Freiler 8th grade Distance Learning Packet

Science

Student: _____

Period: _____

Note to students:

Throughout this packet and subsequent packets you will see options. The options apply to those specific items. This packet will be graded. When you see the Options with an ** you need to choose which activity to do. If you choose the digital option at that point be sure to have your work sent to me via your email accounts or through Edmodo; if the option is to attend the Zoom your attendance will be taken at the meeting and you will need to complete the work requested on the Zoom (school rules apply still in regards to your behavior on a zoom). Email me if you don't understand the directions.

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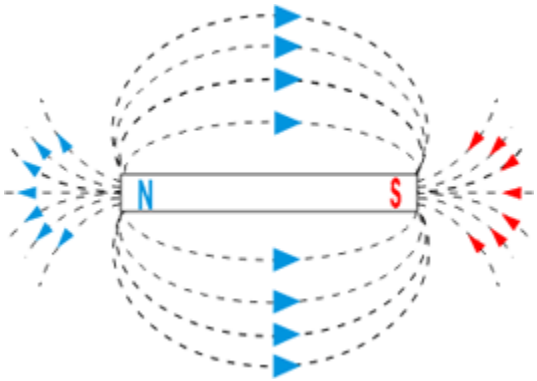
Review of Magnetism

Magnetism is an invisible force or field caused by the unique properties of certain materials. In most objects, electrons spin in different, random directions. This causes them to cancel each other out over time. However, magnets are different. In magnets the molecules are uniquely arranged so that their electrons spin in the same direction. This arrangement of atoms creates two poles in a magnet, a North-seeking pole and a South-seeking pole.

Magnets Have Magnetic Fields

The magnetic force in a magnet flows from the North pole to the South pole. This creates a magnetic field around a magnet.



Have you ever held two magnets close to each other? They don't act like most objects. If you try to push the South poles together, they repel each other. Two North poles also repel each other.

Turn one magnet around, and the North (N) and the South (S) poles are attracted to each other. Just like protons and electrons - opposites attract.

Where do we get magnets?

Only a few materials have the right type of structures to allow the electrons to line up just right to create a magnet. The main material we use in magnets today is iron. Steel has a lot of iron in it, so steel can be used as well.

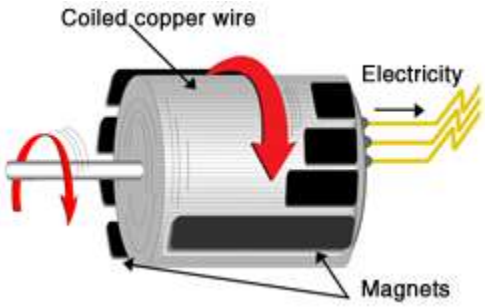
The Earth is a giant magnet

At the center of the Earth spins the Earth's core. The core is made up of mostly iron. The outer portion of the core is liquid iron that spins and makes the earth into a giant magnet. This is where we get the names for the north and south poles. These poles are actually the positive and negative poles of the Earth's giant magnet. This is very useful to us here on Earth as it lets us use magnets in compasses to find our way and make sure we are heading in the right direction. It's also useful to animals such as birds and whales who use the Earth's magnetic field to find the right direction when

migrating. Perhaps the most important feature of the Earth's magnetic field is that it protects us from the Sun's solar wind and radiation.

The Electric Magnet and Motor

Magnets can also be created by using electricity. By wrapping a wire around an iron bar and running current through the wire, very strong magnets can be created. This is called electromagnetism. The magnetic field created by electromagnets can be used in a variety of applications. One of the most important is the electric motor.



Read this article “Review of Magnetism” and summarize what you think are the 5 main ideas of magnetism are.

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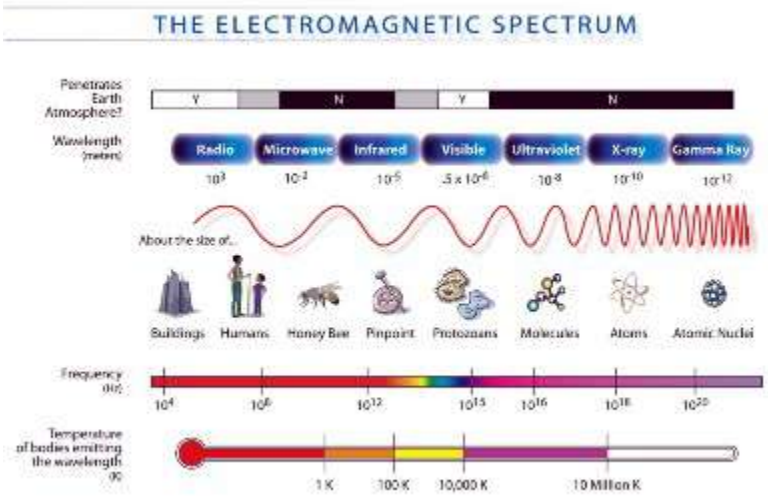
Annotate this reading on electromagnetic waves. Highlight 3 main ideas. **Circle three words you know the least about. Put a "*" next to the 3 most interesting facts that you didn't know before.**

Types of Electromagnetic Waves

Electromagnetic waves are a form of energy waves that have both an electric and magnetic field. Electromagnetic waves are different from mechanical waves in that they can transmit energy and travel through a vacuum.
Electromagnetic waves are classified according to their frequency. The different types of waves have different uses and functions in our everyday lives. The most important of these is visible light, which enables us to see.



Radio Waves

Radio waves have the longest wavelengths of all the electromagnetic waves. They range from around a foot long to several miles long. Radio waves are often used to transmit data and have been used for all sorts of applications including radio, satellites, radar, and computer networks.

Microwaves

Microwaves are shorter than radio waves with wavelengths measured in centimeters. We use microwaves to cook food, transmit information, and in radar that helps to predict the weather. Microwaves are useful in communication because they can penetrate clouds, smoke, and light rain. The universe is filled with cosmic microwave background radiation that scientists believe are clues to the origin of the universe they call the Big Bang.

Infrared

Between microwaves and visible light are infrared waves. Infrared waves are sometimes classified as

"near" infrared and "far" infrared. Near infrared waves are the waves that are closer to visible light in wavelength. These are the infrared waves that are used in your TV remote to change channels. Far infrared waves are further away from visible light in wavelength. Far infrared waves are thermal and give off heat. Anything that gives off heat radiates infrared waves. This includes the human body!

Visible light

The visible light spectrum covers the wavelengths that can be seen by the human eye. This is the range of wavelengths from 390 to 700 nm which corresponds to the frequencies 430-790 THz. You can go here to learn more about the visible spectrum.

Ultraviolet

Ultraviolet waves have the next shortest wavelength after visible light. It is ultraviolet rays from the Sun that cause sunburns. We are protected from the Sun's ultraviolet rays by the ozone layer. Some insects, such as bumblebees, can see ultraviolet light. Ultraviolet light is used by powerful telescopes like the Hubble Space Telescope to see far away stars.

X-rays

X-rays have even shorter wavelengths than ultraviolet rays. At this point in the electromagnetic spectrum, scientists begin to think of these rays more as particles than waves. X-rays were discovered by German scientist Wilhelm Roentgen. They can penetrate soft tissue like skin and muscle and are used to take X-ray pictures of bones in medicine.

Gamma rays

As the wavelengths of electromagnetic waves get shorter, their energy increases. Gamma rays are the shortest waves in the spectrum and, as a result, have the most energy. Gamma rays are sometimes used in treating cancer and in taking detailed images for diagnostic medicine. Gamma rays are produced in high energy nuclear explosions and supernovas.

* Don’t turn in this packet yet. In the next packet you will want to refer to the information in this packet. All hard copies of work can be submitted at one time. You can also submit your work digitally if you prefer. This will help reduce your exposure and keep everyone safe and healthy not to mention save some trees. You can use Insert Shapes to make circles around words without having to print this out.

****Option: Choose one of the following activities. Circle the one you will complete.**

**Option A. Complete the simulation found at this link http://www.glencoe.com/sites/common_assets/science/virtual_labs/CT05/CT05.html and then send me a screen shot or picture of your completed lab work

Or

**Option B. Reproduce the diagram on page 3 in full color on this page. Make it bigger to show the wavelengths, colors frequencies, and label the different types of electromagnetic waves on the diagram.