

DISCLAIMER!

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Electromagnetic Spectrum Review



Strategies toward achievement of:

S8P4b. Construct an explanation using data to illustrate the relationship between the electromagnetic spectrum and energy.

S8P4c. Design a device to illustrate practical applications of the electromagnetic spectrum (e.g., communication, medical, military).

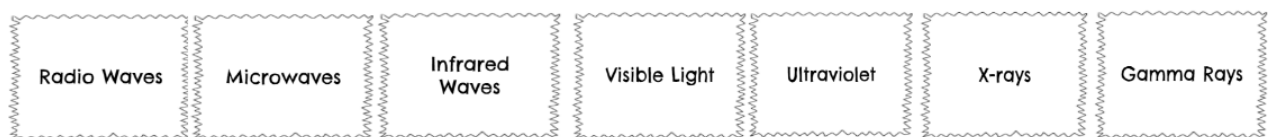
This activity is designed to reinforce concepts about the electromagnetic spectrum in regard to each waves' position on the spectrum, relative wavelength and energy, and use as it relates to 8th grade science Georgia Standards of Excellence. The resources provided can be utilized two different ways. The first, as an exercise for all or developing learners to ensure the concepts are reinforced at an appropriate pace. The second is a fast-paced, engaging game for your more proficient learners.

After giving direct instruction on the concepts of the electromagnetic spectrum, the teacher will use this activity to reinforce concepts. To get started the teacher should print the appropriate number of card sets for their class size. The information on the cards can be adjusted by the teacher as needed.

For learner development or to set a foundation for the second exercise:

Students can work independently or in pairs at the teacher's discretion. The teacher should give the following instructions:

1. Look in your stack of cards and find the names of all seven types of electromagnetic waves. Place them in order from longest to shortest wavelength from left to right across the top of your desk.



2. Next, take a card from the remaining cards in the stack. Determine which electromagnetic wave the card describes and place it below the name of that electromagnetic wave. Do this until you have no cards remaining. When finished, you should have four cards for each type of wave (this includes the card with the name of the wave)

The teacher can go over the answers together as a class or can check individual groups and let "experts" help check other groups by identifying any cards that are incorrectly placed.

Radio Waves	Microwaves	Infrared Waves	Visible Light	Ultraviolet	X-rays	Gamma Rays
Longest Wavelength	Shorter wavelength than radio but longer WL than Infrared.	More energy than microwaves but less energy than visible light.	Only EM Wave that we can see.	Has a frequency higher than Visible Light, but lower than X-rays.	Slightly lower frequency than Gamma Rays.	Highest frequency
Lowest Energy	More energy than radio waves but less energy than Infrared.	Located just before RED on the EM Spectrum.	Only EM wave that has its own spectrum	-Too much of this wave can cause skin cancer. -Used to check for counterfeit money	Has a wavelength that is shorter than UV but longer than Gamma Rays.	Shortest wavelength
Used for broadcasting radio signals	Used in microwave ovens, radar, can send signals from Earth to space satellites.	Related to the temperature of an object. Warmer objects give off more of this type of wave than cooler objects.	Has less energy than Ultraviolet but more energy than Infrared.	Located just to the right of violet	Can penetrate through skin and tissue, but not through bone. Used in the medical field.	Used to treat some forms of cancer

For Proficient Learners:

Students who have a solid understanding of the previous activity can increase the intensity of this review through playing a game of Spoons with the same card set.

The goal of the game is to collect 4 cards that apply to a specific type of EM Wave. One of the 4 cards will have the name of the wave.

Setting Up the Game:

Step 1: Get into groups of 3.

Step 2: Shuffle all the cards

Step 3: Deal each player 4 cards.

Step 4: Place the remaining cards face down next to player 1.

Step 5: Place spoons in the middle. You should have one fewer spoon than you have players. (Ex. 3 players = 2 spoons)

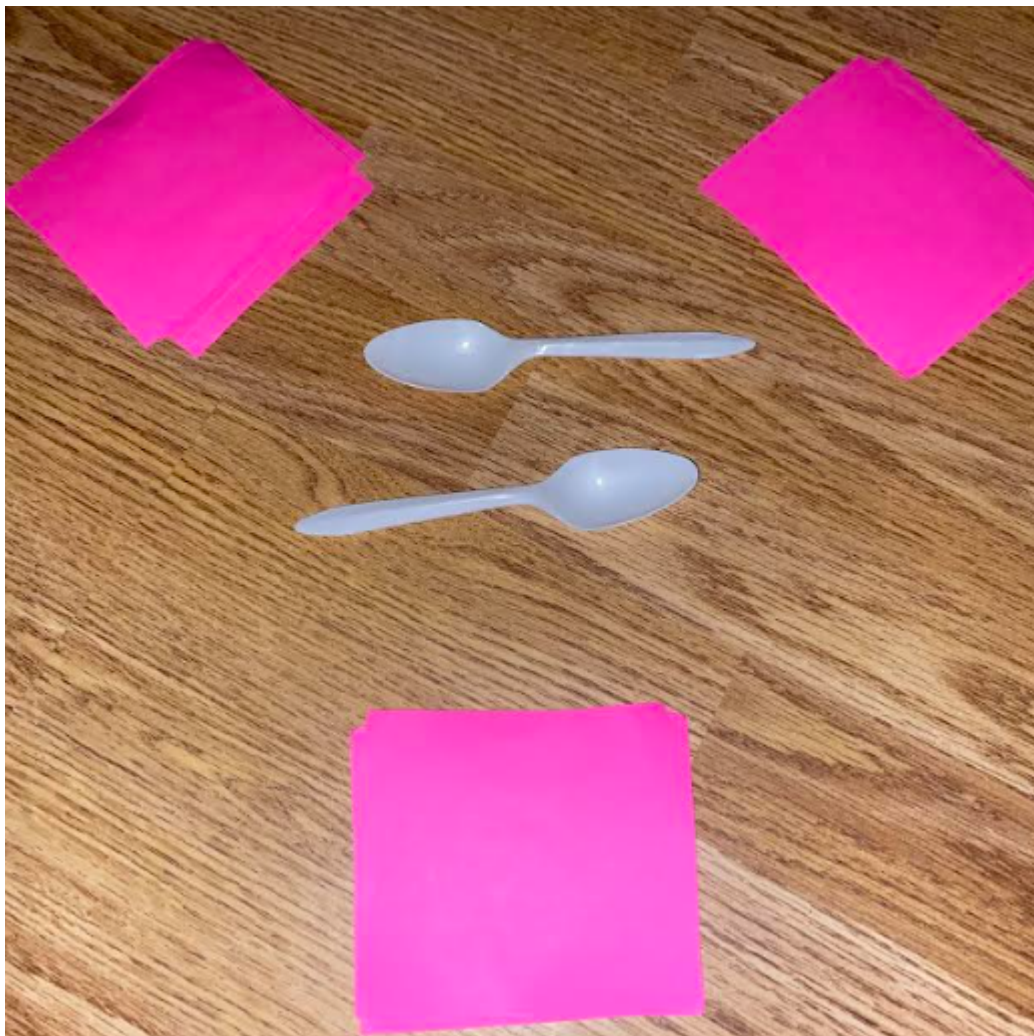
DIRECTIONS: Each player tries to make four of a kind by collecting four cards that all describe a specific electromagnetic wave. Player 1 of the first round begins by picking the top card from the pile in front of them, deciding whether it will help them get four of a kind. If they don't want to keep the card they must place it in a pile, next to player 2. If they do want to keep it, they must choose a card from

their hand and place it in a stack beside player 2. This process will continue for all players.

If the card makes it all the way around, the last player will start a new stack beside player 1. If player 1 uses all the cards from the original stack, he or she will begin using cards from the leftover deck that the last player created.

When someone gets four of a kind, they must grab a spoon, and everyone else must follow. The player left empty-handed is eliminated and a spoon is removed from the middle. You will play until you have one winner.

The “dealer” aka, Player 1, should be a different person each round.



Pre-made Card Set:

Radio Waves

**Longest
Wavelength**

Lowest Energy

**Used for
broadcasting
radio signals**

Microwaves

**More energy
than radio
waves but less
energy than
Infrared.**

**Shorter
wavelength
than radio but
longer WL
than Infrared.**

**Used in
microwave ovens,
radar, can send
signals from Earth
to space satellites.**

**Infrared
Waves**

**More energy than
microwaves but
less energy than
visible light.**

**Located just
before RED on
the EM
Spectrum.**

**Related to the
temperature of an
object. Warmer
objects give off more
of this type of wave
than cooler objects.**

Visible Light

**Only EM Wave
that we can
see.**

**Only EM wave
that has its
own spectrum**

**Has less
energy than
Ultraviolet but
more energy
than Infrared.**

Ultraviolet

**Has a frequency
higher than Visible
Light, but lower
than X-rays.**

**Located just
to the right of
violet**

**-Too much of this
wave can cause
skin cancer.
-Used to check for
counterfeit money**

X-rays

**Slightly lower
frequency
than Gamma
Rays.**

**Has a wavelength
that is shorter
than UV but
longer than
Gamma Rays.**

**Can penetrate
through skin and
tissue, but not
through bone.
Used in the
medical field.**

Gamma Rays

**Highest
frequency**

**Shortest
wavelength**

**Used to treat
some forms of
cancer**

Answer Key:

Radio Waves	<ul style="list-style-type: none"> • Longest Wavelength • Lowest Energy • Used for broadcasting radio signals
Microwaves	<ul style="list-style-type: none"> • More energy than radio waves but less energy than infrared • Shorter wavelength than radio but longer WL than Infrared. • Used in microwave ovens, radar, can send signals from Earth to space satellites.
Infrared Waves	<ul style="list-style-type: none"> • More energy than microwaves but less energy than visible light. • Located just before RED on the EM Spectrum. • Related to the temperature of an object. Warmer objects give off more of this type of wave than cooler objects.
Visible Light	<ul style="list-style-type: none"> • Only EM Wave that we can see. • Only EM wave that has its own spectrum • Has less energy than Ultraviolet but more energy than Infrared.
Ultraviolet Waves	<ul style="list-style-type: none"> • Has a frequency higher than Visible Light, but lower than X-rays. • Located just to the right of violet • Too much of this wave can cause skin cancer. Used to check for counterfeit money
X-ray	<ul style="list-style-type: none"> • Slightly lower frequency than Gamma Rays. • Has a wavelength that is shorter than UV but longer than Gamma Rays. • Can penetrate through skin and tissue, but not through bone. Used in the medical field.
Gamma Rays	<ul style="list-style-type: none"> • Highest frequency • Shortest wavelength • Used to treat some forms of cancer

References