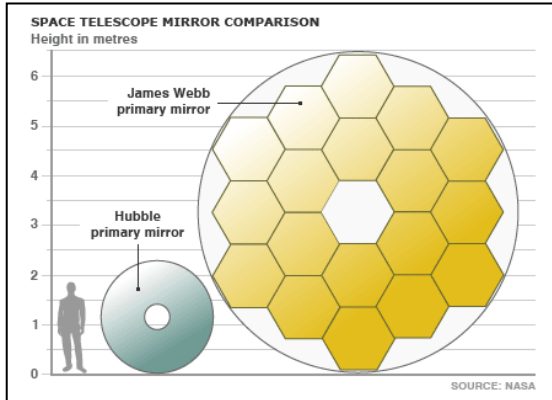


The Hexagonal Tiles in the Webb Telescope Mirror 27

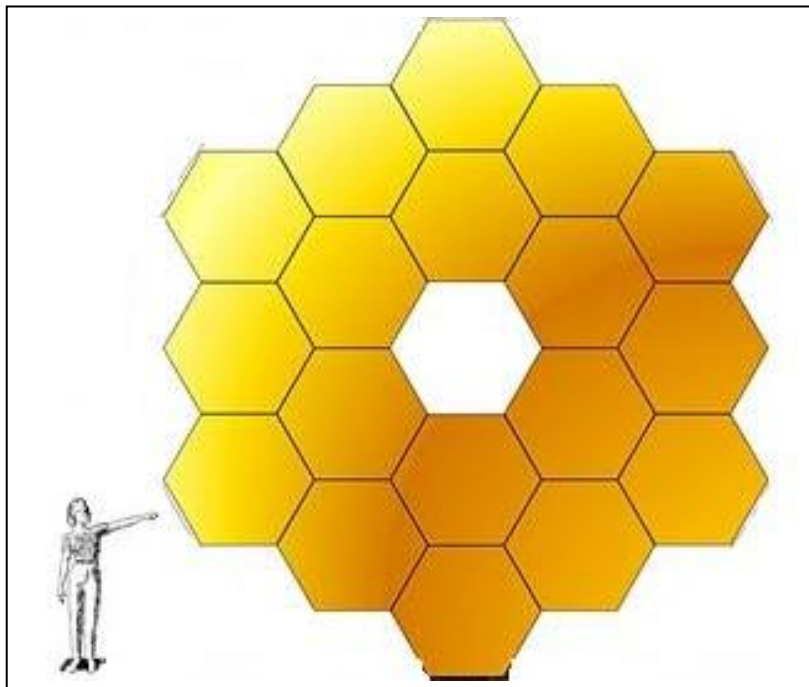


The James Webb Space Telescope, to be launched by NASA in 2014, is a telescope designed to explore galaxies and stars that formed soon after the Big Bang.

Its unique design features a large mirror that consists of 18 hexagonal tiles; each tile is its own mirror. The 18 mirror tiles work together to form a single large mirror to collect faint star light.



An important feature of a telescope mirror is its surface area. The more surface area a mirror has, the more light it can collect. To make faint stars and galaxies appear bright enough to study in detail, mirrors with large collecting areas are needed.

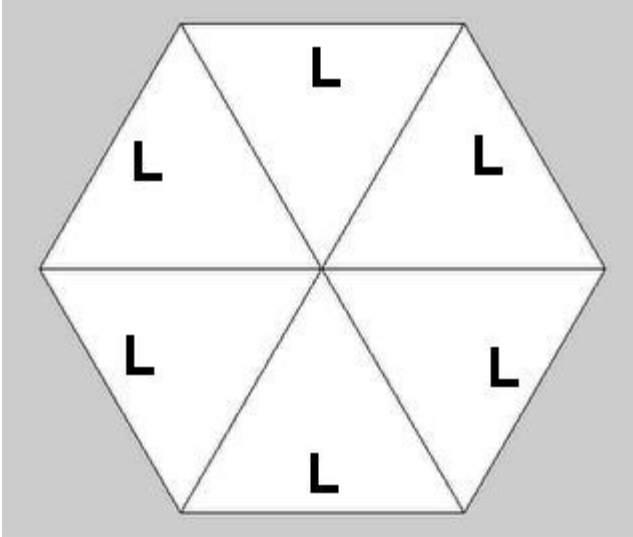


Problem 1 – For a regular hexagon with a side length of L , how many equilateral triangles with a side length of L can you fit into one hexagon?

Problem 2 – From the drawing of the Webb Space Telescope Mirror on the left, how many equilateral triangles are formed by the 18 hexagonal tiles?

Problem 1 – For a regular hexagon with a side length of L , how many equilateral triangles with a side length of L can you fit into one hexagon?

Answer: A total of six as shown below.



Problem 2 – From the drawing of the Webb Space Telescope Mirror on the left, how many equilateral triangles are formed by the 18 hexagonal tiles?

Answer. Students may draw the triangles inside each of the 18 hexagons and then count them, or can recognize that $(6 \text{ triangles in each hexagon}) \times 18 \text{ hexagons} = \mathbf{108 \text{ equilateral triangles}}$.