

Magnets and Migration

Investigation: Watch the Investigation video and answer questions 1-5

1. What happened when you placed the bar magnet over the compass? **[Answer: the compass flipped and the poles were switched].**
2. Where on the earth do you think the magnetic field is the strongest? **[Answer: strongest at poles, weakest at the equator].**
3. Create your own model of Earth's magnetic field using your iron filings, bar magnet, and paper. Describe or draw the model that you created, and explain how it shows Earth's magnetic field.
4. Name one piece of evidence you saw that magnets can exert a force on something, even they aren't touching. **[Possible answers could include: A compass points north because it is attracted to the earth's north magnetic pole. When the iron filings were sprinkled over the magnet, it showed that the magnetic force was strongest at the magnet's poles.]**
5. Why does a compass point towards the earth's geographic North Pole? **[Answer: A compass points towards the earth's geographic North Pole because the compass needle is magnetic. The compass needle is attracted to the earth's magnetic South Pole, which is located at the geographic North Pole.]**

Magnetic Fields in 3D: Watch the Magnetic Fields in 3-D video and answer questions 6 and 7.

6. *(open-ended): What will happen when we drop the magnet in? Use the word 'force' in your answer.* **[Answer: The magnet will exert a force on the iron filings, and they will align with the poles of the magnet]**
7. *(multiple choice): Where on the earth is the magnetic field the strongest?*
 - A. The equator
 - B. **The north and south pole**

The Great Migration: Play the game and answer questions 8-10.

8. *Give one interesting hummingbird fact from the game.* **[Possible answers could include: The world's smallest hummingbird is the bee hummingbird in Cuba, they are often mistaken for bees and weigh less than a dime; there are over 300 hummingbird]**

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species in the world; in Native American traditions, hummingbirds are often portrayed as healers, messengers, and signs of good luck; hummingbirds are the only birds that can fly backwards.]

9. *Give one interesting magnet fact from the game.* [Possible answers could include: The magnetic field of a the average bar magnet is 10,000 times stronger than the earth's magnetic field; the earth's magnetic poles are always moving, they move about 5 miles each year; many rollercoasters use electromagnets (magnets created by electricity) to push cars along the track; Saturn, Jupiter, Neptune, and Uranus are the only other planets in the solar system with a magnetic field.]
10. *Describe one example of evidence you saw in your investigation or in the migration game that magnetic fields exist around Earth and exert forces on objects, even if they aren't touching.* [Possible answers could include: A compass points north because it is attracted to the earth's north magnetic pole. When the iron filings were sprinkled over the magnet, it showed that the magnetic force was strongest at the magnet's poles. A migratory bird can see Earth's magnetic field using a special protein in their eye called cryptochrome, and that sense helps them navigate.]