Packet instruction for Physics with Mr. Graff and Mrs. Shade

Week 2 & 3 Assignment:

Assignments may be located at www.mrgraff.webs.com

Due dates for packets being returned to the office:

Week 1 & 2 are due at the office by May 8th
Week 1: (April 20th to 24th)
Week 2: (April 27th to May1st)

Week 3 & 4: are due at the office on May 15th
Week 3: (May 4th to May 8th)
Week 4: (May 18th to May 22nd)

Monday April 27th	**Tuesday April 28th**	**Wednesday April 29th**	**Thursday April 30th**	**Friday May 1st**
Watch the video posted on the website for magnetic properties for this date. Use these videos to answer the questions for the worksheet on Tuesday..	Complete the worksheet on magnetic properties.	Watch the videos on magnetic inductions and Lenz's Law as listed on the website.	Complete the Lab as listed on the website. There is a worksheet for this lab. If you cannot access the lab, you can do a video reflection worksheet based on a video you watched on youtube that is science related or an article that you found on the internet.	Complete the magnetic induction worksheet.

Monday May 4th	**Tuesday May 5th**	**Wednesday May 6th**	**Thursday May 8th**	**Friday May 9th**
Watch the videos for transformers as posted on the website. Use these videos to answer the questions for the worksheet due tomorrow.	Complete the worksheet on transformer properties.	Watch the videos by Smarter Everyday and complete the video reflection worksheet.	Watch the PBS documentary "Magnetic Storm" and complete the worksheet.	Continue with magnetic storm video.

Instructions for Packets:

- Title the top of **each** paper as shown below:

Teachers Name:_____ **Class:**_____ **Period:**_____ **Your Name:**_____

- Answer all questions to your fullest capability and be sure to show all work.
- Staple all work together.

Contact Info.
Contacts for Mrs. Shade
email:jshade@tusd.net
phone: 2096259450
remind: @shadephys
Zoom Meetings Code: 317-242-980 11AM – 12 PM each school day.
Please note the following changes.
No notebook checks, No projects, No tests, No Final. Please complete all assignments!
Contact Info:
Contact for Mr. Graff
Email: fgraff@tusd.net
Phone: (209) 914-2619
Office hours are from 9 am to 11 am during the weekdays.

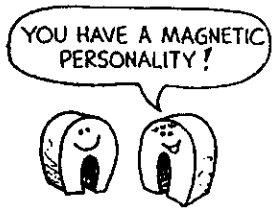
Name Period Date

Concept-Development Practice Page **36–1**

Magnetism

Fill in each blank with the appropriate word.

1. Attraction or repulsion of charges depends on their *signs*, positives or negatives. Attraction or repulsion of magnets depends on their magnetic _____:
   _____ or _____.



2. Opposite poles attract; like poles _____.

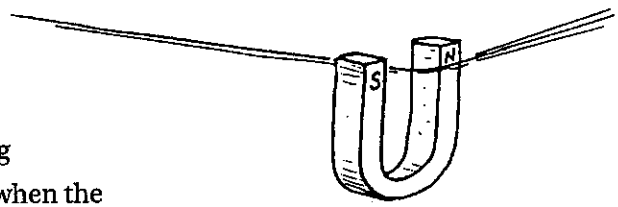
3. A magnetic field is produced by the _____ of electric charge.

4. Clusters of magnetically aligned atoms are magnetic_____.

5. A magnetic _____ surrounds a current-carrying wire.

6. When a current-carrying wire is made to form a coil around a piece of iron, the result is an _____

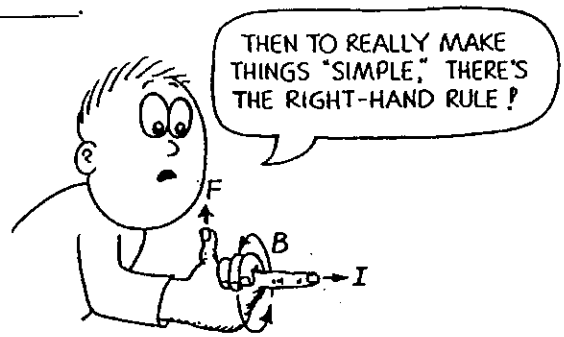
7. A charged particle moving in a magnetic field experiences a deflecting _____ that is maximum when the charge moves _____ to the field.



8. A current-carrying wire experiences a deflecting _____that is maximum when the wire and magnetic field are _____ to one another.

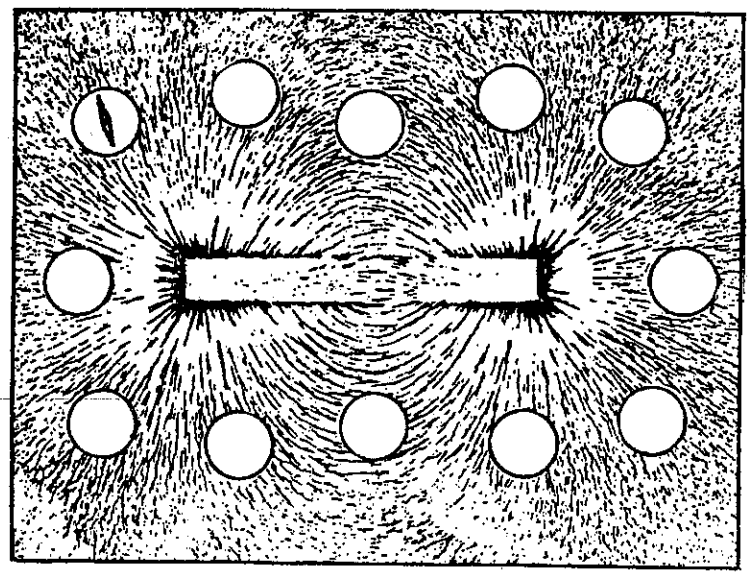
9. A simple instrument designed to detect electric current is the_____; when calibrated to measure current, it is an _____; when calibrated to measure voltage, it is a _____.

10. The largest-size magnet in the world is the _____ itself.

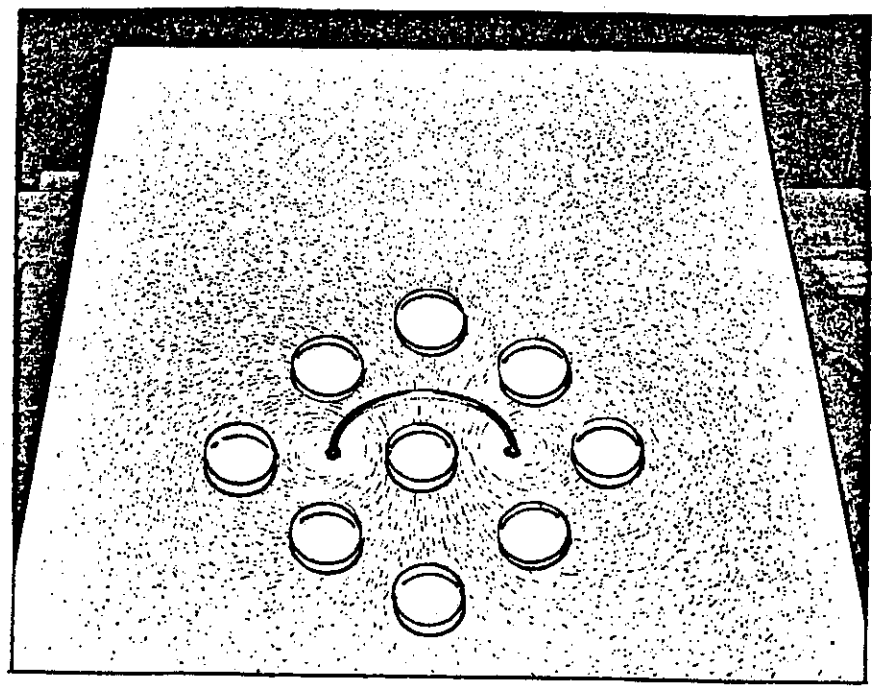


Conceptual PHYSICS

11. The illlustration below is similar to Figure 36.4 in your textbook. Iron filings trace out patterns of magnetic field lines about a bar magnet. In the field are some magnetic compasses. The compass needle in only one compass is shown. Draw in the needles with proper orientation in the other compasses.

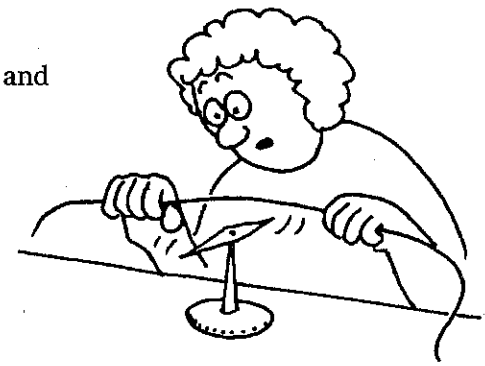


12. The illustration below is similar to Figure 36.13 (center) in your textbook. Iron filings trace out the magnetic field pattern about the loop of current-carrying wire. Draw in the compass needle orientations for all the compasses.



Concept-Development Practice Page 37-1

Faraday's Law

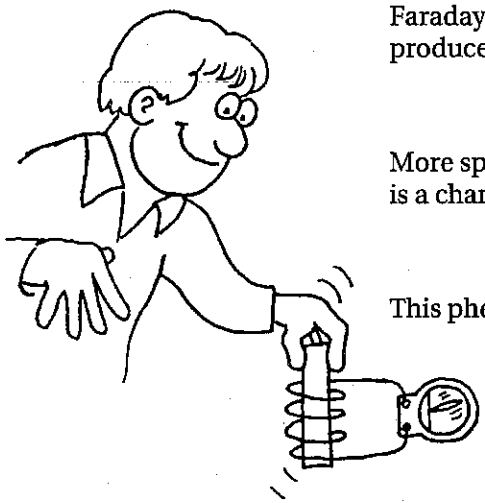


1. Hans Christian Oersted discovered that magnetism and electricity are

   (related) (independent of each other).

   Magnetism is produced by

   (batteries) (the motion of electric charges).



Faraday and Henry discovered that electric current can be produced by

(batteries) (motion of a magnet).

More specifically, voltage is induced in a loop of wire if there is a change in the

(batteries) (magnetic field in the loop).

This phenomenon is called

(electromagnetism) (electromagnetic induction).

2. When a magnet is plunged in and out of a coil of wire, voltage is induced in the coil. If the rate of the in-and-out motion of the magnet is doubled, the induced voltage

   (doubles) (halves) (remains the same).

   If instead the number of loops in the coil is doubled, the induced voltage

   (doubles) (halves) (remains the same).

3. A rapidly changing magnetic field in any region of space induces a rapidly changing

   (electric field) (magnetic field) (gravitational field)

   which in turn induces a rapidly changing

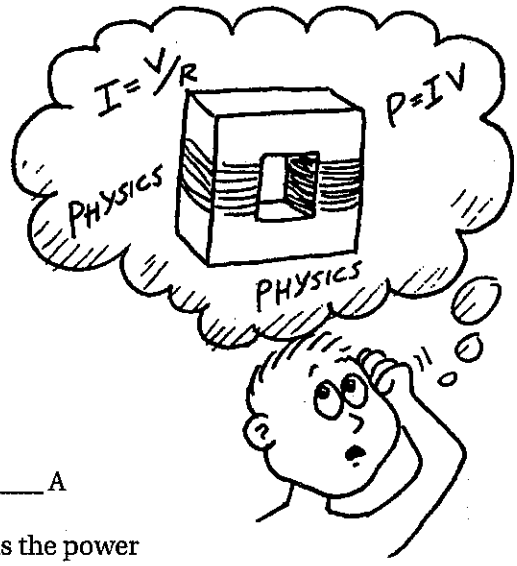
   (magnetic field) (electric field) (baseball field).

   This generation and regeneration of electric and magnetic fields makes up

   (electromagnetic waves) (sound waves) (both of these).

Conceptual PHYSICS

Transformers



Consider a simple transformer that has a 100-turn primary coil and a 1000-turn secondary coil. The primary is connected to a 120-V AC source and the secondary is connected to an electrical device with a resistance of 1000 ohms.

1. What will be the voltage output of the secondary? _____ V
2. What current flows in the secondary circuit? _____ A
3. Now that you know the voltage and the current, what is the power in the secondary coil? _____ W
4. Neglecting small heating losses, and knowing that energy is conserved, what is the power in the primary coil? _____ W
5. Now that you know the power and the voltage across the primary coil, what is the current drawn by the primary coil? _____ A

Circle the correct answers:

6. The results show voltage is stepped (up) (down) from primary to secondary, and that current is correspondingly stepped (up) (down).
7. For a step-up transformer, there are (more) (fewer) turns in the secondary coil than the primary: For such a transformer, there is (more) (less) current in the secondary than in the primary.
8. A transformer can step up (voltage) (energy and power), but in no way can it step up (voltage) (energy and power).
9. If 120 V is used to power a toy electric train that operates on 6 V, then a (step up) (step down) transformer should be used that has a primary to secondary turns ratio of (1/20) (20/1).
10. A transformer operates on (dc) (ac) because the magnetic field within the iron core must (continually change) (remain steady).

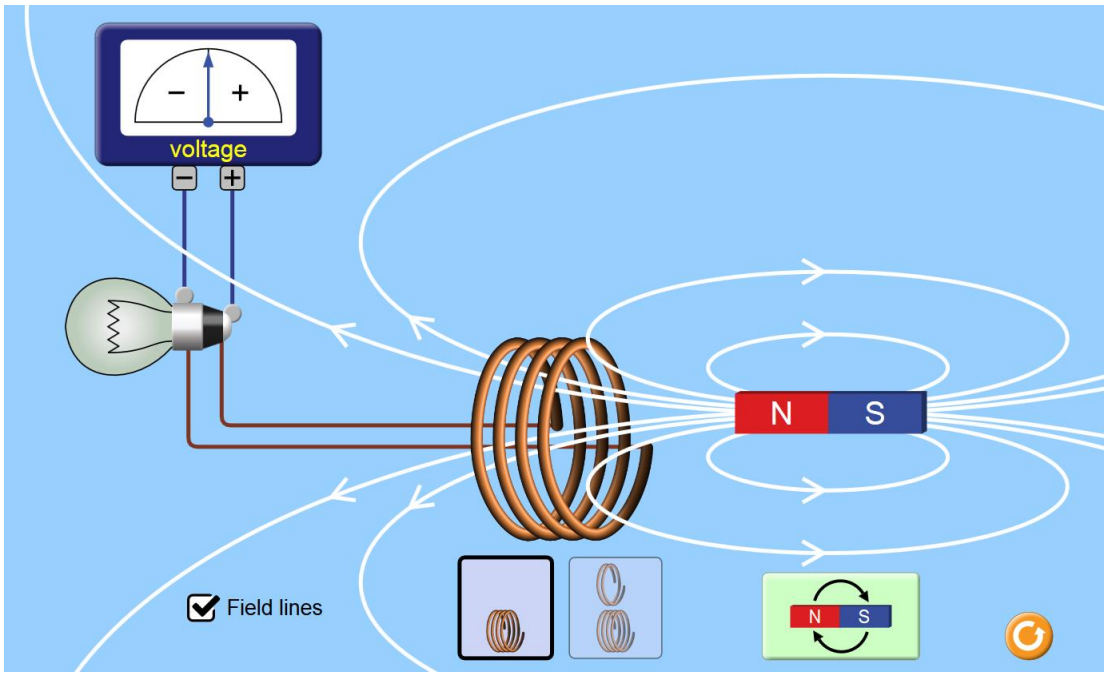
Faraday's Law

Go to: https://phet.colorado.edu/en/simulation/faradays-law

Name:_____ Date:_____ Period_____

Introduction:

Michael Faraday was an English scientist that greatly contributed to the study of electromagnetism including building one of the first electric motors. He also contributed to how induction occurs. In this simulation, we will be experimenting with the process of induction.



Directions:

1) Search for the PhET website and go to the simulation entitled Faraday's Law (html 5).
2) Click on "Field Lines" to see the magnetic field around the magnet. Draw a sketch of what you notice.

3) What happens as you move the north side of the magnet into the coil?

4) How does the Voltage change as you move the south side in rather than the North?

5) What happens if you move the magnet into the coil very slowly vs. very quickly. What relationship can you make between the motion of the magnet and the current produced?

6) Can you produce a current when the magnet goes up and down in the loops?

7) Next try two rings vs. four rings. What relationship can you make between the number of loops and the current produced.

8) Lastly, try putting the magnet in the loops and click the magnet flip button. What happens as you spin the magnet several times?

9) Look at the Voltage needle as you spin it multiple times. What type of current do you think it is producing? AC or DC?

Name _____ Date _____ Period _____

NOVA: Magnetic Storm

1. How far down is the Earth's core?
2. What is the Earth's core made of?
3. The Earth's _____ is generated in the core.
4. What have scientists recently discovered about the field?
5. The _____ is created deep in the Earth's core. It streams out near the _____, loops around the planet, and then runs back into the core near the _____.
6. The magnetic field protects us from _____ from space.
7. Every few hours, the _____ ejects billions of tons of charged particles – the solar _____.
8. The only evidence of the particles hitting the magnetic field are the _____ and _____ lights.
9. In 1996, NASA sent a satellite to _____.
10. Does Mars currently have a magnetic field?
11. There is a way _____ rocks can be _____ when they form. If molten rock cools in a strong _____, iron-based minerals in it can pick up that magnetism and the resulting solid rock will itself be _____.
12. Mars began to lose its water and atmosphere about _____ years ago.
13. Clay contains tiny particles of a mineral called _____.
14. Clay does not become magnetic until it is _____ and cooled.
15. In _____ years, the field has decreased _____%.
16. Its really _____ inside the Earth's core that gives rise to the magnetic field.
17. The liquid metal in the core is in constant _____.

18. Mars may have lost its magnetic field because its core _____ and became solid.

19. Why don't scientists think that Earth's core cooling down is the cause of the decrease in strength of our magnetic field?

20. Going back about 700,000 years, the Earth's magnetic field was _____.

21. On average, reversals happen once every _____ years.

22. On the computer simulation, every time a field reversal was about to happen, the strength of the magnetic field would _____.

23. Eighteenth and nineteenth century sailors had to know the difference between _____ north and _____ north.

24. During the weakened state of the magnetic field, the Earth may have as many as _____ magnetic poles.

25. About _____ people per year would die as a result of increased exposure to radiation.

26. It might be possible to see the _____ every night.

Section 3: Electromagnetic Induction and Transformers

Name:_____ Date:_____ Period:_____

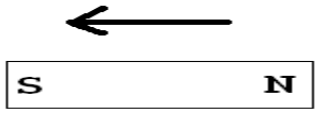
1) Describe how to create current using nothing more than a wire and a magnet.

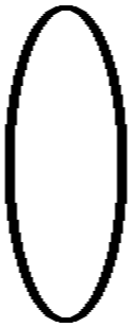
2) A magnet is moved through a coil with one loop. What is the affect of moving the magnet through a coil with multiple loops?

3) Write the equation for Faradays Law and what each variable means.

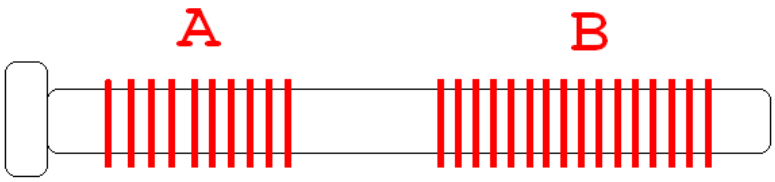
4) Find the voltage produced when a coil of wires that has a cross section of 2 m^2 and 20 turns feels a changing magnet field of 10T/s.

5) Draw the direction of the magnetic field around the loop as the magnet moves away from it.





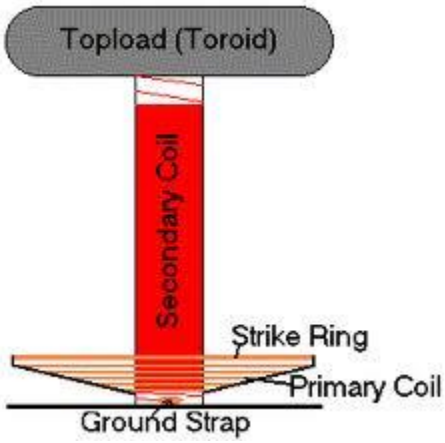
6) The following is a picture of a two sets of wires wrapped around an iron bolt to make a simple transformer. Use this diagram to describe how a transformer works:



7) If 10 volts in applied to point A, what will be the voltage produced at point B?

8) If 20 volts is applied to point B, what will be the output voltage at point A?

9) Describe how at Tesla Coil works:



Physics Video Reflective Questions:

Name:_____ Date:_____ Period:_____

Directions: Please watch the video attached to the website for the current date and give a thorough response below. Hope you enjoyed the video and learned something cool and inspiring! **You must have a total of 300 words no less** 😊

1) Please give an overview of what the video was about:

2) What parts of this video did you find to be the most inspirational?

3) In what way did you see the scientific method being invoked in this video?

4) How does this video relate to the previous lesson that was taught the other day?

5) When sitting at the dinner table with your friends and family, what would you like to share with them about the video that really intrigued you?

6) What further questions do you have regarding this video that left you slightly puzzled?