 15: Repeat steps 1-11 using a large equilateral triangle.

Discussion Questions:

- 1. What can you describe about the position of the circumcenter of a triangle?
- 2. What can you describe about the position of the incenter of a triangle?
- 3. What can you describe about the position of a centroid of a triangle?
- 4. Do any of the four points line up to form a line?
- 5. Which points line up to form Euler's line?

