



How Text Messaging Works

Moving at the speed of light

Dr. B breaks down the invisible electromagnetic waves carrying your messages.



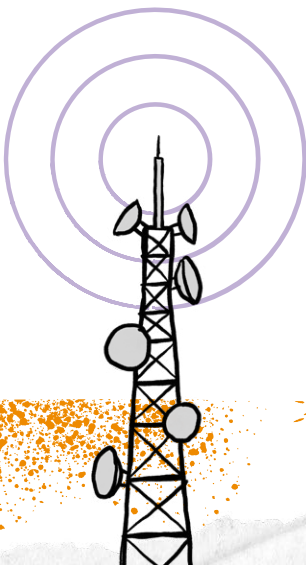
Watch the show!



<https://youtu.be/0qPBxEeciZs>

Quick Questions

1. Do you use a smartphone for texting? What about making voice or video calls?
2. What do you think of when you hear the word "radio"?
3. Did you know that radio waves travel at the speed of light? Does it surprise you?
4. Does it surprise you to know there is light you cannot see?



Deep Dives

1. The eyes of humans are capable of detecting visible light, but not the other wavelengths on the spectrum. How do you think this might benefit our survival? Some animals can see infrared and ultraviolet light as well. How might this benefit their survival? Would there be a benefit for humans to see other wavelengths on the electromagnetic spectrum?
2. Think about all the devices that use radio waves. What do you think our world would look like if we could see radio waves? Each color of visible light is a different wavelength of light. Radio waves have longer wavelengths than red light, and ultraviolet waves have shorter wavelengths than violet light. Does this change what you think it might look like?
3. Imagine communication 100 years ago and 100 years from now. Can you think of two to three ways light waves have been used in the past for communication? Knowing how we use light waves with today's current technology, how might communication via light waves change over the next 100 years?
4. Radio waves travel on Earth, but they also travel through space. In fact, radio telescopes are used to learn about the universe and even to search for extraterrestrial intelligence. If you were to send a radio signal out into the universe to communicate with other intelligent life, what would you want to say? Why?

Engaging in Science Discussions



Recommended Grade Level: Middle and High School

Objective: To engage in open-ended discussions about critical science topics. While leading these discussions, it is important to ensure that everyone is heard, and everyone is treating one another with respect. There is no “right answer” during these discussions, and it’s okay to respectfully disagree.

Additional Notes: We recommend having these discussions multiple times with the same group of participants. This provides the opportunity to explore different topics and improve one’s abilities to have successful conversations about STEM topics. Quick Questions are optional and are recommended to be used as warm-up questions.

Materials: TV or projector Paper and writing utensils

TIMELINE (30 – 40 MINUTES)

5 min	10 min	5 min	10 min	10 min <i>(optional)</i>
Intro + prompts	Watch segment	Think/write time	Share with partner	Small groups

Intro (5 min) Before starting, select one Deep Dive question. Tell the group you will be asking them a question that has no right or wrong answer. After they watch the clip, they will have time to think about and write their response. They will share their response with a partner or small group. Now share the question you selected.

If participants are new to these sorts of discussions, you may want to review the following concepts:

- When you are sharing your responses, provide reasoning and evidence. Reasoning is your own thinking behind your answer. Evidence is facts that support your answer, such as historical facts or scientific facts. You may also have experiences from your own life that support your answer.
- When listening to your classmates, ask questions. The purpose of questions is to better understand their thought process, not to challenge them. Some ways to frame questions are: “I didn’t understand X.” “Could you explain Y again?” “What do you mean by Z?”
- If someone asks you questions, provide clarification. Explain your reasoning and evidence. Remember that there are no right or wrong answers.

Watch the segment (10 minutes)

Think/write time (5 minutes): Participants write down their answers

Share with a partner (10 minutes): Pair up participants. Each person has 5 minutes to share their response and answer questions from their partner. Then switch so each partner gets a turn.

(Optional) Small groups (10 minutes): Put participants in groups of 4 for share-outs and conversations.

(Optional) Homework prompts: Expand your response into a report, picture, poem, essay, short story, song, or performance. Or, write your own discussion question for the group.