[43 minute lesson]

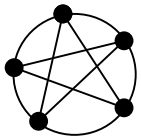
# Australia Public Release Lesson 1 Lesson Graph [8th grade]

6 minutes

## Public Class Work: Whole Class Reviewing Previous Work

The teacher asks students to look at a previous worksheet at the "present your findings" portion.

On the overhead, the teacher shows a student's conclusions about the 5-pointed star inscribed in a circle →



The teacher reads a student's conclusions:

- The sum of the angles don't change when you move the points around the circle.
- When you change the radius of the circle, the size of the circle changes and moves in and out.
- No matter what the size of the angles are, if you have a 5 pointed star inscribed in a circle it will be one hundred and eighty degrees.

3 minutes

## Private Class Work: Students Work Individually/Pairs

Students are asked to read through "Investigation: Exterior Angles in a Polygon" individually and then in pairs, noting words that they might need to know the meaning of.

4 1/2 minutes

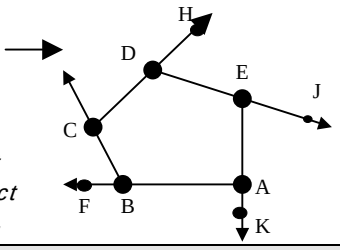
## Public Class Work: Whole Class Discussion of Words and Meanings

The teacher asks for words or phrases that the students noted.
Students nominate the words: *"convex", "quadrilateral", "polygons", "exterior angle", "rays".*
The teacher then asks students to give the meaning of each of the words nominated and asks questions to clarify the meanings of each word.

5 1/2 minutes

## Public Class Work: Posing of Today's Investigation

The teacher asks students how to construct the diagram using the computer. →
There is a brief discussion of the meaning of convex and concave.




The teacher says*: "The investigation is to find out something about these exterior angles. Write down something , a fact, that you might discover about those angles. Think about your own idea and see whether it proves to be correct or not. We have a conjecture but now we are going to look for some evidence".*

23 minutes

## Private Class Work: Students Work in Groups of Two or Three on Investigation

The students work at computers on the investigation, using the following sheet:

**Investigation: Exterior Angles in a Polygon**

An exterior angle of a polygon is formed when one of the sides is extended.
Exterior angles lie outside the polygon. In this investigation, you'll discover the sum of the measures of the exterior angles in a polygon, starting with a pentagon.

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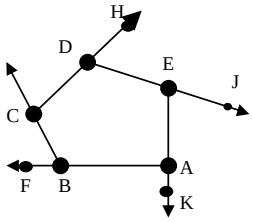
**Sketch:**

**Step 1:** Construct Rays $\overrightarrow{AB}$, $\overrightarrow{BC}$, $\overrightarrow{CD}$, $\overrightarrow{DE}$, and $\overrightarrow{EA}$

Step 2: Adjust the points, if necessary so that pentagon ABCDE is convex.

Step 3: On the rays outside of the pentagon, construct points F on $\overrightarrow{AB}$, G on $\overrightarrow{BC}$, H on $\overrightarrow{CD}$, J on $\overrightarrow{DE}$, and K on $\overrightarrow{EA}$

Step 4: Measure the exterior angles: <KAB, <FBC, <GCD, <HDE, and <JEA. Calculate the sum of these angle measures.




**Investigate:**

Move parts of the pentagon to see if the sum changes. (Make sure your pentagon remains convex.) Is the sum of these exterior angles the same for any pentagon? (Note: This construction creates only one set of exterior angles. Another set would be constructed if you went the opposite direction with your rays.) Try similar constructions using rays to make triangles, quadrilaterals, hexagons, or other polygons with a set of exterior angles. What's the sum of the measures of one set of exterior angles in these polygons?

**Conjecture: Write a conjecture below.**

The teacher circulates to each group answering questions, asking questions, and providing guidance.

1 minute

## Public Class Work: Class Discusses Predictions

The teacher asks :"Who found that their conjecture or prediction was confirmed by what they did? Some predicted the total was going to be 360˚, others 180˚ and a few predicted 90˚. We will continue on with this at a later stage."