

PHYZ SPRINGBOARD: WHAT'S MAGNETIC FLUX?



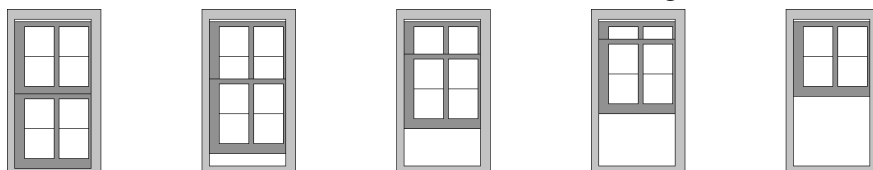
I. The Open Window

Consider an open window. Under what conditions will the most air blow through the window?

A. Area of the open window

1. How does the area of the open window affect the amount of air that blows through it?

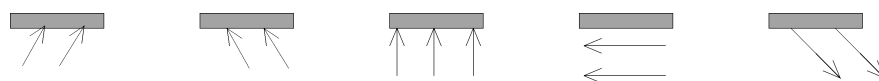
2. Circle the window that allows the most air to blow through it.



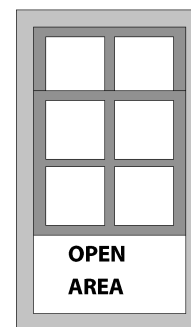
B. Direction of the wind

1. How does the direction of the wind (with respect to the window) affect the amount of air that blows through the window? The diagram to the right shows the window as you were above it and were looking straight down at it.

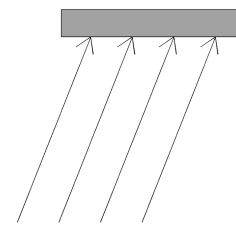
2. Circle the window that allows the most air to blow through it.



FRONT VIEW



TOP VIEW



C. Speed of the wind

How does the speed of the wind affect the amount of air that blows through the window?

D. All together now!

Based on your observations in parts A, B and C, state the conditions necessary for

1. **maximum** air flow through the window.

2. **minimum** air flow through the window.

AIR FLUX: The amount of air blowing through the window; this can be calculated by multiplying the open area of the window by the component of the wind velocity **perpendicular** to the window. (It could also be defined as the product of the wind speed and the component of the open area **perpendicular** to the wind.)

$$\Phi = vA$$

MAGNETIC FLUX: The magnetic flux through a loop of wire is the product of the area of the loop and the magnetic field **perpendicular** to the area of the loop. (Or the product of the magnetic field and the area of the loop **perpendicular** to the magnetic field.)

$$\Phi = BA$$

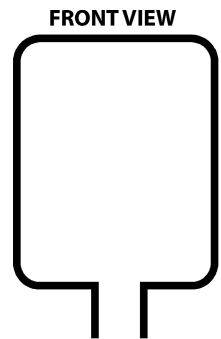
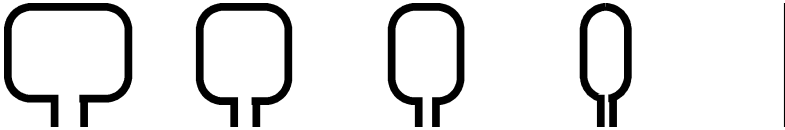
II. The Open Wire Loop

Consider a loop of conductive wire. Under what conditions will the loop enclose the greatest flux?

A. Area of the loop

1. How does the area of the loop affect the amount of flux it encloses?

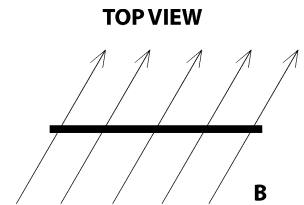
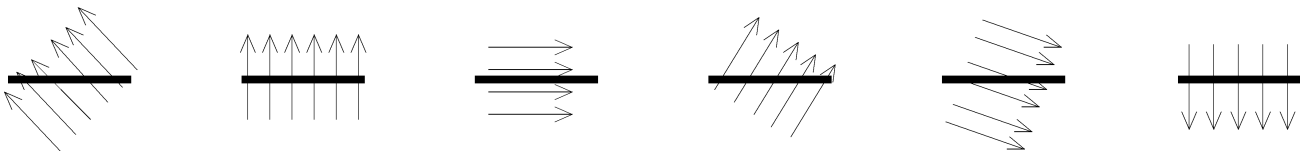
2. Circle the loop that encloses the greatest flux.



B. Direction of the magnetic field

1. How does the direction of the magnetic field (with respect to the wire loop) affect the amount of flux enclosed by the loop?

2. Circle the loop that encloses the greatest flux.



C. Strength of the field

How does the strength of the field affect the amount of flux enclosed by the loop?

D. All together now!

Based on your observations in parts A, B and C, state the conditions necessary for

1. **maximum** flux through the loop.

2. **minimum** flux through the loop.