



Making Movies Come Alive

Many movie animation techniques are based on mathematics. Characters, background, and motion are all created using software that combines pixels into geometric shapes which are stored and manipulated using the mathematics of computer graphics.

Software encodes features that are important to the eye, like position, motion, color, and texture, into each pixel. The software uses vectors, matrices, and polygonal approximations to curved surfaces to determine the shade of each pixel. Each frame in a computer-generated film has over two million pixels and can have over forty million polygons. The tremendous number of calculations involved makes computers necessary, but without mathematics the computers wouldn't know what to calculate. Said one animator, "... it's all controlled by math ... all those little X,Y's, and Z's that you had in school—oh my gosh, suddenly they all apply."

For More Information:

Mathematics for Computer Graphics Applications, Michael E. Mortenson, 1999.



Photograph courtesy of Dinosaur Interplanetary Gazette and Universal Pictures.



The **Mathematical Moments** program promotes appreciation and understanding of the role mathematics plays in science, nature, technology, and human culture.

www.ams.org/mathmoments