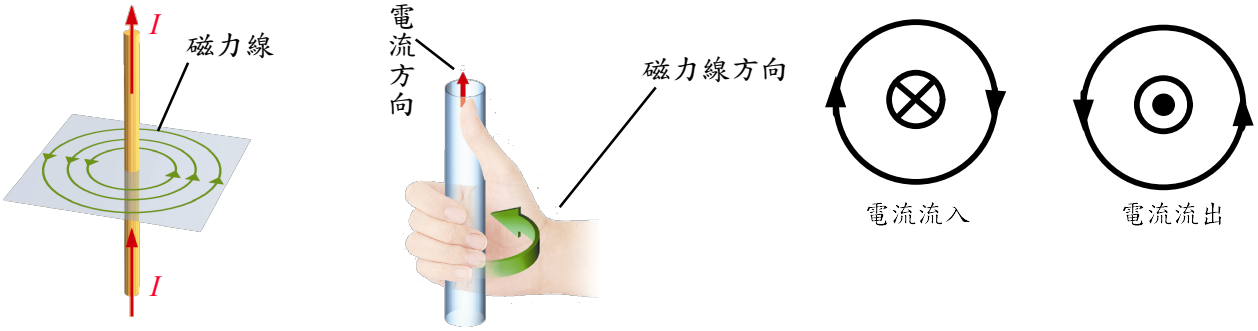
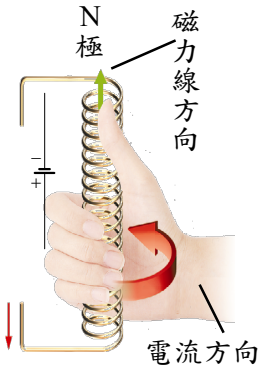
電磁效應

<u>安培右手定則</u>:以右手握導線，姆指所指為電流方向，則其餘四指所指方向即為所產生磁力的方向。

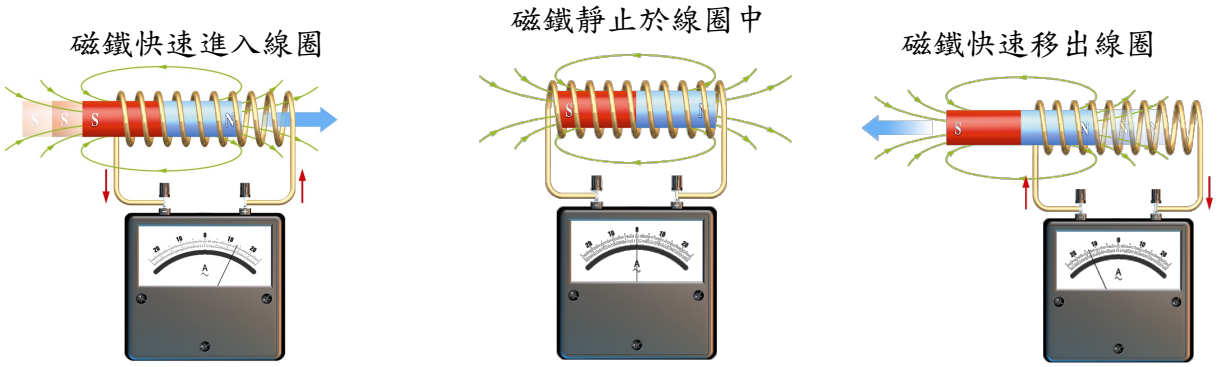


<u>螺線管定則</u>:一線圈通以電流時，以右手彎曲之四指為電流方向，則姆指為磁力線的方向，其所指方向為 N 極。



電磁感應

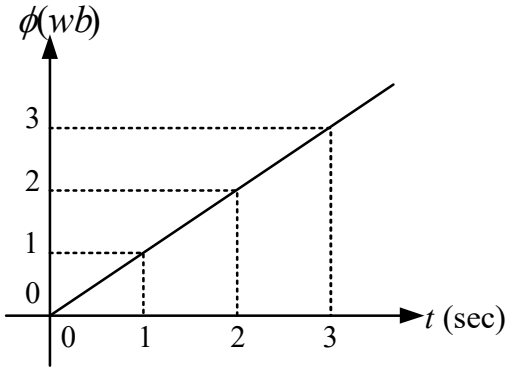
線圈周圍的磁場發生變化時，會令線圈中產生電流，此效應稱為電磁感應。



<u>法拉第電磁感應定律</u>：磁場與線圈發生相對性的變化時，使磁力線受到切割，則線圈兩端產生感應電勢之現象(僅決定應電勢的大小)。

$$e = N\frac{\Delta\phi}{\Delta t} \quad 〔\text{V, 伏特}〕$$

範例說明：



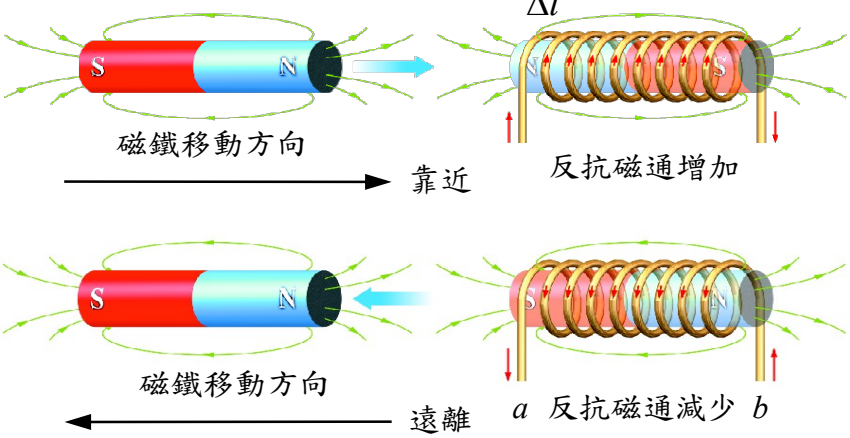
$$N = 1$$

$$E_{0\sim1} = 1 \times \frac{1-0}{1-0} = 1$$

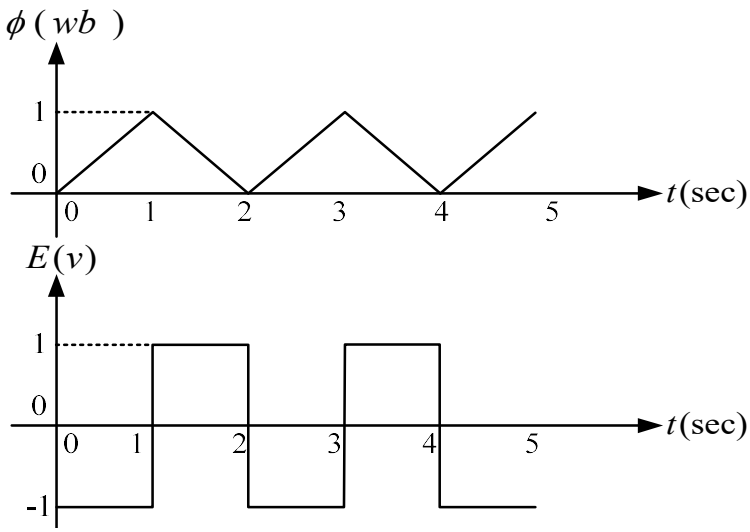
$$E_{0\sim3} = 1 \times \frac{3-0}{3-0} = 1$$

楞次定律：當外力欲使線圈內部磁力線增加時，線圈便會感應一應電勢以產生應電流，而此應電流所產生之磁力線係為阻止線圈內磁通量增加(僅決定應電勢的極性方向)。

$$e = -N\frac{\Delta\phi}{\Delta t} \quad \text{〔V, 伏特〕}$$

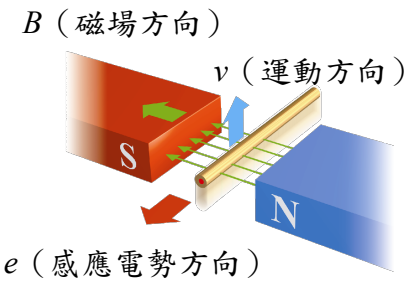


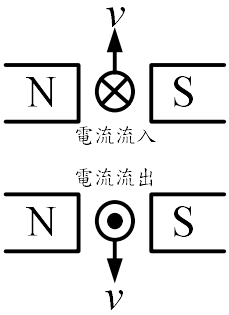
範例說明：



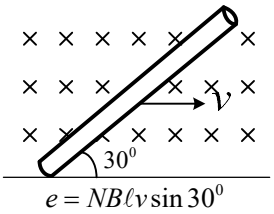
<u>佛萊明右手定則(發電機定則；機械能→電能)</u>：導體在磁場中運動，有感應電勢產生。

$$e = B\ell v\sin\theta \quad 〔\text{V, 伏特}〕$$



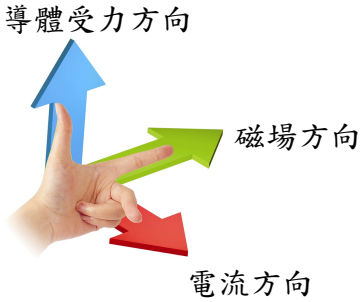


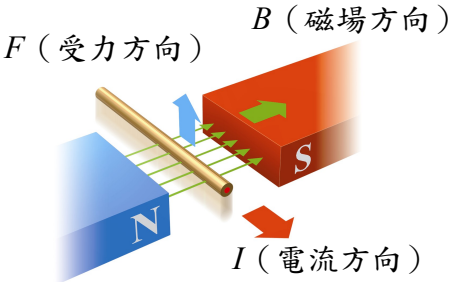
<u>範例說明</u>：

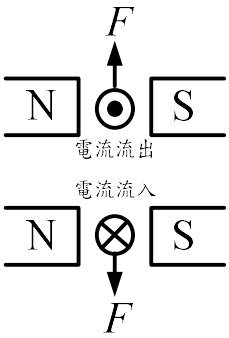
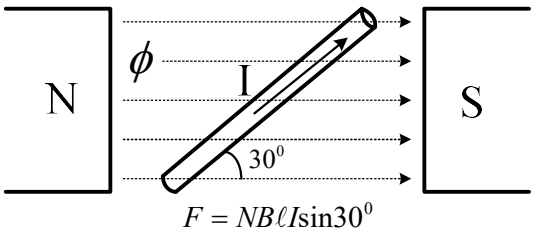


<u>佛萊明左手定則(電動機定則；電能→機械能)</u>：載有電流之導體，置於磁場中，則導體必會受力產生運動。

$$F = B\ell I\sin\theta \quad 〔\text{Nt, 牛頓}〕$$







<u>範例說明</u>：