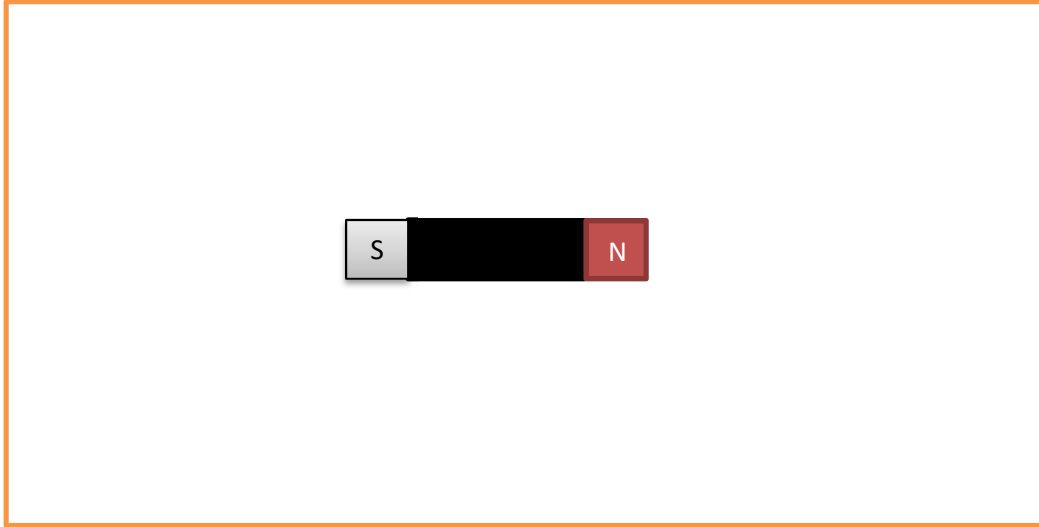


## Magnetic and Compass – PhET Simulation Guide

Procedure:

1. On your PC computer or laptop, go to [www.phet.colorado.edu](http://www.phet.colorado.edu)
2. Search for “magnetic fields” and choose the “Magnet and Compass” simulation.
3. Click on the “play” icon. When the simulation loads, what do you see?
4. Deselect all the options from the menu to the right. You should see just the bar magnet as shown below:



5. Make a prediction: On the diagram above, draw what you think the magnetic field produced by the magnet will look like.
6. Check your prediction by selecting the “Show Field” tab. What do you see?
7. Make a prediction: If you were to chop this magnet in half and separate the pieces, what would be the polarity of each piece?  
Why? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
8. Select “See Inside Magnet”. Do you still agree with your prediction from #7? Why or Why not? \_\_\_\_\_  
\_\_\_\_\_
9. Deselect both “Show Field” and “See Inside Magnet”.
10. Make a prediction: If you place a compass near the magnet, what will the compass do?  
Why? \_\_\_\_\_  
\_\_\_\_\_

11. Select "Show Compass". Move the compass to several positions around the magnet. What do you notice?

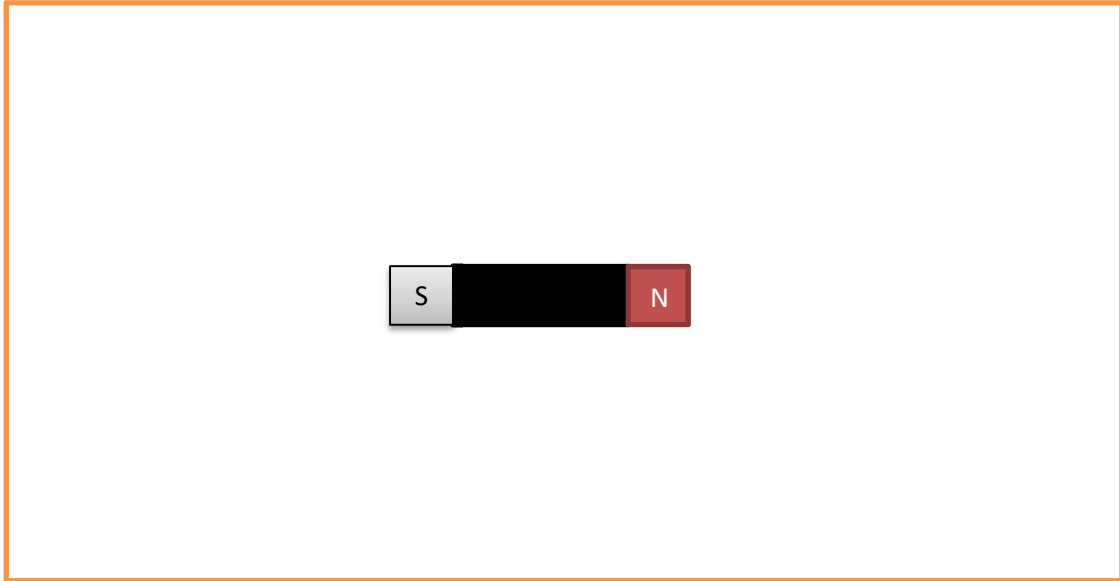
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12. In the space below, sketch the compass needle in at least 10 positions as you see it placed around the magnet.



13. What do these compass needle orientations remind you of?

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14. Select "Show Field". Place the compass at the positions you used for the sketch before. What do you notice?

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15. Based on what you have just seen, what do you think is the polarity of the "North seeking" end of the compass needle?

Why? \_\_\_\_\_  
\_\_\_\_\_

16. Extension: If you are lost in the woods, and you have a compass, would you want to hold it near a magnet as you are trying to find your way? Why or Why not?

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17. Based on your knowledge of compasses, how do they work? What does that tell you about the planet Earth?

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18. Deselect "Show Compass" and then select "Show Planet Earth". What do you notice?

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19. Are the North and South poles where you expect them to be? Why?

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20. Move the compass to various positions around the Earth. Does this confirm your guess about how compasses work? Why or why not?

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21. Does a magnet have to be touching another material to exert a force? Why or why not?

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22. If you were pushing the like poles of two magnets together, what happens as they get closer and closer?

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23. Make a prediction: Based on what you have learned about magnets, and from other natural laws, would you expect magnetic fields to be stronger closer to the magnet, or farther away?

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Why?

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24. Select “Show Field Meter” (can deselect “show earth”). Magnetic field strength is sometimes measured in Gauss (G). Move the meter to at least 6 locations. Record the strength of the field in G below:



25. Do the numbers change quickly with distance, or slowly? What other force does this remind you of?