

# Shaping My Knowledge

## Warm-up

First, ask students to get into groups to brainstorm how they think electromagnetic waves can be used to battle climate change. Circulate, monitoring the discussions. Then, elicit ideas from volunteers and write each on a small piece of paper. Next, tell students their Maker Zone project is to create a physical model of electromagnetic waves in action in a real-world application, such as solar panels, wireless charging of electric cars, and LED light bulbs. Afterward, fold the pieces of paper, put them in a hat, and have a member from each group draw one of them. These will be the models the group will create. If needed, have groups research ideas online and choose the most interesting. Finally, to help guide students, you may demonstrate a model for different real-world uses of EM waves using cardboard and string to show how the waves move while a microwave oven (more energy efficient than a gas or electric oven) is heating food – moving the string or rope to show how the wave moves through space.

## Teaching Tip

### For Exercise 1

First, draw students' attention back to their thoughts on how EM waves can be used to combat climate change and ask them to incorporate this into their presentation. Then, for digital and live presentations, create a checklist or another form of listening task to be completed, including information about the real-life application, the type of wave used, and how innovative the application is. To close the session, invite students to share their thoughts on Padlet or another chat tool on the importance of these innovations in the future. Finally, volunteers should be invited to share them with the rest of the class.

## Differentiation Strategy

### For Exercise 2

Go to the Differentiation Strategies Bank and adapt this exercise using Strategy 2b.

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### EM Waves for the Win!

Electromagnetic waves are everywhere and are part of our lives, from communicating by cell phone or downloading documents to heating or cooling our houses with renewable energy sources such as solar panels. They travel through the air at the speed of light, making it possible for our electronic devices to send and receive information and energy. They are invisible, but they shape our lives by powering our tools.

Taking urgent action to fight climate change and its effects is an important goal for the United Nations and the world. Are EM waves also able to help us fight climate change? Yes, they are insofar as they produce waves needed to power renewable energy sources, meaning we can reduce our dependence on hydrocarbons such as oil and gas. GPS is instrumental in tracking weather patterns to warn people of a dangerous weather event, and post-COVID lockdowns showed us how cell phones, laptops, and other electronic communication devices can be used to decrease travel, reducing CO2 emissions. All this is because of a range of EM waves.

In this Maker Zone, you'll work in groups to create a model that demonstrates EM waves in action in a real-world situation (GPS, radio, cell phone, etc.) and the value of EM waves in the fight against climate change.

DO



### EM Waves for the Win!

In this Maker, you will work in a group to create a model of electromagnetic waves in action in a real-world application.

1. Choose a device that uses EM waves (cell phones, GPS, solar panels).
2. Use the lab tools to create a physical model of the device and how EM waves make it work.
3. Write a presentation to explain how EM waves work with this device.
4. Practice your presentation.
5. Share your presentation with other groups.



## Teaching Tip

## For Exercise 2

First, draw a motivation meter on the board labeled from *Totally Unmotivated* to *Super Motivated*. Ask students how they feel today and brainstorm reasons for losing motivation. Introduce key vocabulary like *burnout* and *distraction*. Have students recall a time they felt unmotivated and answer these questions: *What task felt unmotivating? What did you do to regain motivation? Were you successful?* Encourage rich language and past tenses. Then, in pairs, students share stories and create a short talk show script with one as the guest and the other as the host. Perform segments in class, using props, with a three-minute limit. Finally, discuss what everyone learned from the stories and what currently motivates them.

## Wrap-up

Close the week by inviting students to reflect on the week's most challenging topic (Skills for Life, Science, Social Studies, Arts, Language Structures and Functions). First, ask students to write their answers on a piece of paper. Then, have students stand and gather with others who chose the same topic. Have students discuss what they found challenging and what they did to help themselves and others understand. Close the exercise by eliciting different strategies from volunteers. If space allows, post the strategy around the room for future use. If you choose to complete this task in a digital form, consider Padlet, Canva whiteboard, or another tool so students who have chosen the same topic can digitally discuss their reasons.



## BE Aware of Your Progress

01 It's time for your assessment. First, ask a classmate to help you assess your performance during this week (Peer Assessment). Allow your classmate to provide you with some feedback. Later, assess yourself (Self-assessment) based on how you felt during this week.

VG – Very Good

G – Good

N – Need to Improve

## I can...

## Peer Assessment

## Self-assessment

describe what drives me to take action.

describe the generation of electromagnetic waves and their behavior.

understand the outbreak of the American Revolution.

reflect on the consequences of the war displayed in movies.

 use **Conjunctions** to express reasons, results, contrast, concession, and time (*otherwise, so as (not) to, whereas, whilst, once, until, etc.*).

02 Reflect on a time when you lacked motivation.

Answer the questions:

- › What activity were you unmotivated to do?
- › What did you do to regain your motivation?
- › Were you successful?

Answers will vary.

