PhET Tips for Teachers Magnet and Compass

Tips for controls:

- Try these related sims: Faraday's Electromagnetic Lab, Magnets and Electromagnets, Generator, and Faraday's Law

Important modeling notes / simplifications:

- To understand the direction of field in magnet: Electric current is moving charge. Magnetic fields are created by electric currents. The current creating the magnetic field could by the current in a wire or it could be the current created by the motion of electrons in atoms. In a permanent magnet, the electron currents in the atoms are aligned so that the net effect of all the microscopic electron currents is to make a macroscopic current which is just like the current in a solenoid. So you should think of a bar magnet as a bar-shaped solenoid of current. The magnetic field of a bar magnet is exactly the same as the magnetic field of a solenoid since the currents are the same.
- The Earth's north geographic pole (where Santa lives) is near the earth's south magnetic pole. This is why a compass needle's north end points to the north geographic pole (because compass's north end points in the direction of the magnetic field).

Insights into student use / thinking:

- Students may have difficulty understanding why the field direction inside the magnet is toward the north end. The modeling notes above may be helpful.

Suggestions for sim use:

- For tips on using PhET sims with your students see: **Guidelines for Inquiry Contributions** and **Using PhET Sims**
- The simulations have been used successfully with homework, lectures, in-class activities, or lab activities. Use them for introduction to concepts, learning new concepts, reinforcement of concepts, as visual aids for interactive demonstrations, or with in-class clicker questions. To read more, see **Teaching Physics using PhET Simulations**
- For activities and lesson plans written by the PhET team and other teachers, see: **Teacher Ideas & Activities**

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