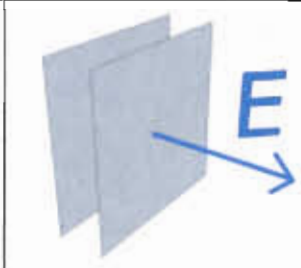
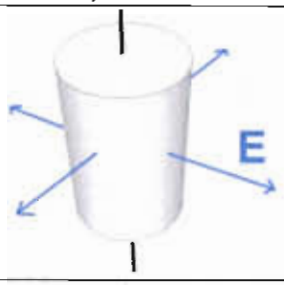
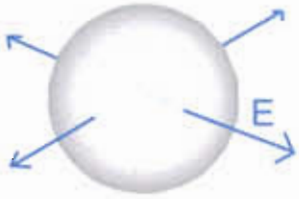
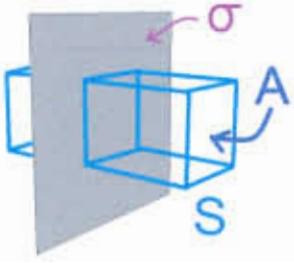
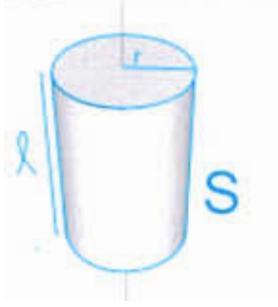
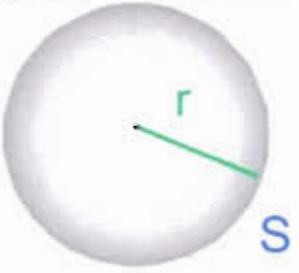
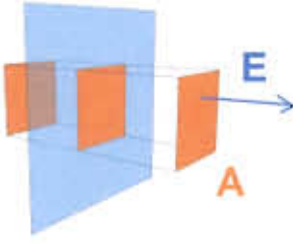
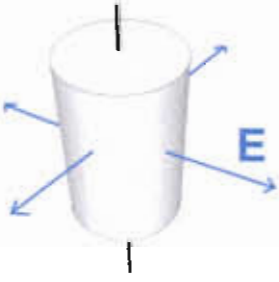
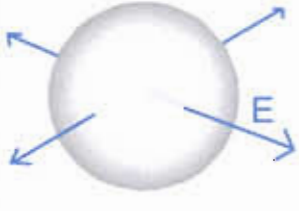
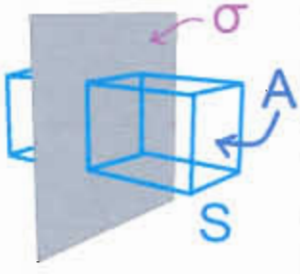
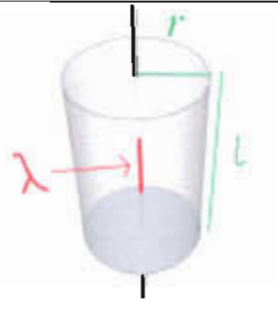
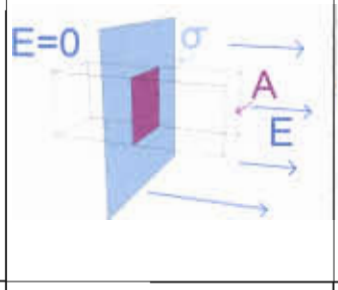
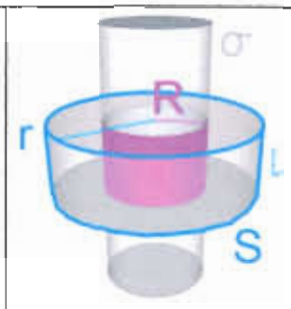
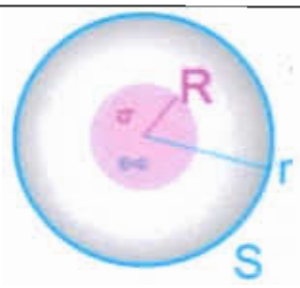
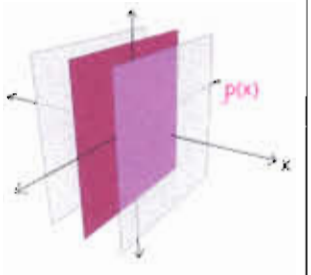
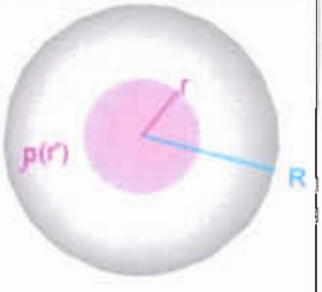
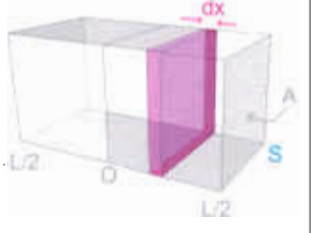
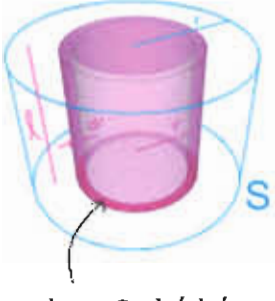
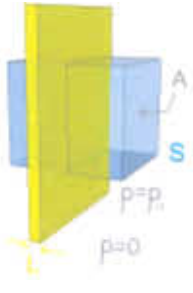
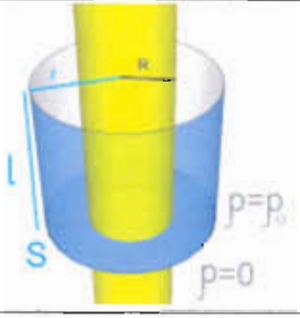
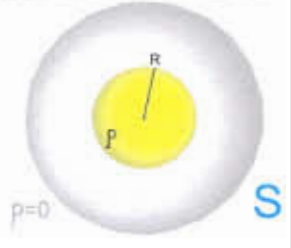
Gauss's Law Tabloid

Symmetry	Planar	Cylindrical	Spherical
Scheme			
LHS $(\oint \vec{E} \cdot d\vec{A})$ Surface (s)			
Flux Scheme			
$\oint \vec{E} \cdot d\vec{A}$ LHS	$2EA$	$E2\pi rl$	$E4\pi r^2$
RHS q_{enc} Simple Scheme			
q_{enc}	$A\sigma$	λl	Q
Example Solution (Simple Case)	$2EA = \frac{A\sigma}{\epsilon_0}$ $E = \frac{\sigma}{2\epsilon_0}$	$E2\pi rl = \lambda \frac{l}{\epsilon_0}$ $E = \frac{\lambda}{2\pi\epsilon_0 r}$ (Radially Outward)	$E4\pi r^2 = \frac{Q}{\epsilon_0}$ $E = \frac{Q}{4\pi\epsilon_0 r^2} = \frac{kQ}{r^2}$ $\left(\vec{E} = \frac{kQ\hat{r}}{r^2}\right)$

Conductors			
Scheme			
q_{enc}	σA	$\sigma 2\pi lR$	$\sigma 4\pi R^2$
Example Solution	$EA = \frac{\sigma A}{\epsilon_0}$ $E = \frac{\sigma}{\epsilon_0}$	$2\pi lrE = \frac{\sigma 2\pi lR}{\epsilon_0}$ $E = \frac{\sigma R}{\epsilon_0 r}$	$4\pi r^2 E = \frac{\sigma}{\epsilon_0} 4\pi R^2$ $E = \frac{\sigma R^2}{\epsilon_0 r^2}$
3-d Schemes			
For q_{enc} dV		 $dv = 2\pi lr'dr'$	 $dv = 4\pi r'^2 dr'$
$q_{enc} = \int dq$	$\int_{-\frac{L}{2}}^{\frac{L}{2}} \rho(x) A\, dx$	$\int_0^r 2\pi l\rho(r')r'\, dr'$	$\int_0^r 4\pi\rho(r')(r')^2\, dr'$
Examples E Outside of Uniformly Charged Objects			
LHS	2EA	$2\pi rlE$	$4\pi r^2 E$
RHS	$E = \frac{L\rho_0}{2\epsilon_0}$	$E = \frac{R^2\rho_0}{2r}$	$E = \frac{\rho_0 R^3}{3r^2\epsilon_0}$