Name _____ Class _____ Date _____

Chapter 18 – Electromagnetism
Directed Reading A

Section: Magnets and Magnetism
PROPERTIES OF MAGNETS

1. Any material that attracts iron is a(n) _____.

2. The points on a magnet that have opposite magnetic qualities are the _____.

3. The magnetic pole that points to the north is the magnet's _____.

4. The magnetic pole that points to the south is the magnet's _____.

5. The force that can either push magnets apart or pull them together is _____.

6. The region around a magnet in which magnetic forces act is the _____.

For each description below, identify the correct magnetic property. Write either *magnetic forces* or *magnetic fields* in the space provided.

_____ **7.** come from spinning electric charges in the magnets

_____ **8.** can push magnets apart or pull them together

_____ **9.** depend on how two magnets' poles line up

_____ **10.** are regions around magnets in which magnetic forces can act

_____ **11.** shape that can be shown with lines that surround magnets

_____ **12.** are strongest at magnetic poles, where lines are closest together

THE CAUSE OF MAGNETISM

_____ **13.** Whether a material is magnetic depends on its
- **a.** density.
- **b.** atoms.
- **c.** shape.
- **d.** mass.

_____ **14.** As an electron moves, it makes, or induces a(n)
- **a.** aurora.
- **b.** ferromagnet.
- **c.** electromagnet.
- **d.** magnetic field.

_____ **15.** Materials in which the atoms' magnetic fields cancel each other out are
- **a.** aligned in domains.
- **b.** like iron, nickel, and cobalt.
- **c.** not magnetic.
- **d.** magnetic.

_____ **16.** Which of these is true when the poles of atoms line up?
- **a.** The atoms cancel each other out.
- **b.** The atoms are arranged in a domain.
- **c.** The atoms make a weak magnetic field.
- **d.** The atoms do not become magnetic.

17. Name one thing that causes domains of a magnet's atoms to lose alignment.

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18. How do you magnetize something made of iron, cobalt, or nickel?

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19. Why do you end up with two magnets when you cut one magnet in half?

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KINDS OF MAGNETS

Match the correct description with the correct term. Write the letter in the space provided.

_____**20.** magnet with strong magnetic properties

_____**21.** magnet made by an electric current

_____**22.** magnet that loses magnetization easily

_____**23.** hard to magnetize, but stays magnetized

a. temporary

b. electromagnet

c. ferromagnet

d. permanent

EARTH AS A MAGNET

24. Why can magnets point north?

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25. If you put a compass on a bar magnet, the needle points to the south pole of the magnet. Explain why.

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26. Why does a compass needle point to Earth's geographic north?

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27. What makes Earth's magnetic field?

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28. When charged particles from the sun hit oxygen and nitrogen atoms in the air, a(n) _____ is formed.

Name _____ Class _____ Date _____

Skills Worksheet

Directed Reading A

Section: Magnetism from Electricity

_____ **1.** What kind of train uses an electromagnet to float above the track?
- **a.** magnetic
- **b.** maglev
- **c.** electric
- **d.** electronic

THE DISCOVERY OF ELECTROMAGNETISM

_____ **2.** The interaction between electricity and magnetism is called
- **a.** electromagnetism.
- **b.** maglev.
- **c.** electric.
- **d.** electronic.

_____ **3.** Oersted discovered that electric current produces a(n)
- **a.** electric field.
- **b.** magnetic field.
- **c.** magnetic current.
- **d.** rotating field.

_____ **4.** The direction of a magnetic field produced by an electric current depends on the direction of the
- **a.** current.
- **b.** magnetism.
- **c.** wire.
- **d.** batteries.

5. Who were the two scientists who did the first research into the interaction between electricity and magnetism?

_____

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USING ELECTROMAGNETISM

_____ **6.** What are two devices that strengthen the magnetic field of a current-carrying wire?
- **a.** magnetic field and magnetic force
- **b.** solenoid and electromagnet
- **c.** electromagnet and current
- **d.** solenoid and current

_____ **7.** A coil of wire that produces a magnetic field when carrying an electric current is called a(n)
- **a.** electromagnet.
- **b.** maglev.
- **c.** solenoid.
- **d.** magnetic field.

_____ **8.** What happens to the magnetic field if more loops per meter are added to a solenoid?
- **a.** The magnetic field becomes weaker.
- **b.** The magnetic field becomes stronger.
- **c.** The magnetic field turns on and off.
- **d.** There is no change in the magnetic field.

_____ **9.** A solenoid wrapped around a soft iron core is called a(n)
- **a.** electromagnet.
- **b.** maglev.
- **c.** magnetic core.
- **d.** magnetic field.

_____ **10.** What happens to an electromagnet if the electric current in the solenoid wire is increased?
- **a.** The electromagnet becomes weaker.
- **b.** The electromagnet becomes stronger.
- **c.** The electromagnet turns on and off.
- **d.** There is no change in the electromagnet.

APPLICATIONS OF ELECTROMAGNETISM

_____ **11.** What is one thing that uses an electromagnet?
- **a.** bicycle
- **b.** doorbell
- **c.** computer
- **d.** solenoid

_____ **12.** An electric motor changes electrical energy into what kind of energy?
- **a.** electromagnetic
- **b.** electronic
- **c.** mechanical
- **d.** magnetic

13. Explain what happens to an electromagnet when there is no current in the wire.

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Match the correct description with the correct term. Write the letter in the space provided. Some terms will not be used.

_____ **14.** a device that converts electrical energy into mechanical energy

_____ **15.** attached to the armature; reverses direction of electric current

_____ **16.** a loop or coil of wire that can rotate

_____ **17.** used to measure current

a. galvanometer
b. armature
c. electric motor
d. commutator
e. voltmeter

Name _____ Class _____ Date _____

Skills Worksheet

Directed Reading A

Section: Electricity from Magnetism

ELECTRIC CURRENT FROM A CHANGING MAGNETIC FIELD

1. What problem did both Joseph Henry and Michael Faraday work to solve?

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2. The process of creating a current in a circuit by changing a magnetic field is called _____.

3. Describe what happened to the electric current in Michael Faraday's experiment when the battery was fully connected.

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4. Describe two ways to induce a larger electric current when you move a magnet in a coil of wires.

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ELECTRIC GENERATORS

_____ **5.** What device converts mechanical energy into electrical energy?

a. electric motor
b. electric generator
c. electromagnetic motor
d. magnetic motor

_____ **6.** When electric current changes direction it is called a(n)

a. generated current.
b. electromagnetic current.
c. alternating current.
d. rotating current.

7. Name the four parts of a simple generator, and describe what they do.

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8. Other than the size, what is one difference between power plants and electric generators?

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9. Name two sources of energy that generators convert into electrical energy.

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Put the following steps for generating electrical energy in order from 1 to 4. Write the appropriate numbers in the space provided.

_____ **10.** Steam turns a turbine.

_____ **11.** Energy boils water into steam.

_____ **12.** Electric current is induced and electrical energy is generated.

_____ **13.** A turbine turns the magnet of a generator.

TRANSFORMERS

_____ **14.** A device that increases or decreases the voltage of alternating current is called a(n)

a. voltmeter
b. generator.
c. transformer.
d. electromagnet.

15. Explain why a transformer uses different numbers of loops in its primary and secondary coils.

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16. Describe what a step-up transformer does.

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17. Describe what a step-down transformer does.

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