# **Magnetism Discussion Guide (for use during or after reading)**

1. What is magnetism? What do attract and repel mean? (What Is Magnetism?, p. 4-5)
   1. Magnetism is an invisible force that either attracts (pulls) or repels (pushes away). Magnetism is produced by the motion of electrons in metals.
2. Magnets have opposing poles. What happens when opposite poles are near one another? What happens when the same poles are near one another? (Magnetic Poles, p. 10-11)
   1. Magnets have a positive pole and a negative pole. When opposite poles are near one another, they attract each other, and the magnets are pulled together. When the same poles are near one another, they repel each other.
3. What is a magnetic field? According to the text, where are magnetic fields strongest? (Magnetic Fields, p. 12-13)
   1. A magnetic field is an area of force surrounding a magnet. The magnetic field is what allows magnets to be able to pull or push on objects without touching them. According to the text, magnetic fields are strongest at the poles.
4. Explain how compasses use magnets to work. (How Compasses Use Magnets, p. 18-19)
   1. A compass is a tool that uses magnets to help determine direction. The Earth’s magnetic pole attracts the compass’s metal needle so that it always points north.
5. How do animals like insects, birds, and fish use magnetism? (How Compasses Use Magnets, p. 18-19)
   1. Scientists believe that some insects, birds, and fish use tiny natural magnets found inside their bodies as built-in compasses to help them find their way in their environment.
6. What happens when an electric current flows through a metal wire? What happens if you turn off that current? (Electricity and Magnetism, p. 20-23)
   1. When an electric current flows through a metal wire, it produces a magnetic field around this wire. If you turn off that electric current, the magnetic field disappears. This shows there is a relationship between electricity and magnetism, which is called electromagnetism.
7. What is an electromagnet and why are they useful? (Electricity and Magnetism, p. 20-23)
   1. An electromagnet is a temporary magnet that comes from running an electric current through metal. This can be useful because it contains a powerful magnetic field that can be turned off and controlled by people.
8. Describe one way people use electromagnetism to make life easier. (How We Use Electromagnetism, p. 24-27)
   1. People use electromagnetism to make life easier. For example, electric generators use electromagnetism to spin magnets and generate electricity. Electric motors use magnets and coils of wire to convert potential energy into mechanical energy. Maglev trains also use the concepts of repulsion to float above the tracks.
9. How are scientists currently using magnetism to help them study complex events? (Why Study Magnetism?, p. 28-29)
   1. Scientists are currently using magnetism to help uncover some complex mysteries. For example, the Large Hadron Collider (LHC) is used to speed up particles and crash them together in order to recreate the conditions that occurred when the universe was formed so scientists can better study it.
10. What fun fact stood out to you and why? (Can You Believe It?!, p. 34-35)
    1. Students’ answers will vary.