Novel Wuhan Coronavirus: What's the Real Story?

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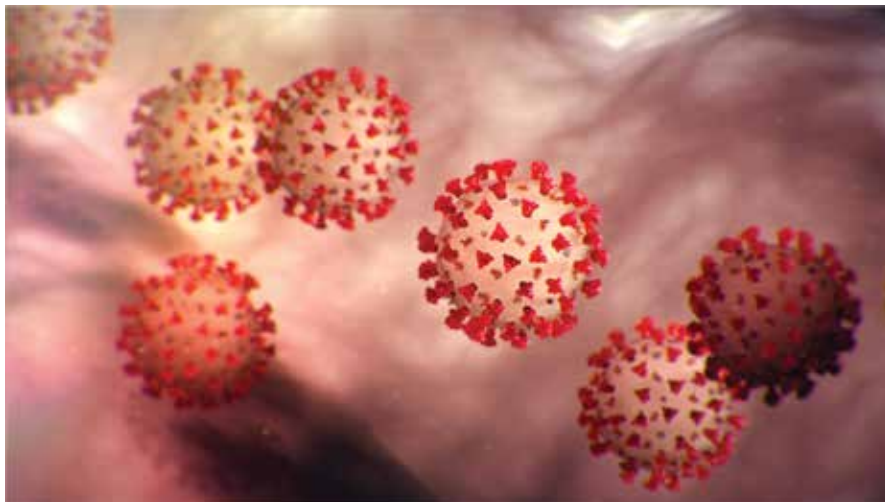
I n this secondary-level lesson, students will generate and prioritize questions about the novel Wuhan coronavirus and evaluate scientific and/or technical information from multiple authoritative sources, assessing the evidence and usefulness of each source for answering their prioritized questions.

Teaching Guidance

This lesson consists of three segments: connecting prior knowledge to the novel coronavirus global outbreak (lesson parts 1–2), making sense of the novel coronavirus (lesson parts 3–4), and examining people's negative bias toward people of Chinese descent at home and abroad (lesson part 5). Lesson part 6 offers students an opportunity for reflection on the lesson as a whole.

Part 1: Lesson Launch

Begin by showing a recent video from a newscast about the coronavirus. Ask students to jot down a few takeaways from

Note to teachers:
Because of documented cases of unfounded and harmful racially driven responses to the outbreak as well as disproportionate (based on the available evidence) fear of the virus by individual students in the United States, students will also discuss appropriate and inappropriate responses to the outbreak.

Developments in the novel coronavirus story are currently in rapid flux, so you may also choose to engage students in obtaining and evaluating more recent reliable sources.

the video clip in their notes or on the student handout (4 minutes). Ask students to individually write about three things: their current understandings, their feelings, and their questions about the coronavirus (5 minutes).

Have students briefly discuss their responses in small groups and then lead a whole-class discussion, and at the front of the room, record the class's understandings, feelings, and questions in separate categories. Gather as many student questions as possible (you could use a one-question-per-sticky-note method) while supporting students in drawing connections between their questions (10 minutes).

Continuing the whole-class discussion, ask students to consider how we might prioritize their questions for investigation. Which questions seem bigger or more important to address first? Students are likely to prioritize questions regarding action—what we can do to respond to the outbreak (and how worried we should be) in an evidence-based way. Though other questions may be prioritized as well, try to build a class

consensus that these response-related questions make sense to investigate first (5 minutes).

Divide students into small groups and ask them to consider how to investigate their questions about the novel coronavirus, and particularly the questions about appropriate evidence-based responses. Have a few groups share their ideas with the whole class. Expected investigative ideas include research using reliable sources of information (5 minutes).

Next, to continue to build student buy-in, ask the whole class if investigating the coronavirus more in science class will be helpful. After listening to student responses, consider saying, "there is a lot of information and in some cases misinformation out there about the coronavirus. Our classroom is a safe space where we can evaluate that information together and make sense of it so that we have a better understanding of what, according to scientists, we should know now. Also, by generating questions we have and considering ways to investigate those questions, we're applying our

practice as scientists to this problem and meeting the goals of our science class" (3 minutes).

Note: At this point and throughout the lesson, stay attuned to students who may be uncomfortable or scared. Gather assessment evidence on this issue throughout the lesson and if necessary connect students to additional support (such as their own family and school counselors).

Part 2: Students Connect Science Ideas to the Novel Wuhan Coronavirus

Ask students if they suspect any connections between the coronavirus outbreak and science ideas that they have figured out in this science class or in previous science classes. Student responses will vary depending on the class context. Possible connections include disciplinary core ideas (especially in the life sciences and engineering design) and crosscutting concepts (for example cause and effect: mechanism and explanation; stability and change; and structure and function) (3–50 minutes).

Part 3: Shared Reading

Ask students to individually consider what might be some reliable sources to gather more information about the novel coronavirus. Have students share their ideas, which might include medical professionals, government, newspapers, and/or health organizations like the CDC and the WHO (3 minutes).

Tell students that you found an article from a major national newspaper (*USA Today*, February 1, 2020: "Coronavirus is scary, but the flu is deadlier, more widespread") that refers to members of the science community and that you think will be of interest to our questions about the level of concern we should currently have. Ask students to individually read and annotate the article. As they read, students should record connections to questions or ideas already raised in class, new ideas, and new questions (10 minutes).

Have students briefly discuss their connections, new ideas, and questions in small groups. Listen for student takeaways, such as that they are much more likely at this stage to contract the flu virus than the novel coronavirus, and that there is a surprisingly high number of flu-caused deaths in the United States every year (3 minutes).

Ask the whole class to reflect on what questions posed earlier were answered by this reading and what questions remain or new questions the class has (3 minutes).

Listen to student responses that seek more information about the novel coronavirus or about influenza.

Part 4: Jigsaw Texts

Tell the whole class that in order to answer as many of their questions about the coronavirus (and now flu) as possible, students will participate in a jigsaw reading, where they will read one article in their small group, summarize the main ideas (and generate a list of connections, new ideas, and questions), and then share those ideas with a group of students who have read other texts. (2 minutes)

- Article 1: CDC: What the Public Should Do: *www.cdc.gov/coronavirus/2019-ncov/about/what-you-should-do.html*

- Article 2: CDC: nCov 2019 *Transmission www.cdc.gov/coronavirus/2019-ncov/about/transmission.html*

- Article 3: CDC: nCov 2019

Phenomenon: Global outbreak of novel Wuhan coronavirus

Science and Engineering Practice
Asking Questions
- Ask questions that arise from careful observation of phenomena, models, or unexpected results, to clarify and/or seek additional information. (MS)

- Ask questions that arise from careful observation of phenomena, models, or unexpected results, to clarify and/or seek additional information. (HS)

Obtaining, Evaluating, and Communicating Information
- Critically read scientific texts adapted for classroom use to determine the central ideas and/or obtain scientific and/or evidence about the natural and designed world(s). (MS)

- Compare, integrate, and evaluate sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a scientific question or solve a problem. (HS)

Crosscutting Concepts
Cause and Effect
- Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS)

Scale, Proportion, and Quantity
- The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs. (HS)

Prevention and Treatment *www.cdc.gov/coronavirus/2019-ncov/about/prevention-treatment.html*

- Article 4: WHO: Novel Coronavirus (2019-nCoV) situation reports *www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports*

- Article 5: WHO: Novel Coronavirus (2019-nCoV) advice for the public: Myth busters *www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/myth-busters*

- Article 6: Chicago Department of Public Health: 2019-nCoV: Guidance for Students *www.chicago.gov/content/dam/city/depts/cdph/HealthProtectionandResponse/2019-nCoV%20Guidance%20for%20Students%2001.30.2020.pdf*

- Article 7: CDC: Novel Coronavirus (2019-nCoV) and You *www.cdc.gov/coronavirus/2019-ncov/downloads/2019-ncov-factsheet.pdf*

Note that any of these articles could be exchanged with other articles from health agencies or news organizations or even informational videos listed in Additional Resources. You may also consider previewing each article and assigning the articles to students based on their typical reading-for-comprehension speed and the length of the article. Finally, you may not need to use all seven articles.

As students complete the reading individually, direct them to both annotate and complete the relevant section of the student handout (13 minutes).

Have students who read the same article briefly share their findings with one another in a small group and discuss the article. This will help students with preparing to briefly summarize their article in the mixed group (4 minutes).

Regroup students so that one rep-resentative from each article is in each group. Ask students to briefly summarize the purpose of their article in their new groups. Each summary should be brief—less than one minute. When sharing the summaries, students should make connections to what they have heard elsewhere, including in the other students' summaries. Talk through anything that is unclear or seems inconsistent from one article to the next. Students should take notes during this sharing, listening, and discussion process (14 minutes).

Ask students to answer the following questions, either individually or in small groups. Were there any noticeable patterns or repetitions in the articles you and your classmates summarized? Why might this be? What questions that we posed earlier did these articles help us to answer? (5 minutes).

Discuss the main takeaways from the jigsaw reading with the whole class. Then ask students what questions they feel like we've answered and what questions we're still wondering about (or what new questions we have) (10 minutes).

Listen for student responses that remark on the shared advice across organizations for prevention, the similarities of prevention measures between coronavirus and the flu, or the fact that the virus is not spreading widely in the United States. Where appropriate, clarify students' thinking through follow-up questions and other talk moves and facilitate students in clarifying each other's thinking. Note that teachers may need to clarify transmission prevention practices important for personal and public health, but that teachers should first give students an opportunity to describe these to one another in the group discussion.

Coach students in articulating questions that they have answered as a result of the readings, which may include questions about the appropriate response to the virus or the severity of the virus. Anticipate additional student questions about details of transmission, the origins of the virus, methods scientists use to study the viruses, personal health risk factors, or other related topics.

End this part by leading a class discussion about other ways besides obtaining and evaluating information that we could go about investigating the novel coronavirus. Display models and images of coronaviruses and ask students how using these models might be helpful for deepening our understanding and explanations. Students are likely to discuss the possibility of doing laboratory investigations with viruses in the school. Ask students to reflect on why this is impractical, but suggest that we could act as citizen scientists using publically available scientific data like the 2019 nCov DNA genome or the WHO nCov case data portal. Subsequent lessons could include students' use of mathematics to analyze the spread of the virus or the student's analysis of gene data using resources such as BLAST. Students could also develop general models for vaccination and explore what research into vaccine development entails (10 minutes).

Part 5: Shared Video
Play the video from Al Jazeera English (beginning at 1:03) to the whole class. Ask students to individually jot down notes from the video in their notebooks or on the student handout (5 minutes).

Ask students to individually answer the following questions on their student handout: Have you ever felt unfairly targeted because of a group that you belong to? If so, how did it make you feel? If not, how do you imagine that would feel? Based on what you know about the novel coronavirus from this lesson, explain why prejudice against people with Chinese or Asian ancestry who live in countries outside of China has no scientific basis (5 minutes).

Lead a whole-class discussion (or, if you prefer, first have students discuss their answers in small groups). Ask stu-

dents why the reporting from France is concerning. Ask students to explain why the fear of people based on their race or ethnicity with respect to the coronavirus is contrary to what we know about the coronavirus (5 minutes).

Part 6: Wrapup and Reflection

In their small groups (or as a whole class) ask students to discuss the following prompts and capture the group's thinking in their notes or on the student handout. What are some markers of reliable information when it comes to major events like the coronavirus? What makes this information reliable? What are some strategies we used to help make sense of the information available? What other tools (other than obtaining and evaluat-

ing information) might we use to further investigate our questions about the novel coronavirus? (20 minutes).

ON THE WEB

Google Slides, Student Note-catcher: *http://bit. ly/CoronavirusLesson_Materials*
ABC News: 11 confirmed cases of coronavirus: *https://youtu.be/VdUi_kwuw7I*
Al Jazeera English: The racist angle behind China coronavirus epidemic: *https://youtu.be/ YqJgMl39JpI*

ADDITIONAL RESOURCES

Report from NBC on emergency declared: *www. youtube.com/watch?v=g8rkSG62OiQ*
CBC Explainer: *www.youtube.com/ watch?v=kIL5m5XznNY*
Wikipedia page: *https://en.wikipedia.org/*

wiki/2019%E2%80%9320_Wuhan_coronavirus_ outbreak
Flu worldwide CDC: *www.cdc.gov/media/ releases/2017/p1213-flu-death-estimate.html*
Flu is deadlier: *www.usatoday.com/story/ news/health/2020/02/01/coronavirus-flu- deadlier-more-widespread-than-wuhan-china- virus/4632508002/*
WHO video explainer: *www.who.int/emergencies/ diseases/novel-coronavirus-2019*
Complete genome: *www.ncbi.nlm.nih.gov/ nuccore/MN908947*
WHO Dashboard: *http://who.maps.arcgis. com/apps/opsdashboard/index.html#/ c88e37cfc43b4ed3baf977d77e4a0667*

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