



The Hidden Costs of Your Smartphone Upgrade

High-impact mining, carbon emissions, and electronics waste: Dr. B breaks down the power struggle between innovation and sustainability.



Watch the show!



<https://youtu.be/q-REpiBzPik>

QUICK QUESTIONS

1. Do you have a smartphone? If so, how long have you had it?
2. Are you the sort of person who likes to have the best new technology as soon as it's on the market? Or do you wait until others have tried it first?
3. Have you ever thought about where the materials for smartphones come from?
4. When a new model drops, what are the features that drive people to buy it? Are they small upgrades or large upgrades? Do you know?
5. Have you ever tried to repair a smartphone or other piece of technology that broke? Why do you think people often purchase new devices rather than repairing them?

Deep Dives

1. Imagine you are going to buy a new smartphone. How would you go about deciding what type of smartphone to purchase? What features matter most to you? What features do not matter?
2. The materials used for smartphones are often used for other devices such as laptops. Do you think we will ever run out of these materials? What would we do?
3. Smartphones are ubiquitous today, but it wasn't very long ago that people did not carry smartphones at all. Imagine a world in which there are no smartphones. What might it be like? How would it be different? Do you think it would be better or worse? Why?
4. Dr. B mentioned recycling and refurbishing programs that can help reduce the harmful effects of smartphone production. These tend to increase profits for the companies and reduce costs. Should companies only make these efforts if they are profitable? Or do companies have a responsibility to do some things even if they don't impact the profit margins? Explain.
5. Mining for materials used in smartphones comes with a serious human cost, including inhumane and dangerous working conditions. In some cases, children work the mines alongside adults. Do the companies that make cell phones have a responsibility to mitigate these dangers? What about the consumers? Do the people who purchase cell phones hold any responsibility? What, if anything, do you think should be done? 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.