



Activity III Quadratic Growth

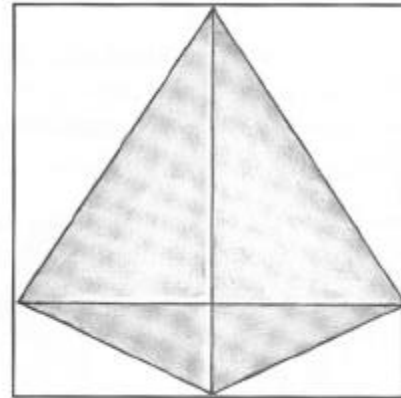
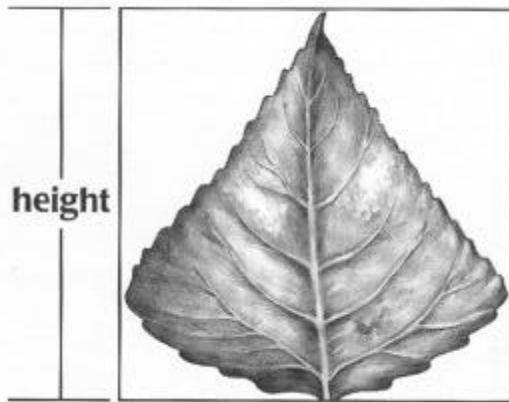
Quadratic Growth

Through the process called photosynthesis plants absorb light through their leaves and use it to decompose water into hydrogen and oxygen. The oxygen is released into the atmosphere and the hydrogen is combined with carbon dioxide from the atmosphere to create sugar to feed the plant.



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It is clear that the plants ability to create food is dependent on the surface area of its leaves. To determine the surface area of a leaf shine a light vertically at a leaf held horizontally, trace and measure the shadow by subdividing it into geometric figures. To determine a geometric model that might be similar and enable one to approximate the surface area draw a square around it or its shadow.



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Notice that the kite shaped model covers about the same proportion of the square as does the leaf.

1. Determine what portion of the square is covered by the leaf. Explain how you made your determination.
2. If you know the height (h) of such a leaf you would be able to determine its surface area (A). Explain how you would determine a formula that could be used to determine the surface area of a black poplar leaf.
3. In the figure the leaf is symmetric. Draw a picture of a non-symmetric leaf for which the formula will continue to work.
4. Use the formula created in problem 2 and make a table of the heights and areas of the black poplar leaf then plot its graph.
5. Using the graph determine the surface area of a leaves having heights 4.5 cm, 8.3 cm and 11.5 cm the check you results using the formula.