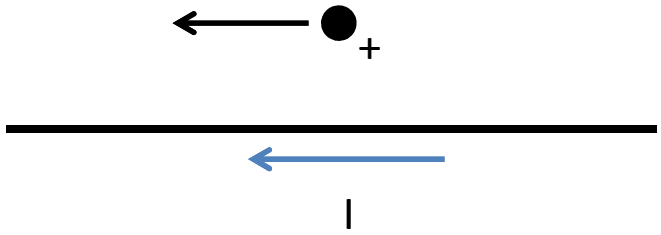
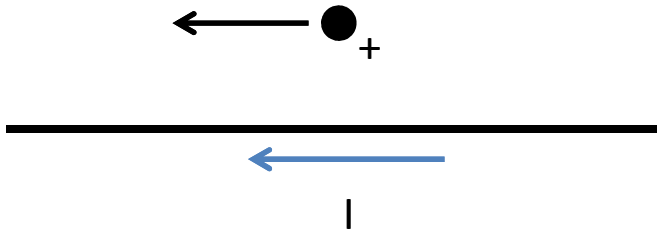


A positive charge moves nearby a current-carrying wire as shown above. The force on the charge is

A) in the upwards direction
B) in the downwards direction
C) into the picture
D) out of the picture
E) zero

Extra: calculate the magnitude of the force in terms of I, q and the distance d.



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C) into the picture
D) out of the picture
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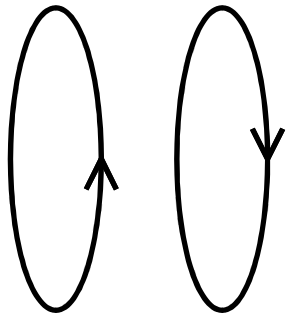
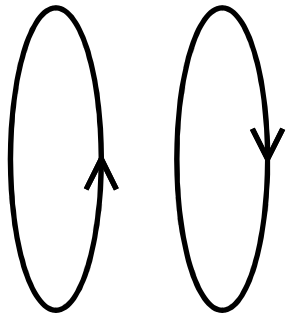
Magnetic field from the wire at the location of the charge is into the picture. This gives a force in the downwards direction.



Two nearby loops of wire have current in opposite directions. We can say that

A) the loops will attract
B) the loops will repel
C) The loops will exert no net force on each other



Two nearby loops of wire have current in opposite directions. We can say that

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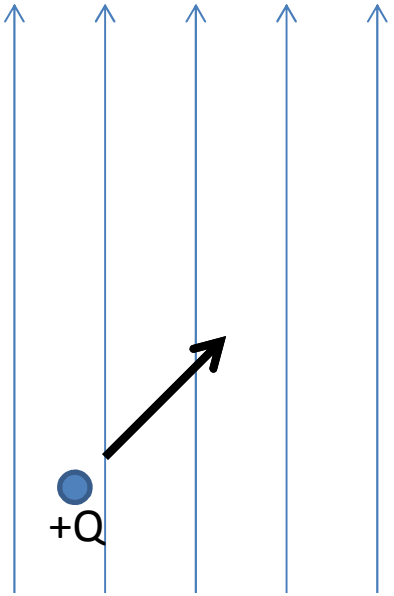
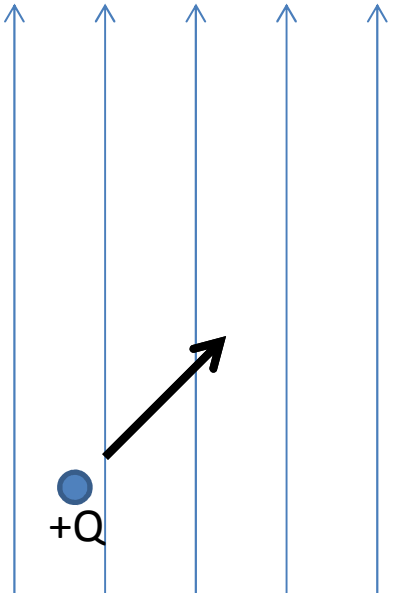
Loops behave like magnets: opposite directions for current corresponds to magnets aligned in opposite directions, so we get repulsion



What will be the subsequent trajectory of the charged particle shown in the picture?



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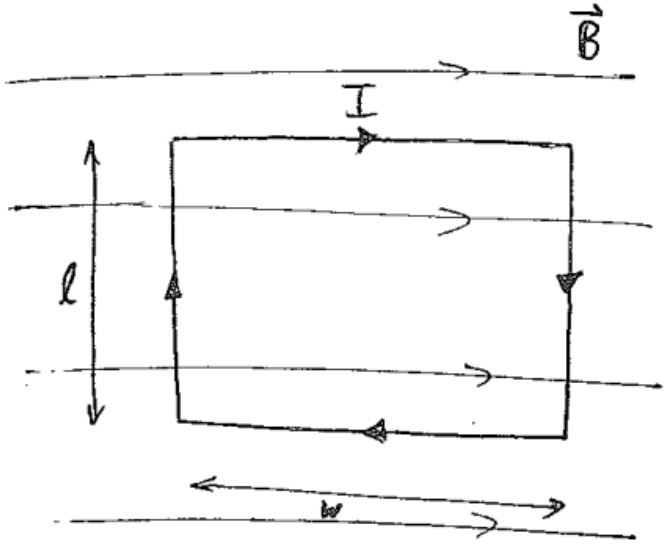
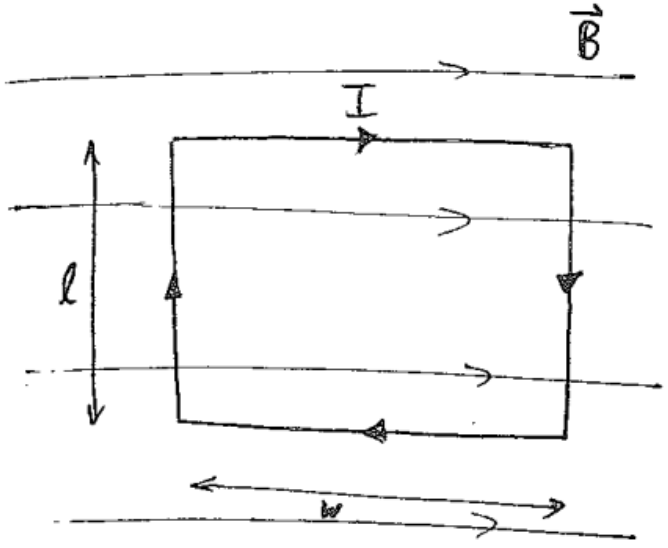


A rectangular loop of wire with width w and height l sits in a constant magnetic field that points to the right. The wire will

A) Move upwards
B) Move to the right
C) Rotate about the vertical axis
D) Rotate about a horizontal axis
E) None of the above

Extra: What will the magnitude of the force on a segment of current carrying wire depend on?

How does the magnitude of the net force and/or torque depend on I, w, B, and l?



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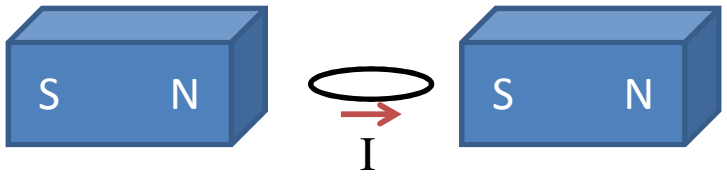
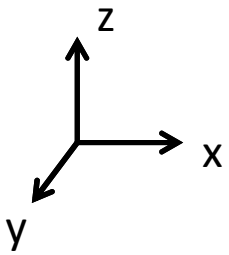
Extra: How does the magnitude of the net force and/or torque depend on I, w, B, and l?.

Can we quantify the strength of a magnet? For example, given two magnets with different shapes and sizes, is it possible to say which one is stronger? If so, can you think of a quantitative way to assign a single number that represents the strength of the magnets?

Extra: Try to think of a second way that you could determine the relative strength of two magnets.



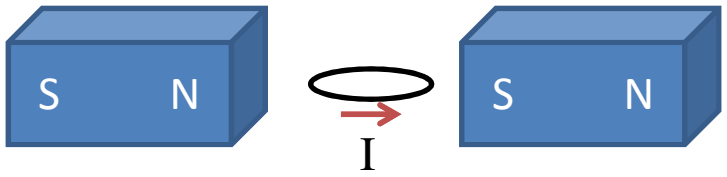


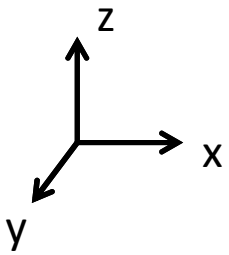
(initially) SILENT Clicker question:

A current is passed through a loop of wire that sits between two stationary magnets as shown. We can say that initially,

A) The loop will rotate around its x-axis
B) The loop will rotate around its y-axis
C) The loop will rotate around its z-axis
D) The loop will not rotate

EXTRA: determine which direction the loop will rotate and say what happens for all later times if the current continues to flow





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