7

Circle to Ellipse to Parabola

www.magicmathworks.org/geomlab7

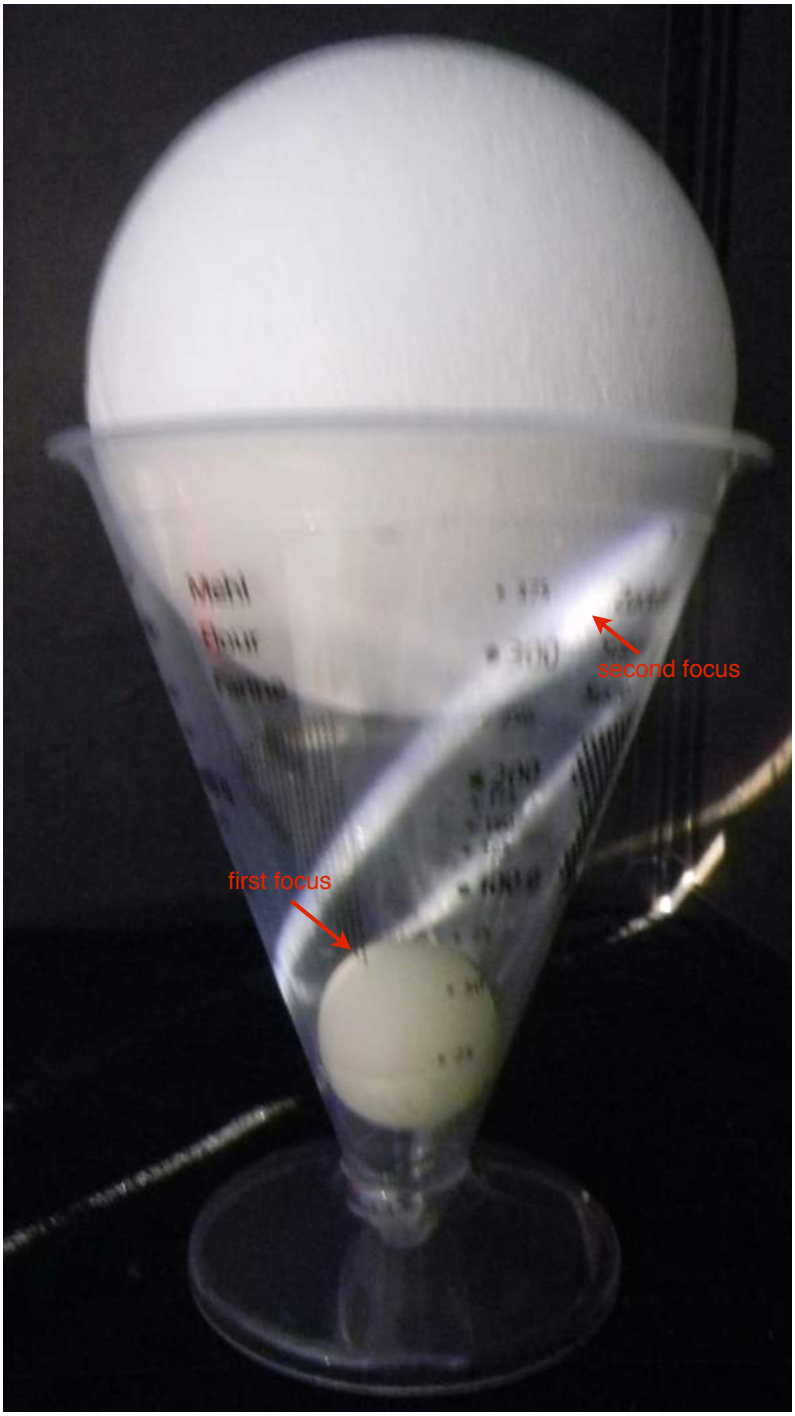
For this experiment use Baravalle's optical knife (the OHP with a slit on it), the conical measuring funnel and the 3 expanded polystyrene spheres.

1) Drop the middle-sized sphere in the funnel and the biggest one on top. They touch. Set the slit horizontally so that their common point lights up. This is the centre of the circle traced by light on the funnel.

2) Swap the middle-sized sphere for the smallest. There is now a gap between the lower and the upper. Angle the slit so that a point on each lights up. These are the foci of the ellipse traced by light on the funnel. (We prove this in **9**.)

3) Now a thought experiment: Imagine the upper sphere growing bigger and bigger. The foci get further and further apart. In the limit you are left with one focus - the other has moved off to infinity - and an open curve, the parabola.

Line
Ellipse
Sphere
Cone
Cylinder
Circle
Line family
Loxodrome
Equiangular spiral
Archimedean spiral
Tiling
Polyhedron
Polygon
Plane
Helicoid
Helix
Catenoid
Catenary
Exponential curve
Tractrix
Sine curve
Line pair
Hyperbolic paraboloid
Hyperboloid


second focus
first focus