A Medical Mystery … Online?
Tips for Reframing a Digital NGSS Unit for Online Instruction

This document is designed to support the text and resources in the freely available digital program for middle school, *A Medical Mystery*.

At BSCS Science Learning, we have spent decades creating high-quality instructional materials for use in face-to-face classrooms. Some of our materials are digital, like *A Medical Mystery*. We have identified options for teachers to use this digital unit online to allow education to continue while schools are closed due to the coronavirus over the coming weeks.

A Medical Mystery, designed for face-to-face classrooms, can be adapted for online instruction. Designed for the Next Generation Science Standards, the unit supports multiple opportunities for students to engage in analyzing data and developing models to explain complex phenomena related to how body systems interact.

In this document, we describe how teachers might support those analyses and model-building discussions in an online setting. We provide specific guidance for the Unit Introduction and the first few activities in chapter 1, noting that **the remaining activities and chapters not explicitly outlined here could follow a similar pattern**. In places where the materials call for wet lab activities (such as the iodine and starch lab in chapter 2), we provide a video for students to make observations at home (see the teacher's edition).

Step 1 – Access *A Medical Mystery*.

Student and teacher materials for *A Medical Mystery* are available free of charge. Go to www.bscs.org/amedicalmystery to get access. Students can access the unit directly—with no registration required—at https://3dmss.bscs.org. Teachers need to register for the teacher's edition. You can register for your free access to the teacher's edition at www.bscs.org/amedicalmystery. Click on the "Request TE Registration Code" button, and you will receive a code you can use to create your own login for the teacher's edition.

Step 2 – Get familiar with the unit.

Because *A Medical Mystery* was designed to support the NGSS, you will see that it is not your typical unit. Spend some time reviewing both the student edition and teacher's edition materials to help you get a sense of the instructional design.

Step 3 – Plan to move online.

Students will need their own dedicated notebook for *A Medical Mystery*. Some teachers might use digital notebooks, others may opt for paper ones. Both work, so long as students are recording their thinking along the way.

We have identified freely available digital resources to help you transition to using *A Medical Mystery* online. These include Google Drive (students collaborate in small teams on a document or share ideas

with the whole class), VoiceThread (students can draw on an uploaded image while they share their ideas), Padlet (students can create a board to share ideas, including how ideas are related to one another), and Zoom (students and the teacher engage in a "face to face" video discussion). For each tool, you will need to create your own account. These are not the only tools that will work. You may have your own favorite tools that accomplish the same things. Other teachers have suggested EdPuzzle and Notability as something to try. But we will use Google Drive, VoiceThread, Padlet, and Zoom to illustrate what might be done with your students to bring *A Medical Mystery* alive in online instruction.

Unit Introduction

Below are some tips for how you might navigate the student interactions for the Unit Introduction in online instruction.

In the Unit Introduction, students are introduced to M'Kenna.

Page 1 – A Medical Mystery

Students read about M'Kenna and write down their initial ideas in their student notebook (questions 1-7). In question 8, students are supposed to share their "how" and "why" questions with the class. Create a Google Doc for this purpose. Allow students to edit the document and post their questions. Be sure to ask them to include their names next to their questions.

Page 2 – M'Kenna's Symptoms: Evidence #1

Assign students to small groups and create a Google Doc for each group. Show students how to use the "chat" feature on Google Docs to engage in a discussion as they work on their table. You might want to get a screen grab of where they should click for the chat feature. Note that students must be logged in to a Google account for the chat function to show up.
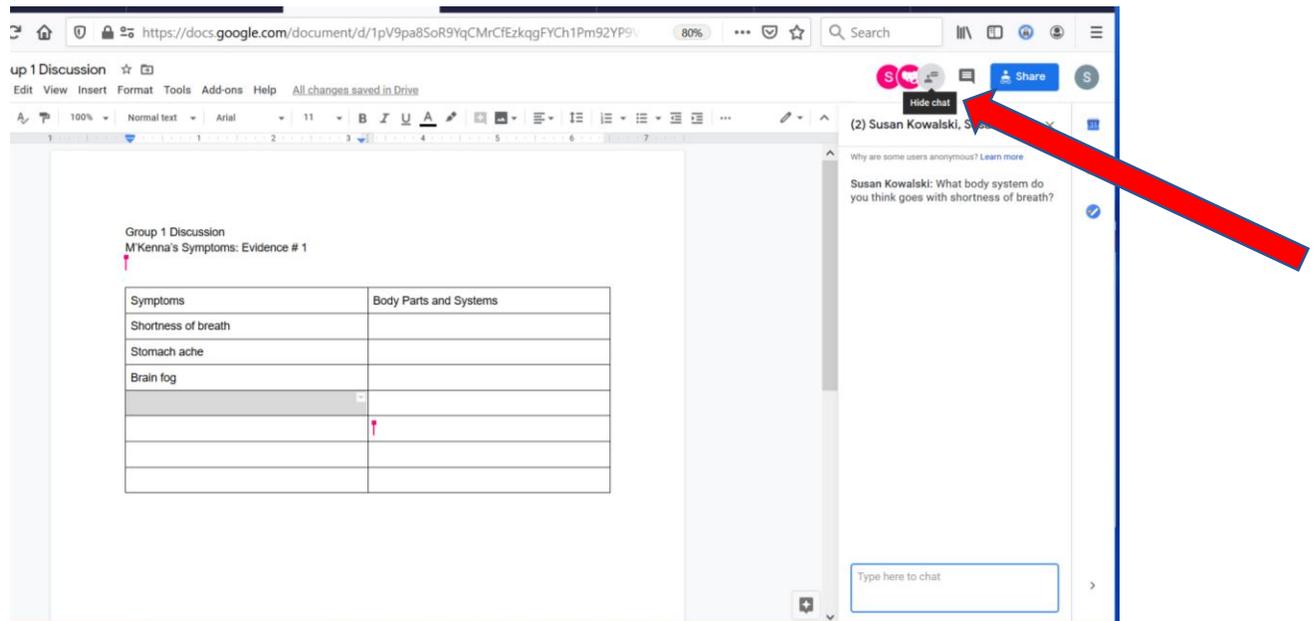
In step 1, students copy the table in their notebook. In steps 2-3, students individually read about M'Kenna's symptoms from the pdf, *Doctor's Notes*. Students can access the pdf by clicking on the link. Students individually write in the left column of their table all the symptoms M'Kenna has.

In step 4, students can use their team's Google Doc to create their own team table. The table should include all the symptoms students identified independently and then, in the right column, the body part or body system associated with each symptom.

In step 5, students should work as a team to explain how a problem with one part of the body can cause symptoms in other parts of the body.

Give students a deadline for completing their team table and explanation. After that deadline, students should go in and view the tables and explanations from each group. You can set Google Docs to be editable or read only for each student (team members should be able to edit their own doc; all students should be able to only read other teams' docs). If you need help setting the permissions in a Google Doc, see this link.

Students individually complete step 6 in their notebooks. You may ask students to email their response to you.

Page 3 – Questions I Have

On this page, students will add their questions to a Driving Question Board (DQB). You will return to this DQB throughout the entire unit, so you need it to be available to students for a while. Padlet is a great tool for digital DQB. Create a Padlet, name it "Driving Question Board", and include the class period in the name if you have multiple classes. Ask students to individually post questions to the digital DQB. Note that the student page in *A Medical Mystery* indicates that posting questions should be a team activity. If you want students to discuss their questions as a team before posting them, you may wish to have them brainstorm questions on a team Google Doc first.

Chapter 1: Digestion

ENGAGE

Page 1 - Food in the Body: My Ideas

Students respond to steps 1 and 2 in their own notebook. Ask students to take a photo of the model they draw for step 3 and email it to you. In preparation for the next page, create a VoiceThread for each group with the models from students in each group's VoiceThread.

Page 2 – Food in the Body: Compare Ideas

Students need to compare their model to the models of their team members. With a VoiceThread for each group (with the initial models from each group member uploaded to the VoiceThread), students can record their ideas about how their model is similar to or different from the models of their teammates. They can also describe what they might add to their model based on what they see from their team.

Page 3 – [Agree or Disagree?](#)

Students need to discuss a series of claims as a team, decide if they agree or disagree with each claim, and identify evidence they would need to help them decide. Create a Google Doc for each team with a table set up like the one shown on the *Agree or Disagree?* handout. Students in each team should use the chat feature to discuss their ideas and complete the table together.

Page 4 – [Reflect and Connect](#)

Ask students to submit their Reflect and Connect responses to you through email. Use the opportunity to get a sense of where students are (without scoring their answers as right or wrong).

EXPLORE

Page 1 – [A Trip Through Digestion: Prepare](#)

Students spend some time reviewing the data sheet and thinking about how they will use the interactive to learn about the function of each organ in the digestive system. They will likely need some help or guidance in figuring out how to complete the data sheet. Take a screen grab of the interactive with data showing (be sure there is a comparison from one organ to the next as shown).
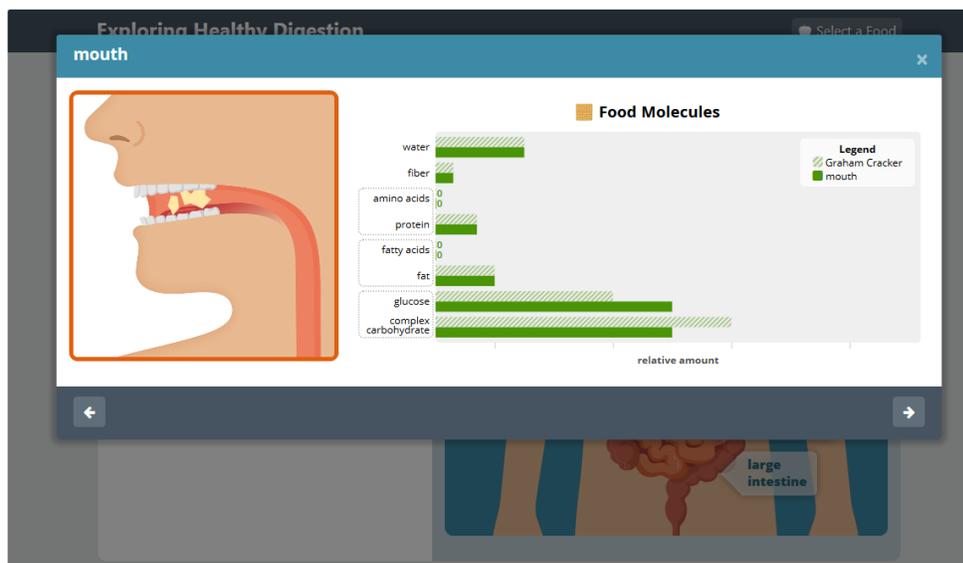
Then upload the screen grab of the interactive and the *A Trip Through Digestion* data sheet into VoiceThread. Using the "record" feature in VoiceThread, show students how they should complete the data sheet for a given type of food. You may ask students to each select only 1 or 2 of the six different types of food for which to collect data.

Page 2 – [A Trip Through Digestion: Explore](#)

The instructions in the activity indicate that students should work in groups to complete the data tables. This is something students could virtually do in a small group with each student completing 1-2 foods and then sharing their results. To help students pool their results, create a Google Doc with tables for

students to add their data to. They can then compare their results across members of their team and look for patterns in the data.

Page 3 – A Trip Through Digestion: Analyze

Create a Google Doc for each team of students that includes the table shown on this page. Encourage students to use the Google Doc chat feature as they complete the table in their groups.

Step 6: Class Discussion

If you have access to video conferencing (such as Zoom or Skype), this would be a great time to use it. You might think about working with each group independently or bringing the whole class together in a single session. If you don't have access to video conferencing, engage students in a live Google Docs chat. That is, ask students to all join into a class Google Doc at the same time to type their ideas in a text-based discussion. It's crucial that students have the chance to connect the activities they have done to their thoughts about the function of each organ in the digestive system.

Page 4 – A Trip Through M'Kenna's Digestive System: Explore

Students add data about M'Kenna to their existing Google Doc data table. Once again, you may want to use VoiceThread to upload a screen grab of the M'Kenna version of the interactive and the *A Trip Through Digestion* data table and record yourself marking up the data table. The goal is for students to look for patterns that show how M'Kenna's digestive system is similar to or different from a healthy person's digestive system.

Once students understand how to complete the table, use a jigsaw strategy within teams and have each student complete the data for 1 or 2 different foods. Then use students' existing Google Doc (one per group) to allow students within a group to share data.

Page 5 – A Trip Through M'Kenna's Digestive System: Analyze

Create a Google Doc for each team of students that includes the table shown on this page. Encourage students to use the Google Doc chat feature as they complete the table in their groups.

Step 3: Class Discussion

If you have access to video conferencing (such as Zoom or Skype), this would be a great time to use it. You might think about working with each group independently or bringing the whole class together in a single session. If you don't have access to video conferencing, engage students in a live Google Docs chat. That is, ask students to all join into a class Google Doc at the same time to type their ideas in a text-based discussion. It's crucial that students identify patterns in the data to see that M'Kenna's middle of the small intestine and large intestine are not functioning the way a healthy person's function.

Page 6 – Model Tracker and Evidence #2

The *Model Tracker* document is not linked in the student materials, so you will need to make this document available to students (e.g., by email or by uploading it to a Google Drive folder). To help students understand how to complete the Model Tracker, upload it to VoiceThread and model filling it out. Then ask students to volunteer the important ideas they have learned so far. Students might participate in the VoiceThread by recording themselves talking or by typing responses. When students

have shared their ideas, create a Google Doc with your Model Tracker completed. Keep this document at hand. You will add to it throughout the unit. Students should maintain their own copy, taped in the back of their notebooks.

Ask students to go to the Driving Question Board Padlet and add comments linked to questions for which they now have answers (or partial answers).

In step 4, students should write their new answer to the focus question in their notebooks. At this time, you may wish to have students submit their answers to you electronically. This will allow you the chance to formatively assess their understanding (as described in the teacher's edition).

Page 7 – Reflect and Connect

Students can respond to the Reflect and Connect questions in their own notebooks. If you like, you may ask them to submit their responses electronically so you can formatively assess their progress as described in the teacher's edition.

We hope you found this brief illustration of how to bring A Medical Mystery *alive in an online setting. We envision that the types of interactions outlined here will be generally applicable throughout the unit. We wish you all the best in helping students learn science during this difficult time.*