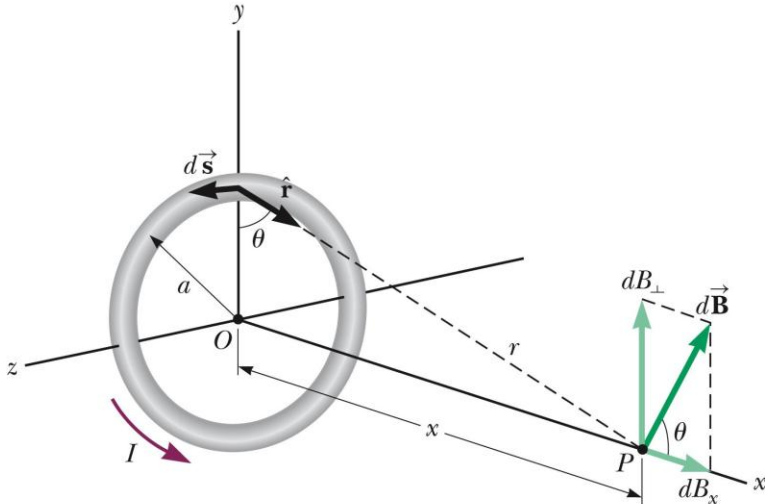# B-field of a Current Loop and Solenoid
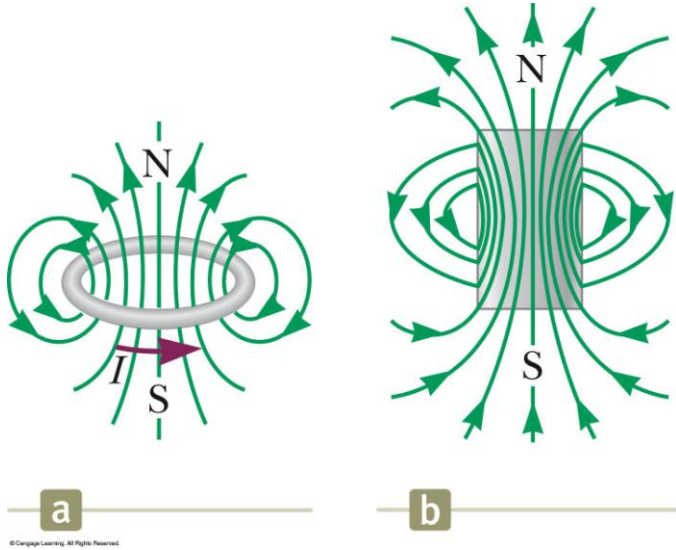
Current Loop of Radius 'a'

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$$B_x = \frac{\mu_o I a^2}{2\left(a^2 + x^2\right)^{3/2}}$$ B-Field along x-axis

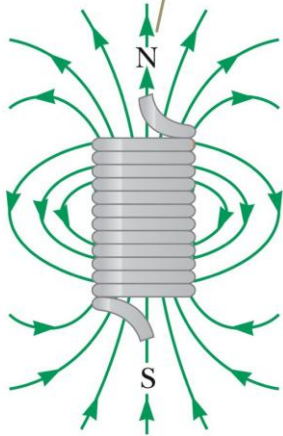$$B_x = \frac{\mu_o I}{2a}$$ B-field at x = 0 (center of loop)

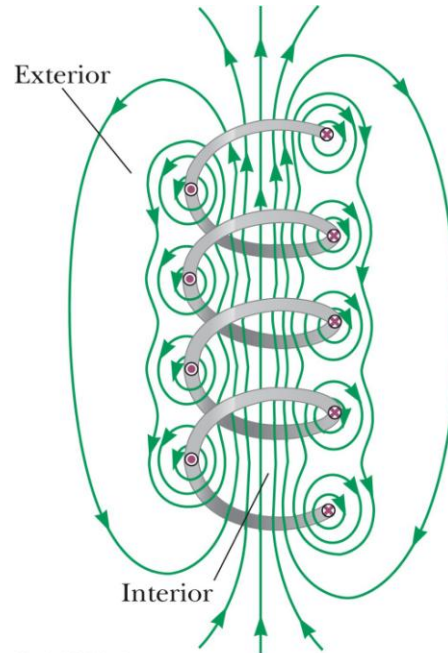© Cengage Learning. All Rights Reserved.

B-field lines of a current loop are similar to that of a bar magnet!

Solenoid

The magnetic field lines resemble those of a bar magnet, meaning that the solenoid effectively has north and south poles.

N

S

a

Exterior

Interior

$B_x = \mu_o n I$ B-Field along axis of solenoid

n = number of turns per length