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The Maglev Train

Student Handout

In the following handout, students will be required to:

- Explore superconductivity and the potential implications of the technology
- Draw magnetic field lines

Provided in this document are sample answers (pages 2-3) and a blank handout (pages 4-5). The blank handout should be made available to each student prior to the activity.

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The Maglev Train - Handout Answers

Student Handout - Answers

1) What would be some of the advantages of applying this technology to a life-size train?

There would be virtually no friction between the train and the track, and this transport system has the potential to be faster, quieter and smoother than a conventional train.

2) What would be some of the problems with implementing this technology?

Superconductors need to be cooled to very low temperatures and, as of now, cannot function at room temperature. Also, strong magnetic fields onboard the train would mean that passengers would not be able to carry credit cards or laptops, and individuals with pacemakers would not be able to travel on board the train. Finally, maglev trains cannot use existing infrastructure and new tracks would need to be built.

3) Have you ever heard of superconductors before? If so, what are some uses of superconductors? If not, use the Internet to research some uses of superconductors.

Superconductors are used in nuclear magnetic resonance imaging (MRI), nuclear magnetic resonance (NMR) machines and the Hadron collider.

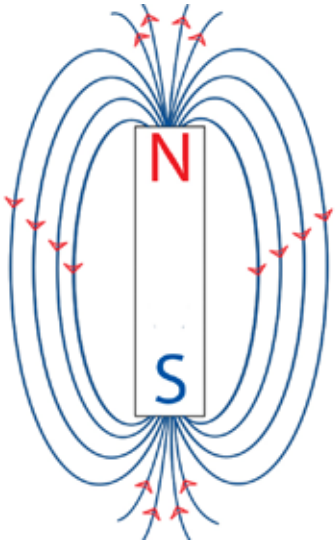
4) Superconductors need to be cooled to a very low temperature to function as superconductors.
If superconductors could function at room temperature, what implications would this have?

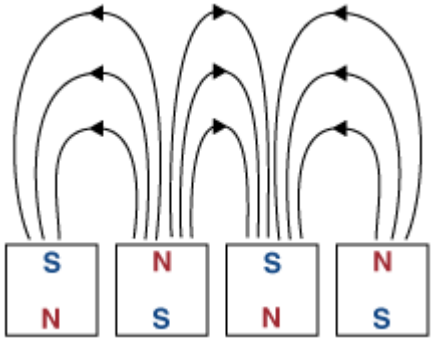
Since superconductors have virtually no resistance and can carry current for long periods of time without any loss, room temperature superconductors would greatly increase the efficiency of electrical power transmission. Room temperature superconductors would revolutionize electronics.

5) List three places where you use magnets everyday:

Magnets are used in speakers, computers, cellphones, microphones and compasses. Credit and debit cards use magnetic strips.

6) The figure on the left represents a bar magnet, whereas the figure on the right represents the orientation of the train track. Recalling that magnetic field lines exit the north pole and enter the south pole, draw the magnetic field lines in the figures below.





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