Environment & Care
The industrial revolution proved that exploiting the environment makes us sick.
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Understanding systems that impact our lives is an essential first step toward creating positive change. The human impulse to care for one another and the evolution of systems of care is especially important given how many lives and how much of our lives are affected. Yet very few of us have the opportunity to explore and interrogate the systems intended to keep ourselves, our communities, our countries and the world healthy.

The Museum of Care movement intends to democratize knowledge about care and health care systems by sharing carefully researched and curated information and exhibits through a global network of practitioners, educators, and advocates. In particular, this movement celebrates care work in all its forms, which is, and always has been, at the heart of our human experience.

MICRO, with support from the Johnson & Johnson Center for Health Worker Innovation, understands that now more than ever, engaging learners of all ages in the Museum of Care movement is critical. The movement launched with MICRO’s Museum of Care, which encourages visitors to consider themselves as a caregiver and the complex considerations in the quest to provide equitable care for all. The museum also showcases the stories and voices of frontline health workers from around the world who are the primary link between communities and health systems.

To further engage audiences in the Museum of Care movement, this Educator Guide was designed to build and deepen students’ understanding of health and care through multiple lenses - personal, community, and global. The curriculum is designed to engage students in a series of activities that lead them through inquiry, research, and fabrication to create their own MICRO DIY Museum of Care to generate dialogue in their community around well-being, public health, and advocacy.
About this Guide

This resource is designed for educators in K-12 formal and informal learning environments. The guide provides curricular tools focused on building and strengthening understanding of personal, community, and global health for students in K-12 learning communities.

In this curriculum, students begin by looking closely at healthcare, its many facets and challenges, and generating their own questions to drive research. After this deep learning, students enter a fabrication phase to design, create, and construct their own MICRO DIY Museum.

Users of this guide are encouraged to host a showcase of their MICRO DIY Museum of Care exhibits to engage their community in dialogue about public health, inspire advocacy efforts in their community, and improve public understanding about the importance of caring for one another.

This curriculum was developed by Anna Delia in collaboration with MICRO.

About MICRO

MICRO | The Collaborative Museum

MICRO works with designers, scientists, and storytellers to create and place six-foot-tall museums in high-impact public spaces like libraries, transit hubs, community centers, and hospital waiting rooms. MICRO’s fleet of award-winning museums expand access to fundamental knowledge, creating conversations that everyone can join.

Since launching publicly in 2017, MICRO Museums have reached hundreds of thousands of visitors, and have been recognized with the Tribeca Film Institute’s New Media Award, SXSW’s Place by Design Award, and two Editors’ Choice Awards from the World Maker Faire.

About the Center for Health Worker Innovation

Johnson & Johnson Center for Health Worker Innovation

The Museum of Care is a new museum exploring the past, present, and future of care and is supported by Johnson & Johnson's Center for Health Worker Innovation – an initiative focusing on what individual healthcare workers need to thrive on the job.
Introduction

This guide features a collection of curricular tools that were built—by an educator, for educators—to strengthen understanding of personal, community, and global health for students in grades K-12.

In the Curricular Phase, students take a close look at “healthcare,” its many facets and challenges, and generate their own questions to drive research. They participate in an interview of a frontline health worker, complete a healthcare-focused science experiment, select a topic to research, read case studies to illuminate different aspects of healthcare challenges and barriers, and participate in a variety of class discussions and reflections.

After this deep learning, students enter the Fabrication Phase, where they design, create, and construct their own MICRO DIY Museum of Care.

In the Launch Phase, your class or school’s exhibits will come together in a community showcase, to tell a story of public health, generate further interest, and improve community knowledge about our collective experiences with and access to healthy lives. Your MICRO DIY community museum can be displayed in your school lobby or in other public spaces (or, in the true spirit of MICRO, it could travel around). Be sure to share photos and videos of your students’ work with MICRO at https://micro.ooo/share-your-museum

This curriculum explores the following Essential Questions:

- What challenges or barriers does humanity face to living and experiencing healthy lives?
- How do we as individuals and as a society respond to growing health challenges?
- What does a society need in order to be “healthy?”
- How can we convey a full picture of healthcare to the visitors of our MICRO DIY Museum of Care?
- How do the many different health worker roles come together to play a vital and integral role in quality community health?
- What are the future needs of healthcare?
- In what ways are humans, by nature, caregivers?

These questions are explored through inquiry topics such as:

- What is access to healthcare like in our community, and what is it like in another area of our country or world?
- What does it mean to live with a long-term or chronic illness?
- What is a day-in-the-life like for a frontline health worker?
- What challenges do frontline health workers face?
- What inequalities exist within healthcare?
- What can I do to live a healthier life and/or increase the quality of care available to those in my community?

Student inquiry and agency is a central theme of this curriculum; students should feel empowered to guide and explore the types and depth of topics covered. In the end, the class will have gathered research on many different facets of healthcare, health workers, and the overall human health experience; they will be ready to create an engaging display and MICRO DIY Museum that will provide the opportunity to develop this understanding for all who visit their museums.
Trauma-Informed Best Practices

As the focus of the Museum of Care Educator’s Guide curriculum centers on health, students will inevitably have personal connections, experiences, and reactions to this material. These may only be slight connections, or they could be deeply rooted in a vivid personal experience. As many of the included activities are student-driven, investigations and researched content will vary extensively from class to class. It is impossible to be aware of all the connections students may bring to this material, or have a clear sense of which particular topics will be pursued at the outset, if you as the teacher are committed to student choice and agency. We hope you will be.

When students drive the direction of study, paired with this particular focus on healthcare, it is important to keep in mind some trauma-informed best practices for guiding your students as they learn and uncover healthcare topics during their pursuit of creating their MICRO DIY Museum of Care. Move forward in your teaching of these materials knowing that students may be in any phase of processing topics related to health and wellness, the passing of a close family member or friend, personal experience with health, or have read or heard about politics surrounding healthcare in recent years. It is not uncommon for students to be somewhere along a spectrum of grief if they themselves have experienced loss due to a health issue. Students will also build empathy for others’ experiences related to health, as a result of spending time with this material and in conversation with each other or community guests you may invite to your classroom.

For these reasons, we recommend setting up some class norms to guide your discussions and group work. It is critical to keep student participation in class activities grounded in dignity for all. Students should participate in describing how they would like to feel when learning about challenging topics, and everyone should have the right to pass or skip participation if a discussion becomes too personal, without explaining their reasoning to the group. Prep students for the types of content, potential triggers, and health specifics at the start of each class or when assigning homework. Connect with families and caregivers by sharing materials or summarizing talking points, so students can continue conversations and gain support at home. Do not hesitate to enlist support of your school guidance counselor or other support staff if you sense a student may be experiencing heightened emotionality about these topics.

Knowing that a study of healthcare will inevitably contain topics that carry trauma, consider how you can best facilitate a conversation about these topics among your students. Build in breaks for students to pause and reflect. Consider how you will plan to support your students, and rally the resources you may need, prior to embarking on your teaching, research, and fabrication of your own MICRO DIY Museum of Care. Additional trauma-informed teaching strategies may be found here:
https://www.ascd.org/el/articles/trauma-informed-teaching-strategies

Next Step: Explore the Museum of Care

Prior to implementing your Museum of Care unit using this guide, the next step is to familiarize yourself with the content featured in the Museum of Care exhibits. Explore content from the museum on the following pages (7-9).
A BRIEF HISTORY OF SOCIETY AND CARE.

The history of social inequality, human behavior and our interactions with the environment have shaped how we care for each other.

Inequality & Care
As societies grew and became more complex, inequality didn’t affect everyone the same way.

Behavior & Care
International movement and trade gave birth to pandemics. As we treated new diseases, we also learned how to provide better care and stop the spread of pandemics.

Environment & Care
The Industrial Revolution proved that exploiting the environment makes us sick.

About 5,000 years ago
Some of the first rules for professional caretakers were written into “ Hammurabi's Code” on a 7-foot stone obelisk. These doctors received different rewards based on the social status of the patients. They got the most for nobles and the least for enslaved people.

*Even though women provided nearly all of the care work, these doctors were all men. Women were not allowed to become professional caregivers.

About 400 years ago
Doctors in Europe studied herbs in the belief of it as a method to prevent them from spreading the plagues. The herbs didn’t work. What did work was quarantining the sick, improving public sanitation, and promoting good hygiene. Sound familiar?

About 170 years ago
The air was so polluted in London in the 1800s that an increase in coal intensity raised infant death rates by 5-8%.

About 120 years ago
Distributing mosquito nets may be history's greatest act of care. In the 1800s, malaria killed 150-300 million people. Until 1957 when we discovered mosquito transmitted disease, there was no effective prevention for malaria. Today mosquito nets save the lives of 600,000 children in Africa every year.

YOU ARE MADE TO CARE FOR OTHERS

Caring for others was so important to our survival that we literally evolved to be really good at it.

A simple smile isn’t so simple.

Smiling activates the Empathy Circuit in your brain, which is how the emotions of others cause chemical changes in your body. It happens in just a fraction of a second.

1. Amygdala
Recognize other people’s emotions.

2. Anterior Cingulate Cortex
Tells your body to feel the same way.

Amygdala: "They look happy."

Anterior Cingulate Cortex: "I should be happy."

3. Autonomic Nervous System
Releases chemicals to change how you feel.

4. Anterior Insula
Triggers you to display the same emotions to others.

Autonomic Nervous System: Releasing good vibes.

Anterior Insula: "Let’s smile back!"
YOU ARE MADE TO CARE FOR OTHERS
Caring for others was so important to our survival that we literally evolved to be really good at it.

It’s 200,000 years ago. Life isn’t easy. Choose your tools for survival.

Over hundreds of thousands of years, we’ve evolved traits that help us care for each other.

- Better Hands
- Stronger Bones
- Bigger Muscle
- Bigger Brain
- Bigger Ribcage
- Smarter Ribcage

Communicating through touch was more important to our survival than having strong bones, as our bones got lighter and our hands more sensitive.

Collaboration with each other was more important for survival than strength. So our brains needed more energy and our muscles got weaker.

Having babies that others wanted to care for was more important to our survival than babies being able to fend for themselves. Two-thirds of human brain growth happens after birth.

WHAT DOES IT TAKE TO CARE FOR EACH OTHER?
Learn how to give care through the experiences of health workers.

Caregivers are not just doctors and nurses. In fact, 1 in 5 people in the U.S. provide unpaid care to an adult loved one.

Take a moment to think about who you might need to care for, and who might need to care for you.

Ernest Gardner
Community Health Worker
Ernest Gardner understands that listening is the first step in providing care.

How to care through listening:
“We listen and ask questions to get to better understand people and their needs, then we provide social support to bridge the gap between the community and the healthcare system.”

Marion Subah
Nurse Midwife & Community Health Outreach Leader
Marion Subah makes careful decisions under pressure.

How to be a decisive caregiver:
“You need to be an assertive person, not in terms of aggressiveness, but making sure that things get done. You must have decision-making based upon data and evidence, both quantitative and qualitative. You use that to plan your care and decide the best thing to do for the patient.”

Arti Modshe
Nurse
Arti Modshe knows how to be resilient when caring for others.

How Arti made an impact in one year:
- Delivered 6 children
- Immunized 60 children
- Provided prenatal care to 19 pregnant women
- Diagnosed 244 people with hypertension, 31 people with diabetes, and convinced 1 person with COVID-19 to go into quarantine, stopping the spread to the rest of the region.

Explore Content from the Museum of Care
CARE IS NOT A SERVICE, IT’S A PARTNERSHIP

Health workers need us to play active roles in improving care for ourselves and everyone else. Being a partner in care is easier than you may think. Here’s how.

You can be a partner in care.

At any given moment one-third of health workers experience extreme exhaustion, chronic stress, anxiety, or depression. That’s 20 million people! We owe it to them to improve their working conditions.

Talk about care.

- Do your neighbors have health insurance?
- Can you offer tech support to help them access care?
- Could they use a ride to the doctor?

Check in on yourself.

- When was your last checkup?
- Got all your vaccinations?

Helping others helps you, too.

Studies show that volunteering and providing care to others...

- Has the same benefit as eating 6 servings of fruits and vegetables each day.
- Lowers your blood pressure, cholesterol, and risk of heart disease.
- Lowers your chance of premature death by 26%.

Be an active citizen.

- Tell leaders to take action on climate change.
- Advocate for better working conditions for health workers.

Listen to what health workers want.

"The world’s 27 million nurses must not be applauded for their courage and compassion while left unsupported and at serious risk. We require collective action from all stakeholders, including governments and healthcare providers. Let us remember that health is a human right, which includes all nurses and health workers."

—Annette Kennedy, President of the International Council of Nurses

A ROAD MAP FOR HEALTH CARE EQUITY

Health workers know what makes us sick but they can’t stop all the sources of illness on their own. If we listen to them, we can relieve their burden and improve health for all.

Solve the health worker burden.

The CDO reports that 80% of poor health comes from social determinants, like our access to safe, healthy living conditions, and our environments. When these sources of illness are ignored, health workers shoulder an impossible burden.

Improve our environment, improve our health.

Polluted air kills 7 million people every year.

That’s more than AIDS, diabetes, and traffic accidents combined.

By 2050, outdoor air pollution is projected to become the top cause of environmentally related deaths worldwide.

Address social inequity.

When you trace back to the causes of the causes of illness, in so many cases you see how our social fabric itself is in need of mending.

—Diane A. Wright, MPH, MD, JD, DPhil

Put care within reach.

Give health workers what they need.

Give health workers what they need.

Problem: For many reasons, people often find it difficult to access care.

Solution: Placing health workers in community centers and homes helps eliminate barriers to care like costs, transportation, and lack of trust.

Clean Water: One in four healthcare facilities around the world lacks basic water services, impacting over 2 billion people.

Equipment: Each month in 2020, the world needed 50 million masks and 70 million gloves. We didn’t have close to enough.

A health care system can’t just be about making patients well. We have to care for the healers, too!

—Unsung Health Worker
### Suggested Unit Plan: Every Other Day, 45-Minute Sessions

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<td><strong>Week 1</strong></td>
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<tr>
<td>Welcome &amp; Introductions</td>
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<td>Begin Curricular Phase</td>
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<td>Concept Mapping</td>
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<td><strong>Week 2</strong></td>
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<td></td>
<td>Visual Conversation</td>
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<td>(from Hook Activity)</td>
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<td></td>
<td>Introduce Research Opportunities</td>
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<td></td>
<td>Homework: Interview</td>
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<td><strong>Week 3</strong></td>
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<td>Due: Interview Homework</td>
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<td>Case Study</td>
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<td><strong>Week 4</strong></td>
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<td>Guided Research Class</td>
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<td>Begin Fabrication Phase</td>
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<td></td>
<td>Introduce MICRO DIY Museum Design Challenge &amp; Prompt</td>
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<td>Design Sprint Playbook (DSP): Rapid Brainstorm</td>
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<td><strong>Week 5</strong></td>
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<td>DSP: Finalize Design Basic Prototyping Techniques Gather Materials</td>
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<td>DSP: Rapid Prototype Gather Feedback</td>
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<td><strong>Week 6</strong></td>
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<td>DSP: Modify/Refine Prototype Digitize Design Files</td>
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<td>Fabrication Day</td>
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<tr>
<td>DSP: Modify/Refine Prototype</td>
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<td>Gather Feedback</td>
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<td>Gather Feedback</td>
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<td>Seek additional materials</td>
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<td>Gather Feedback</td>
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<td><strong>Week 7</strong></td>
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<td>Final Fabrication Day</td>
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<td>2nd Concept Map</td>
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<td>Fabrication Day</td>
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<td>Written Reflective Components</td>
<td>Prepare Showcase Materials and Space Complete any final Fabrication</td>
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<tr>
<td><strong>Week 8</strong></td>
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<td>Class Celebration of Work Reflections Blueprint for Advocacy</td>
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*Opening Hook / Class Inquiry Gallery Walk*
## Curricular Phase

### Research, Understand, Notice, Observe, Look Closely

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<tr>
<th>Activity</th>
<th>Goal</th>
<th>Notes &amp; Resources</th>
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<tr>
<td>Introduction to Unit through Concept Mapping</td>
<td>Collect and document students’ understanding before &amp; after this unit.</td>
<td>A <a href="#">Concept Map Template</a> is included that you may choose to use on page 17.</td>
</tr>
<tr>
<td>Opening Hook</td>
<td>Engage students with content topics and provide an avenue for student voice in unit focus.</td>
<td>A <a href="#">Student Notespace Sheet</a> is included (for older students) to use on pages 29-30.</td>
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<tr>
<td>Frontline Health Worker Interview</td>
<td>Homework or In-Class, gain first-person perspective on various frontline health worker roles and careers.</td>
<td>A <a href="#">Student Interview Sheet</a> included on pages 32-33.</td>
</tr>
<tr>
<td>Case Studies</td>
<td>Provide Case Studies to consider equity, access, barriers to quality care, experiences of frontline health workers, inequalities in healthcare, and what care may be like in different areas around the world. Discuss from a lens of barriers and challenges posed to achieving full facets of health.</td>
<td>A list of <a href="#">Barriers</a> is included along with suggested <a href="#">Case Studies</a>; you could also generate case studies from your local community. Repeat this activity throughout this unit. A <a href="#">Barriers and Challenges Note Sheet</a> is included (for older students) on page 45.</td>
</tr>
<tr>
<td>Healthcare-Focused Experiment</td>
<td>A laboratory experience to build on STEM focus of this unit. K-5: Test bandages and their performance underwater 6-12: Effectiveness of Cleaning Agents on Microbiomes</td>
<td>Data Collection sheets and Analysis/Conclusion questions are included within each procedure on pages 48 and 51.</td>
</tr>
<tr>
<td>Guided Research</td>
<td>Focused classes for students to research, gather information, read deeper, and look closely at topics related to healthcare.</td>
<td>A <a href="#">Research Notes Template</a> is included on pages 60-62.</td>
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Rationale

Concept Mapping creates an opportunity for learners to display their present level of understanding on any topic. Thinking is made visible through the content of the map and the orientation of terms or ideas in relation to one another. For teachers, this offers a powerful tool for us to take inventory of our students’ understanding and watch their mastery of a concept grow as we progress through learning modules. The comparison of a pre-map and a post-map will provide concrete evidence for what was learned and underscore student reflection of their growth. The post-map should be made at the conclusion of the unit, following final presentations, but created in time to be presented along with a more public showcase.

Scaffolded procedures for pre-mapping and post-mapping and a Concept Map worksheet (page 17) for students are provided on the following pages and are organized by grade-level bands.

See pages 13-16 for:
Pre-Mapping: A Tool to Introduce, Spark, and Open Your Unit
Post-Mapping: A Graphic Organizer to Convey New Knowledge, Understanding, and Invite Reflection
K-2 Pre-Mapping

Teaching Procedure

- Gather students for a class meeting, with clear view of a central whiteboard or large chart paper tablet.
- Introduce the central topic word: “Healthcare.” Write this word in the middle of your presentation space. Circle “Healthcare.”
- Invite students to contribute other words that come to mind when they hear the word “Healthcare.” As students share terms, write each of these words around the central “Healthcare” term, a short distance away, inside its own bubble. Your goal is ten or more terms collected from your class. At this time, there are no “wrong” terms; anything may be included.
- After students have shared initial vocabulary understanding, take a moment to connect each associated term to the central term with a drawn line.
- Ask students to share how the new terms are connected to the central term. As students contribute connections, write a short (3-5 word) phrase along the connecting line, between the two terms.
- Photograph and print, or use the chart paper to display the class’s pre-concept map in a central space, during the remainder of the unit.

K-2 Post-Mapping

Teaching Procedure

- Temporarily remove your Pre-Map created at the start of the unit, and set it aside.
- Gather students for a class meeting, with clear view of a central whiteboard or large chart paper tablet.
- Again, place the word “Healthcare” in a central location of the presentation space. Circle “Healthcare.”
- Invite students to contribute other words that come to mind when they hear the word “Healthcare,” based on the learning they have experienced throughout this unit. As students share terms, write each of these words around the central “Healthcare” term, a short distance away, inside its own bubble. At this time, you are looking to add many terms or short concepts to the space and may go far beyond your initial ten from the first map. Images may also be used if your class has been able to collect and share visuals (i.e., a photo of PPE).
- After students have shared their new terms, take a moment to connect each associated term or short concept to the central term with a drawn line.
- Ask students to create a connecting sentence. Example: “PPE is part of healthcare because...” As students contribute connections, write a short (3-5 word) phrase along the connecting line, or scribe the full sentence, between the two terms.
- Display the original concept map next to the new concept map.
- **Final Reflection, Younger Students:** Record a short video of students explaining the difference between the two maps. Compile the videos for a class reflective piece.
- **Final Reflection, Older Students:** Ask students to write 2-3 sentences describing the difference between the two maps. Students may read this reflection aloud to classmates, or display their reflections on the wall next to the two maps.
3-5 Pre-Mapping

Teaching Procedure

- Distribute Concept Map Template Sheet (Page 17) to students. “Healthcare” is the central topic word.
- Introduce the central topic word: “Healthcare.” Inside the ideation box, invite students to list as many words, or quick sketches of symbols or icons, that come to mind when they hear or think about “Healthcare.” Allow 3-5 minutes for this ideation. The goal is five or more terms; at this time, there are no “wrong” terms; anything may be included.
- Invite students to take their list and create a word cloud around the central term. Each term they generated in the ideation stage should have its own bubble, and be placed around the central word to create an overall look of a circle or a web.
- Ask students to connect each of these terms or small sketches to the central “Healthcare” term, connecting the web.
- Create an opportunity for pair-share, small group, or whole class share out. As students share, ask them to connect their thinking of ideated terms to the central term, using a short phrase, to create a sentence. For example: “PPE keeps healthcare workers safe.”
- Collect student maps for documentation (and comparison later).

3-5 Post-Mapping

Teaching Procedure

- Distribute a blank copy of the Concept Map Template Sheet to students.
- Inside the ideation box, invite students to now list all the words or quick sketches they can, related to “Healthcare.” The list should be much larger than the first map, so allow ten minutes for this ideation, and review of the materials from the unit.
- After students have generated a list of new terms or images, ask them to place these words around the central term, like a web. For older students, ask them to place them in proximity to the central word, based on closeness of relationship, in their understanding.
- Ask students to create a connecting sentence for each term. Example: “PPE is part of healthcare because...” Students should scribe these connecting phrases between the term “Healthcare” and their new term.
- After completion, distribute the original Concept Map for display next to the new concept map.
- Ask students to complete a final reflection: write 2-3 sentences describing the difference between the two maps. Students may read this reflection aloud to a peer or small group. Create an engaging space on their showcase table to display the pre-map, post-map, and reflective writing.
**6-8 Pre-Mapping**

**Teaching Procedure**

- Distribute [Concept Map Template Sheet](#) (Page 17) to students. “Healthcare” is the central topic word.
- Introduce the central topic word: “Healthcare.” Inside the ideation box, invite students to list as many words, or quick sketches of symbols or icons, that come to mind when they hear or think about “Healthcare.” Allow five minutes for this ideation. The goal is eight or more terms; at this time, there are no “wrong” terms; anything may be included.
- Invite students to take their list and create a word cloud around the central term. Each term they generated in the ideation stage should have its own bubble, and be placed around the central word to create an overall look of a circle or a web. Terms or icons should be placed in proximity to the central word based on students’ understanding of closeness of connection. A more closely connected word should be placed closer. Allow an additional five minutes for this step.
- Ask students to connect each of these terms or small sketches to the central “Healthcare” term, making a web.
- Students should write a short phrase (3-5 words) connecting the central term to their ideated term. Each line on the web should now have a brief connecting sentence. Allow five more minutes for this part of the process.
- Display completed maps throughout the room and invite students to do a gallery walk to gather a sense of understanding within the room.
- Reflection: Ask students to write 2-3 sentences reflecting on patterns observed in looking over the class’s concept maps.

**6-8 Post-Mapping**

**Teaching Procedure**

- Distribute a blank copy of the Concept Map Template Sheet to students.
- Inside the ideation box, invite students to now list all the words or quick sketches they can, related to “healthcare.” The list should be much larger than the first map, so allow ten minutes for this ideation, and review of the materials from the unit.
- After students have generated a list of new terms or images, direct them to place these words around the central term, like a web, selecting proximity based on closeness of relationship of the term to the central word.
- Ask students to create a connecting sentence for each term. Example: “PPE is part of healthcare because…” Students should scribe these connecting phrases between the term "Healthcare" and their new term.
- After completion, distribute the original Concept Map for display next to the new concept map.
- Reflection: Students should write a short paragraph reflecting on the difference (or similarities) between their two maps, and give 3 explicit examples of what was learned through this unit, as evidenced in the growth of their maps. Students can display their reflection alongside their concept maps at a final presentation showcase or could incorporate them into a video reflection on the entire project.
Teaching Procedure

- Distribute **Concept Map Template Sheet** (Page 17) to students. “Healthcare” is the central topic word. Distribute a small stack of mini sticky notes.
- Introduce the central topic word: “Healthcare.” Ask students to jot as many terms, quick sketches of symbols, or short snippets from personal or known experience, each on its own mini sticky note. Whatever comes to mind when they hear or think about “healthcare.” Allow 5-10 minutes for this ideation. The goal is eight or more terms; at this time, there are no “wrong” terms; anything may be included.
- Migrate each sticky note onto the Concept Map Template Sheet. Groups of words should stay relatively close together. Terms or sketches should be placed in proximity to the central word based on students’ understanding of closeness of connection. More closely connected terms should be placed closer.
- Ask students to connect each of these terms or small sketches to the central “Healthcare” term, making a web.
- Students should write a short phrase (3-5 words) connecting the central term to their ideated term. Each line on the web should now have a brief connecting sentence. Allow 5-10 minutes for this process. Students should photograph their completed Concept Map and store the digital file for use in their final portfolio or digital showcase for the project.
- Display completed maps throughout the room and invite students to do a gallery walk to gather a sense of understanding within the room.
- Reflection: Ask students to write 2-3 sentences reflecting on patterns observed in looking over the class’s concept maps.

9-12 Post-Mapping

Teaching Procedure

- Distribute a blank copy of the Concept Map Template Sheet to students.
- Repeat procedure of ideation using the sticky notes. Students may include terms, sketches, short stories, names of people encountered during this process, historical examples, and more. Anything related to the learning for this unit.
- After students have generated a list of new terms or images, ask them to place these words around the central term, like a web, selecting proximity based on closeness of relationship of the term to the central word, as with the first map.
- Ask students to create a connecting sentence for each term. Example: “PPE is part of healthcare because…” Students should scribe these connecting phrases between the term “Healthcare” and their new term.
- After completion, distribute the original Concept Map for display next to the new concept map.
- Create an opportunity for a gallery walk throughout the classroom to view the collective growth in knowledge.
- Reflection: Students should write a short paragraph reflecting on the difference (or similarities) between their two maps, and give three explicit examples of what was learned through this unit, as evidenced in the growth of their maps. Students may display their reflection alongside their concept maps at a final presentation showcase, digitize for inclusion in their portfolio of work for this project, or even incorporate them into a video reflection on the entire project.
List of terms to include in my map:

Mapping Space

Central Term
(i.e. “Healthcare”)
Opening Hook

Rationale

This Opening Hook is an opportunity to introduce students to the many facets and approaches to thinking about “healthcare” and frontline health workers, community members, services, and facilities. It allows students to connect the full scope of topics related to personal and public health. This activity will allow students to share their current understandings and also pose questions to guide future study within the unit. This written conversation should occur at the start of the MICRO Museum of Care unit and can also be revisited and added to throughout.

As the facilitator, you can prepare materials to use to introduce students to the topic during the Hook. You can also opt to have students do a quick session of research on distributed topics, then share out the information back to the entire group. A shared slide deck may make images, media, and quick facts available on these topics if students do not have enough class time to present during this introductory phase. See the Extension Activities on Page 94 for a link to the Museum of Care Virtual Museum to access slides or you can use the Museum of Care content sheets on pages 7-9.

Two Hook activities have been provided to offer flexibility, or, if revisited throughout the course of the unit, continue to build students’ sense of agency and guidance of what they would like to pursue.

Scaffolded Procedures on the following pages (pages 19-28) and Student Notespace (pages 29-30) sheets have been provided for grade-level bands for the following activities:

- Inviting Student Agency: What Do You Wonder About?
- Making Questions Visible: A Written Conversation
Teaching Procedure

- Select and curate artifacts relevant to healthcare (physical objects, videos, interviews with frontline workers, first-person narratives, news articles, print sources, images, etc). Prep photographs, artifacts, example videos, and short statements you may plan to read aloud. Set up a station to view materials, an opportunity for students to interact in small groups, or a small booklet for each student that contains examples. You may even be able to bring in a guest speaker or your school nurse.

Categories that could feel relevant to this age group:
- PPE/masks
- Different ranges of costs for basic healthcare supplies (band aids, toothpaste, glasses)
- What happens in a routine pediatrician visit?
- Jobs in hospitals
- X-Rays - how they work, what they are used for?
- Doctor’s office vs. urgent care vs. hospitals - What happens in each? What do they look like?
- City vs. Rural: What do hospitals look like?
- Ambulances, emergency response
- Care, commonly used devices/supplies for different age groups: babies, elderly, etc.
- Childhood vaccines
- Day in the life of a school nurse
- Day in the life of a frontline worker

- Invite students to interact with your prepared materials. For guest speakers, provide an opportunity for students to hear a bit about their work and ask questions. As questions are asked, jot these down in a common space, or make a quick recording. For older students, provide a small stack of sticky notes to jot down a word or short question as they hear or come across information they would like to learn more about. For example, in a short video tour of a local hospital, students may pause the video and wish to write short phrases like “where do visitors sleep?” or “how does someone go the bathroom during surgery?” on their provided sticky notes.

- For younger students, rotate between small groups to ask students what they would like to know more about. Record their responses in a common space or make a short video recording, or use Google images to search for the terms they identify and add these to a vision board or shared slide deck, that could be displayed later. For older students/based on readiness, provide chart paper to record questions, what they would like to know more about, what they wonder about.

- Gather responses and type them up in an easy-to-read, large font. Include visuals where relevant and able. Create a collective display area.

- Create a short video connecting any recorded questions or responses to show to the class or share with families as the unit begins.

- Provide blank space where students may continue to add questions or thoughts. Provide an opportunity for students to view this collection of early observations and questions, and ask for their reflections.

- Refer back to comments in “What Do You Wonder About?” when a topic is approached or touched on in that unit of study.
Teaching Procedure

- Provide a collection box and stack of index cards/small pieces of paper.
- Invite students to pick up an index card throughout the unit, whenever a new question, wonder, or idea to research comes to mind. You may also have daily time available to visit with groups and scribe new questions or thoughts.
- Every so often, empty out the collection box and display student questions in groups around central topics/artifacts relevant to their new questions. You may choose to type the posed questions or thoughts, based on legibility of your students’ handwriting. This can be added to your “What Do You Wonder About” display.
Teaching Procedure

- Select and curate artifacts relevant to healthcare (physical objects, videos, first-person narratives, news articles, print sources, images, etc). Prep photographs, artifacts, example videos, short statements typed as quotes, and/or short literature provided by local health organizations/services. Spread materials throughout the classroom space, with chart paper and pens next to each artifact. Write the name of the topic or artifact at the top of the chart paper.

Categories that may feel relevant to this age group may include:
  - PPE/masks/scrubs/gloves
  - Costs of healthcare services: well visits, emergency room visits, surgeries, basic hygiene/medical supplies, epipens...
  - Training/education paths for medical careers: dentists, optometrist, pediatrician, nurse, physician’s assistant, physical therapist, etc.
  - Jobs in hospitals
  - Medical devices: costs, suppliers, access (wheelchairs, crutches, post-surgery supports, slings, hearing aids, specialty glasses, prosthetics, etc.)
  - Braces and other orthodontic devices - purpose, effects, procedures
  - Doctor’s office vs. urgent care vs. hospitals - What happens in each? What do they look like?
  - City vs. Rural: What do hospitals look like? Doctors’ offices?
  - Ambulances, emergency response
  - Care, commonly used devices/supplies for different age groups: babies, elderly, etc.
  - Universal Design for varying abilities, aging
  - Access: Distance to emergency room services based on zip code, area of city, neighborhood, etc.
  - Childhood vaccines
  - Day In the Life of a School Nurse
  - Day In the Life of a Frontline Worker

- Invite students to take a gallery walk and interact with the prepared materials. As students rotate to different displays, invite them to use the provided markers to write questions or short words for what they would like to learn more about.

- For guest speakers, provide an opportunity for students to hear a bit about their work and ask questions. As questions are asked, assign a scribe to jot these down in a common space, or make a quick recording.

- During video research/investigations, provide a small stack of sticky notes to jot down a word or short question as they hear or come across information they would like to learn more about. For example, in a short video tour of a local hospital, students may pause the video and wish to write short phrases like “what surgeries happen in my local hospital” or “how long does it take an ambulance to arrive after calling 9-1-1” on their provided sticky notes.

- Gather chart papers and create a collective display area. If space is limited, assign 1-2 chart papers to each student group to type or scribe all the responses. Display this in a space all students can see or in the hallway near your classroom. Provide a blank piece of chart paper where students can always contribute and add new questions or thoughts. Create a short video connecting any recorded questions or responses to show to the class or share with families as the unit begins. This is also a piece to display/share at the final showcase.

- Provide opportunity for students to view this collection of early observations and questions, and ask for their reflections.

- Refer back to comments in “What Do You Wonder About?” when a topic is approached in that unit of study.
Teaching Procedure

- As class begins on each day of the unit, provide a large blank piece of paper to each student group with a question at the top related to one of the Wonders presented in the Opening Hook. For example: “What are you now wondering about Medical Devices?” Feel free to pre-load the sheet with a few questions.
- Provide time (~5 mins) for each group to write new questions. Students may write individually or have a group scribe.
- As class begins, have each group read one question off their chart paper aloud to the other groups.
- Display the chart paper where everyone can see, during the class time.
- At the end of class, collate questions into a collaborative document that can be displayed or used as an extension whenever students or groups are seeking further learning opportunities.
Teaching Procedure

- Select and curate artifacts relevant to healthcare (physical objects, videos, first-person narratives, news articles, print sources, images, etc). Prep photographs, artifacts, example videos, short statements typed as quotes, and/or short literature provided by local health organizations/services. Spread materials throughout the classroom space, with a chart paper and pens next to each artifact. Write the name of the topic or artifact at the top of the chart paper. Include several blank pieces of chart paper for students to bring forward their own topics of interest.

Categories that may feel relevant to this age group may include:

- PPE/masks/scrubs/gloves
- Costs of healthcare services: well visits, emergency room visits, surgeries, basic hygiene/medical supplies, epipens...
- Training/education paths for medical careers: dentists, optometrist, pediatrician, nurse, physician’s assistant, physical therapist, etc.
- Jobs in hospitals
- Medical Devices: costs, suppliers, access (wheelchairs, crutches, post-surgery supports, slings, hearing aids, specialty glasses, prosthetics, etc.)
- Common health costs to individuals, families
- Braces and other orthodontic devices - purpose, effects, procedures
- Doctor’s office vs. urgent care vs. hospitals - What role do each of these facilities play?
- City vs. Rural: Number and size of facilities, how many health workers are employed in their city/rural area vs. a nearby city/rural area?
- Ambulances, emergency response, field equipment, jobs in on-the-ground emergency response
- Care, commonly used devices/supplies for different age groups: babies, elderly...
- Universal Design for varying abilities, aging
- Access: Distance to emergency room services based on zip code, area of city, neighborhood, etc.
- Support for aging family or community members (special note: students within this age band may be more likely to have a more recent experience with support for, or loss of, an older family member)
- Role of therapy animals
- Music therapy
- Health-based volunteer organizations/services in the community that accept/rely on help from teens
- Basic hygiene access: dental care, deodorant, feminine hygiene supplies
- Challenges to local health services: costs, access, demand for care
- Day In The Life of a Frontline Health Worker
- Childhood vaccines
- Nutrition: creating a balanced food plan
Teaching Procedure

- Invite students to take a gallery walk and interact with the prepared materials. As students rotate to different displays, invite them to use the provided markers to write questions or short words for what they would like to learn more about. If there is a new area of interest, students may initiate that chart paper for others to add to.
- For guest speakers, provide an opportunity for students to hear a bit about their work and ask questions. As questions are asked, assign a scribe to jot these down in a common space, or make a quick recording.
- During video research/investigations, provide a small stack of sticky notes to jot down a word or short question as they hear or come across information they would like to learn more about. For example, in a short video tour of a local hospital, students may pause the video and wish to write short phrases like “what surgeries happen in my local hospital” or “what and how do families budget for healthcare” on their provided sticky notes.
- Gather chart papers and create a collective display area. If space is limited, assign 1-2 chart paper(s) to each student group to type or scribe all the responses. Display this in a space all students can see, or in the hallway near your classroom. Provide a blank piece of chart paper where students can always contribute and add new questions or thoughts. As an extension, invite interested students to create a short video connecting any recorded questions or responses to show to the class or share with families as the unit begins. Send these questions home to be included as part of family conversations to allow for extended conversations.
- Provide an opportunity for students to view this collection of early observations and questions. Utilize student journals or notebooks as a space to write a reflection: What does our class hope to learn in this study? What were you surprised by? What connections did you see between your wonders and those of other students? What challenges do you notice in health systems?
- Refer back to comments in “What Do You Wonder About?” when a topic is approached in that unit of study.
Teaching Procedure

- Throughout the unit, provide, on occasion, class time to do a whole-class written conversation around this topic.
- Begin with a large, clean writing space (such as the classroom whiteboard, or a collaborative technology space where anyone can add). Start with a Provocation Statement in the middle of the whiteboard, for example: “What challenges do health workers face at the urgent care we visited?” or “What care is needed by our aging population in Santa Fe, New Mexico?”
- Provide each student with a whiteboard pen or access to the collaborative tech document.
- Explain that students may make any written comment on the board, so long as it is directly connected to another comment or phrase on the board. They should write their new comment next to the previous question or statement and connect the two with a short line. Following their addition, anyone else may approach the board and add on to their comment or question with a new statement. In effect, this will create a silent, but in-depth and equitable conversation.
- Provide a timer for the conversation (20-30 minutes) or until board space runs out.
- Take a photograph of the written conversation. Distribute/email to students.
- Go around the classroom and allow students to contribute reflections on the activity and the written conversation that just occurred. Students may want to reflect on this particular type of experience, or on specific comments contributed during the “conversation.”
- At the end of class or for homework, ask students to write a reflective paragraph from the conversation, and list 2–3 questions they would like to investigate after participating in such an experience.
9-12: What Do You Wonder About?

Teaching Procedure

- Select and curate artifacts relevant to healthcare (physical objects, videos, first-person narratives, news articles, print sources, images, etc). Prep photographs, artifacts, example videos, short statements typed as quotes, and/or short literature provided by local health organizations/services. Spread materials throughout the classroom space. Materials could also include an opportunity to engage with an expert in this area through a zoom call, by watching a local news segment where someone might have been interviewed, or reading primary source documents from a local medical archive.

Categories that may feel relevant to this age group may include:
  - PPE/masks/scrubs/gloves
  - Costs of healthcare services: well visits, emergency room visits, surgeries, basic hygiene/medical supplies, epipens...
  - Macro- and micro-economies created through healthcare systems in your local municipality
  - Training/Education paths for medical careers: dentists, optometrist, pediatrician, nurse, physician's assistant, physical therapist, etc.
  - Jobs in hospitals
  - Medical Devices: costs, suppliers, access (wheelchairs, crutches, post-surgery supports, slings, hearing aids, specialty glasses, prosthetics, etc.), careers in Medical Sales
  - Common health costs to individuals, families
  - Doctor’s office vs. urgent care vs. hospitals - What role do each of these facilities play?
  - City vs. Rural: Number and size of facilities, how many health workers are employed in their city/rural area vs. a nearby city/rural area?
  - Ambulances, emergency response, field equipment, jobs in on-the-ground emergency response
  - Care, commonly used devices/supplies for different age groups: babies, elderly, etc.
  - Universal Design for varying abilities, aging
  - Access: Distance to emergency room services based on zip code, area of city, neighborhood, etc.
  - Support for aging family or community members (special note: students within this age band may be more likely to have a more recent experience with support for, or loss of, an older family member)
  - Role of therapy animals
  - Music therapy
  - Health-based volunteer organizations/services in the community that accept/rely on help from teens
  - Basic hygiene access: dental care, deodorant, feminine hygiene supplies
  - Challenges to local health services: costs, access, demand for care
  - Day In The Life of a Health Worker
  - Pediatric vs. adult well visits, taking care of their health for the long term
  - Organ donation
Teaching Procedure

- Provide students with a packet, handout or paper, writing utensils, and clipboards, in order to take notes.
- Invite students to take a gallery walk and interact with the prepared materials. As students rotate to different displays, invite them to pose 2-3 questions at each station. They should record these within their notes or perhaps on a shared doc or online space so other students can see their thinking.
- For guest speakers, provide an opportunity for students to hear a bit about their work and ask questions. As questions are asked, assign a scribe to jot these down in a common space, or make a quick recording.
- Continue to guide student note-taking and questioning of materials based on strategies that make sense for your classroom, student group, and teaching space.
- Gather students back into groups of 3-4. Allow students to go around and share questions they posed or observations they had based on their interactions with the materials provided.
- Prompt the groups to come up with 3-4 essential topics they would like to know more about, and write a leading question that could be researched, for each of these topics. For example, if a group would like to know more about emergency response routes within their city, they may craft a question like: “What is the average time it takes an emergency vehicle to respond at different 2-hour bands of the day, depending on the traffic?” This is a testable question with which this group may be able to form an experiment.
- Refer back to student questions written during this “What Do You Wonder About?” activity throughout the entire unit. Perhaps each day could be started by posing one of the student or group questions to the class.
Teaching Procedure

- Throughout the unit, provide occasional class time to do a whole-class written conversation around this topic.
- Begin with a large, clean writing space (such as the classroom whiteboard, or a collaborative technology space that anyone can add to). Start with a provocation statement in the middle of the whiteboard, derived from the student questions posed at the start of the unit. For example: “What challenges do health workers face at the urgent care we visited?” Or, “What care is needed by our aging population in St. Louis, Missouri?” Or, “What impact does traffic have on emergency response times in our city?”
- Provide each student with a whiteboard pen or access to the collaborative tech document.
- Explain that students may make any written comment on the board, so long as it is directly connected to another comment or phrase on the board. They should write their new comment next to the previous question or statement and connect the two with a short line. Following their addition, anyone else may approach the board and add-on to their comment or question with a new statement. In effect, this will create a silent, but in-depth and equitable, conversation.
- Provide a timer for the conversation (20-30 minutes) or until board space runs out.
- Take a photograph of the written conversation. Distribute/email to students.
- Go around the classroom and allow students to contribute reflections on the activity and the written conversation that occurred. Students may want to reflect on this particular type of experience, or on specific comments written or contributed.
- At the end of class or for homework, ask students to write a reflective paragraph from the conversation, and list 2–3 questions they would like to investigate after participating in such an experience.
- Assign one student to pose three new questions that could be investigated as a result of what was brought forward during this conversation. Decide as a class if you would like to pursue or research these questions or assign them out to groups. Design a study, experiment, or research process to draw new conclusions around these questions.
What does our class hope to learn in this study?

What were you surprised by?

What connections did you see between your wonders and those of other students?

What challenges do you notice in health systems?
This sheet will likely be most useful for older students (grades 6-12). This space can be used to take some notes during Opening Hook / Written Conversation Activities. Students could also use a digital space for note taking or a notebook or journal.

Reflective Paragraph: Create a reflective paragraph (5-7 sentences), based on your experience participating in this opening hook or the written conversation in class today. What was this style of learning experience like for you? What did you take away from it?

Based on your experience with this activity and questions that remain, what 2–3 areas of healthcare should we focus on next, as a class?
Frontline Health Worker Interview

Rationale

This activity is designed to be completed independently by students with a health worker in their community. Students may start with a health worker they know well (pediatrician, dentist, nurse, neighbor who works in healthcare), or may call a larger organization, such as the closest hospital or a healthcare nonprofit or social service provider, to connect with a service provider.

Encourage students to think creatively about all types of roles involved in healthcare, and connect with a frontline health worker, if at all possible.

Also consider:
- Facilities or business roles at local hospitals
- EMTs or emergency personnel
- Pharmacists
- Hospice care or transportation
- Organizations that provide discounted health services or other social supports to the community.

Prepare students to reach out to their selected interviewee by asking them to set up the appointment by phone and respect the individual's time by keeping the interview planned for 15-20 minutes, though some health workers may have more time available. For younger students, a caregiver should attend with them and may need to assist in writing or recording responses.

Students may add additional questions as they desire to focus their interview. Older students certainly should craft tailored questions that will provide them insight into the job or role of their interviewee. The intention is that the class will capture a snapshot of a variety of frontline health professions and how they work together to serve the community.

If students do not have easy access to an individual to interview, or a pathway to achieving that interview, you may wish to have a few frontline health workers visit your classroom and provide time for students or small groups to talk with them. Virtual interviews, set up by you or your students, during class time may also be a great option to allow deeper access within your local health worker network.
Introduce yourself: Hello, I’m _____________________________, a student in _________________ grade/class at _____________________________ School. I am here to ask a few questions to get to know you and your role in healthcare. Thank you for your time today. If there are any questions you are not able to answer or are uncomfortable answering, I will just skip those.

What is your job title?

How long have you been doing this work?

What training did you complete or school did you attend to prepare you for this job?

What does a typical day look like for you?

What is your favorite part of your work?

What is challenging about your work?

What is something you wish your patients or people who use your services knew before working with you?

In your view, what are important issues facing healthcare?

Do you have anything else to share? (Students may also come up with their own questions here.)

Thank you for your time today!
Rationale

The following case studies will provide students with the opportunity to consider and explore some of the experiences, challenges, and barriers individuals encounter when seeking healthcare, living with long-term illness, or serving communities as a health worker.

As each person is unique, and healthcare is multifaceted, challenges and barriers will vary between any one group of people or any one story. However, all of these issues exist in some way within our communities.

Reading, discussing, and reflecting on these case studies will provide students an opportunity to consider access, equity, experience, and quality of care as people interface with their own health needs across their life or serve the community through a healthcare career. The purpose of reviewing these case studies is to provide a deeper and broader scope of information to inform the group’s eventual MICRO DIY Museum of Care.

Students may have personal experience with these topics, especially barriers or challenges, or might have no knowledge that these exist. This activity will bring forward these challenges and provide students with an opportunity to consider and brainstorm how improved at-home or local care may alleviate some of these barriers, while perhaps eliminating the need for formal care later in life. Keep in mind some students may experience triggers or sensitivities when discussing barriers such as access to quality care, discussing the particulars of managing long-term illnesses, or when considering the emotional toll of a career in healthcare or inequalities that may exist to accessing healthcare in different geographies. These triggers could be based on personal or family experience. As the teacher you should be ready to guide these conversations and the processing of information, using trauma-informed best practices. Do not hesitate to connect with local or school resources, such as your guidance counselor, as student needs are demonstrated and rise to your awareness.

This activity may be completed using any personal story from within your community, if someone is willing to share their experience. Feel free to call on a member of your community to share their personal story of a healthcare experience, appropriate for your students’ age group, and use the provided tools for students to identify what barriers may exist within their stories. Or you can share the stories and resources we have provided and review them together as a class.

Scaffolded Case Study exploration procedures for grade-level bands are included on the following pages and a Barriers & Challenges Note Sheet for students can be found on page 45.

The following Case Studies can be found on Pages 41-44:

Case Study 1: Sara’s Story: Accessing Care While Aging
Case Study 2: Community Health Worker Ernest Gardner: The Role Community Health Workers Play in Mitigating Healthcare Needs At Home
Case Study 3: Nurse Midwife Marion Suba: Pre & Postnatal Care In Liberia
Case Study 4: Health Worker Voices From The Frontline: Johnson & Johnson’s Center For Health Worker Innovation Profiles Health Worker Experiences
Introduce your students to the concepts of **Challenges** and **Barriers**. A challenge is anything the person in the story must think about, plan for, overcome, bypass in order to access the healthcare they need or provide quality care to others within their care circle or their healthcare profession. A challenge could be anything that makes accessing or providing care more difficult. A barrier can be seen as more explicit and in effect *blocks* someone from accessing the fullest quality of healthcare or providing care to someone else. Barriers might be very obvious (a patient must rely on someone else for transportation from home to a hospital) or they might be more subtle (the paperwork on how to finance hospital visits was not available to the patient because it was placed up high and they are in a wheelchair or it was on a webpage and they do not have internet at home).

**Examples of Physical Barriers:**
- Size of home, number of floors, layout of home, location of bathroom, entrances, parking options
- Physical proximity of home to care facilities, doctor's offices, location of clinics in relation to each other
- Physicality required of doing everyday tasks like writing, walking, bathing, cleaning, driving, preparing healthy foods by cutting/chopping/cleaning vegetables & fruit or lifting or moving pans
- Proximity to help (neighbors? family members? friends?)
- Dangers of walking outside to get to a car or public transportation (weather factors that may lead to slips/falls, safety concerns, temperatures)
- Mobility requirements due to a physical disability (need for motorized wheelchair, specialized vehicle, etc.)

**Examples of Mental/Emotional Barriers:**
- Managing personal details of care as well as day-to-day of living
- Loneliness
- Grief over physical capabilities not being what they used to be or what is seen in others in one's community
- Uncertainty of who to ask for help
- Time it takes up to attend appointments vs. time for activities that may bring joy
- Relaying health information to family or those who need to know
- Deciding who to entrust with health information
- Assigning decision-making to someone else
- Uncertainty for what's to come in the years ahead or how long it may take to “recover,” if ever
- Evaluating what's really important (bucket list, family goals, hopes and dreams)

**Examples of Economic/Financial Barriers:**
- Yearly checks/renewal in government-assisted care or other health plans
- Ensuring doctors are in-network
- Budgeting for and planning ahead for future bills
- Spending a greater portion of income on healthcare (vs. living expenses, travel, entertainment, gifts, etc.)
- Staying on time with payments/writing/mailing checks
- Access to internet/computer to pay bills, schedule appointments, or engage in telehealth
- Cost of travel for family members to come visit, assist, spend time together
- Cost of new devices needed to support mobility, health (oxygen, daily medical supplies, walker, etc.)
- Cost of documentation required for government- or community-assistance programs (printing out bank statements, accessing old credit card statements, copying/faxing/mailing in required paperwork)
Examples of Social, Cultural, Racial, or Religious Barriers:
- HPPA: Who has the right to know and obtain information, who does not have the right? Is this right to privacy always protected?
- Beliefs about caregiving/caretaking/receiving of care from someone of a different sex
- Beliefs about end-of-life care
- Beliefs and practices about medications, vaccinations, treatments
- Ability to attend treatments, stay overnight in hospital, etc. based on family structure and at-home responsibilities (taking care of children, pets, other family members)
- Impact on social activities due to management of health needs (i.e. feeling too exhausted due to treatments to attend social gatherings, impact of care needs on participation in physical activities like sports or exercise, reactions/aversions to certain foods that make social dining a challenge)

Examples of Environmental Barriers:
- Asthma or other respiratory illnesses related to air quality
- Syndromes that may present more strongly in different temperatures, altitudes, humidities
- Proximity to toxic waste sites/brownfields
- Impact of industry or traffic on air quality, noise pollution

Examples of Nutrition Access Barriers:
- Living in or near a food desert (healthy food options are not readily available within close/walking distance proximity to home)
- Ability to purchase and prepare traditional foods
- Physical proximity to grocery stores or hours stores may be open (nights, weekends)
- A youth's control (or lack thereof) of what type of food is in the home or prepared
- Reliance on food pantries or food banks and what types of food are made available in each delivery
- Availability of vitamins, supplements, and products in local stores during supply shortages

Examples of Language/Comprehension Barriers:
- Ability to understand oral and written expression of the country's primary/target language
- Ability to respond in the primary/target language of that country or healthcare system
- Ability to understand dialects, accents
- Mental capacity to retain information given auditorily
- Time it may take to process medical information, then make informed decisions
- Communication of relevant information to other parties who can or need to make decisions (i.e. family members who may have medical power of attorney; a child's parents or guardians)
- Ability to access web-based tools that may explain more information about a certain disease or condition
- Ability to read, decipher, and share medical records

Geographic Barriers
- Distance required to travel to different medical appointments or clinics
- Terrain such as rocky areas, rivers, water bodies, canyons that must be traveled through or around in order to obtain medical care; organizing or access to transportation for that distance or terrain
- Potential cost or time of traveling to see a specialist or habitual travel to see a specialist
- Finding locations to stay if travel causes a need to stay overnight

Other Barriers
We suggest spending time generating a class list of additional barriers that are not listed here, or may be specific to your region, population, culture, or personal histories.
K-2: Case Study Exploration

Repeat this class format and experience throughout the MICRO Museum of Care unit of study, as many times as may be relevant to help deepen your class’s exposure and understanding to the many different facets of, and challenges within, quality healthcare. Use this activity as a springboard for students to consider ways they can take better care of themselves and others in their community.

Teaching Procedure

● Gather students in a circle and prepare them for the case study. Or you may have a guest coming to share their health story and you’ll want to prepare them.

● Introduce the concept of a **Barrier**.

● Ask students to listen to the story, and keep mental notes of barriers they notice within the story.

● Read-aloud today’s Case Study. For this age group, you may want to read just a few sentences at a time and pause for group conversation. Students may also raise their hand as a silent signal, when a barrier is noticed.

● Ask students to list places in the story where the main character experienced a barrier or a challenge, even if it was not obvious to the character.

● Draft a list of the barriers in a space where everyone can see. Consider using icons/graphics to signify these barriers, as not everyone in this age group may yet be able to read the list.

● As a group, decide on **one** of the barriers to investigate. Spend the remaining class time considering:
  ○ Does this barrier exist in our local/school community?
  ○ Do members of our class have personal experience with this barrier? (This may or may not be something students are comfortable sharing.)
  ○ What solutions could you envision for this situation? What new solutions do we wish our community had for someone like the character(s) you read about today?
  ○ What can we do? What should we do? Invite students to reflect on personal and small changes we can make in our community to address these barriers and challenges. Keep a mental list of their responses and return to this as an ideation space when students are composing their Blueprint for Advocacy at the end of the unit.

● Send a copy of the Case Study (or notes shared from a personal interview) to families so students may continue this conversation at home.
Repeat this class format and experience throughout the MICRO Museum of Care unit of study, as many times as may be relevant to help deepen your class’s exposure and understanding to the many different facets of, and challenges within, quality healthcare. Use this activity as a springboard for students to consider ways they can take better care of themselves and others in their community.

**Teaching Procedure**

- Gather students in a circle and prepare them for the case study. Or, you may have a guest coming to share their health story, and you’ll want to prepare them.

- Introduce the concept of a **Barrier**.

- Distribute [Barriers & Challenges Note Sheet](#) (page 45) or have students bring notebooks to take a note of barriers they notice within the story.

- Read-aloud today’s Case Study. For this age group, you may want to read just a few sentences at a time and pause for group conversation or for time to note any barriers. Students can quickly jot down a word or even draw a quick icon to represent a barrier they noticed. Students may also raise their hand as a silent signal, when a barrier is noticed.

- Ask students to list places in the story where the main character experienced a barrier or a challenge, even if it was not obvious to the character.

- Draft a list of the barriers in a space where everyone can see, such as a large whiteboard or community chart paper.

- As a group, decide on one of the barriers to investigate. Spend the remaining class time considering:
  
  - Does this barrier exist in our local/school community?
  - Do members of our class have personal experience with this barrier? (This may or may not be something students are comfortable sharing.)
  - What solutions could you envision for this situation? What new solutions do we wish our community had for someone like the character(s) you read about today?
  - What can we do? What should we do? Invite students to reflect on personal and small changes we can make in our community to address these barriers and challenges. Keep a mental list of their responses and return to this as an ideation space when students are composing their Blueprint for Advocacy at the end of the unit.

- Who are critical care partners for the character(s) in this case study? If you have an experience like this in your own life, who are critical partners for you or a family member or friend?

- Send a copy of the Case Study (or notes shared from a personal interview) to families so students may continue this conversation at home.
Repeat this class format and experience throughout the MICRO Museum of Care unit of study, as many times as may be relevant to help deepen your class’s exposure and understanding to the many different facets of, and challenges within, quality healthcare. Use this activity as a springboard for students to consider ways they can take better care of themselves and others in their community.

**Teaching Procedure**

- Provide copies of today’s case study to each student and organize students into small groups. Or, you may have a guest coming to share their health story, and you’ll want to prepare them.

- Introduce the concept of a **Barrier**.

- Distribute **Barriers & Challenges Note Sheet** (page 45) or have students bring notebooks to take a note of barriers they notice within the story.

- Ask groups to read-aloud today’s Case Study to each other (one person reads, group members take turns, etc.). Also, make sure each student has an individual copy to read silently at the same time. While reading, students can quickly jot down a word or even draw a quick icon to represent a barrier they noticed. Students may also raise their hand as a silent signal, when a barrier is noticed.

- Ask students to go around in their groups and list places in the story where the main character experienced a barrier or a challenge, even if it was not obvious to the character, and the effects of that barrier.

- As a group, students should draft a list of the barriers and effects, and scribe onto a community space where others will be able to see, such as a large whiteboard or community chart paper.

- As a class, decide on **one** of the barriers to investigate. Spend the remaining class time considering:
  - Does this barrier exist in our local/school community?
  - Do members of our class have personal experience with this barrier? (This may or may not be something students are comfortable sharing.)
  - What solutions could you envision for this situation? What new solutions do we wish our community had for someone like the character(s) you read about today?
  - What can we do? What should we do? Invite students to reflect on personal and small changes we can make in our community to address these barriers and challenges. Keep a mental list of their responses and return to this as an ideation space when students are composing their Blueprint for Advocacy at the end of the unit.
  - Who are critical care partners for the character(s) in this case study? If you have an experience like this in your own life, who are critical partners for you or a family member or friend?
  - Are there any local or federal laws or policies in place that protect the character(s), or are working to eliminate some of the barriers brought to light today?

- Send a copy of the Case Study (or notes shared from a personal interview) to families so students may continue this conversation at home.
Repeat this class format and experience throughout the MICRO Museum of Care unit of study, as many times as may be relevant to help deepen your class's exposure and understanding to the many different facets of, and challenges within, quality healthcare. Use this activity as a springboard for students to consider ways they can take better care of themselves and others in their community.

**Teaching Procedure**

- Provide copies of today's case study to each student and organize students into small groups. Or, you may have a guest coming to share their health story, and you’ll want to prepare them. Ideally, for this activity, students will read a case study as a warm up, and then have an opportunity to hear a real story from their community, whether that guest speaker comes to the classroom, or it is someone the student finds to interview, or you provide a list of community members who may be willing to speak with students or be interviewed. It is highly valuable for students in this age range to identify real-world challenges, connected to real people, within their community, and begin the work to overcome them.
- Introduce the concept of a **Barrier**. Connect to other curricular areas where barriers may have been explicitly taught, or uncovered.
- Distribute [Barriers & Challenges Note Sheet](#) (page 45) or have students bring notebooks to take a note of barriers they notice within the story.
- Ask groups to read-aloud today’s Case Study to each other (one person reads, group members take turns, etc). Also, make sure each student has an individual copy to read silently at the same time. While reading, students can quickly jot down a word or even draw a quick icon to represent a barrier they noticed. Students may also raise their hand as a silent signal, when a barrier is noticed.
- Ask students to go around in their groups and list places in the story where the main character experienced a barrier or a challenge, even if it was not obvious to the character, and the effects of that barrier.
- As a group, students should draft a list of the barriers and effects, and scribe onto a community space where others will be able to see - such as a large whiteboard or community chart paper.
- As a class, decide on **one** of the barriers to investigate. Spend the remaining class time considering:
  - Does this barrier exist in our local/school community?
  - Do members of our class have personal experience with this barrier? (This may or may not be something students are comfortable sharing.)
  - What solutions could you envision for this situation? What new solutions do we wish our community had for someone like the character(s) you read about today?
  - What can we do? What should we do? Invite students to reflect on personal and small changes we can make in our community to address these barriers and challenges. Keep a mental list of their responses and return to this as an ideation space when students are composing their Blueprint for Advocacy at the end of the unit.
  - Who are critical care partners for the character(s) in this case study? If you have an experience like this in your own life, who are critical partners for you or a family member or friend?
  - Are there any local or federal laws or policies in place that protect the character(s), or are working to eliminate some of the barriers brought to light today?
  - If we wanted to advocate for one of these barriers, what partner organizations exist within our community who might share or be able to advance our mission or vision for this? Whom should we contact at our local health facilities (hospital, etc.)?
- Send a copy of the Case Study (or notes shared from a personal interview) to families so students may continue this conversation at home.
Sara is an 80-year old woman living in a mid-size city. She lives alone in a two-story house, in a neighborhood she has been part of for a long time. In her home, her bedroom is upstairs and her car is parked in a detached garage. Sara has two children and several grandchildren. They live in a different city from Sara, but one of her children, and sometimes her grandchildren, come to visit her once a month for a weekend. One of her children is able to drive to visit her, because they do not live too far away, but her other child needs to take an airplane to come see her.

Sara lives just a few miles from a hospital and several doctors. Having grown up in this city, she has several different doctors she needs to see on a regular basis, but has been with these doctors for a long time, so they have a clear picture of her full health history. Sara has arthritis in her hands and back, and in the last few years, is more and more uncomfortable doing daily tasks and some of the physical tasks she used to enjoy, like gardening, hiking, knitting, and even walking. She takes a few medications for her blood pressure, which she pays for through Medicare (government-assisted health insurance). Her doctors tell her she is in good health, but recently recommended she visit her specialists at least once a month to monitor her arthritis progression, that she attend physical therapy twice a week at a clinic on the other side of the city, and have regular scans at the hospital.

Sara is finding she is more and more uncomfortable holding the steering wheel of her car, getting in and out of bed or climbing the stairs, and she thinks she is going to be spending more and more time at doctor’s appointments as the years go on. Her mind is sharp and she manages the paperwork and bills for her home and health needs, but also finds opening envelopes, grasping a pen, and even handwriting are no longer easy for her. Navigating web-based information, payment methods, and appointment reminders is at times overwhelming and confusing. Sara feels her schedule is at a tipping point where she will be spending time every day on some aspect of her healthcare.
Case Study 2: Community Health Worker Ernest Gardner

The Role Community Health Workers Play in Mitigating Healthcare Needs At Home

Ernest Gardner is a Community Health Worker in Philadelphia, PA, a large city in the eastern United States. Ernest participated in an interview with a member of the MICRO team. The full recording and transcript of this interview are available on MICRO’s website (https://micro.ooo/museum-of-care#ernest_playlist).

Provide students with access to this interview audio, or a transcript of the interview, to investigate the challenges brought to light through their conversation.

If limited for time, specific quotes from Ernest are below:

“...the work I do is definitely essential... we can kind of bridge the gap between the community and the healthcare system.”

*When speaking about his experiences working with sickle cell patients:* “...a pretty good doctor [might be] rushing them to get the appointment over with... not really hearing their concerns. [The patient] might not be believed in certain instances.... Healthcare providers often think they’re drug-seeking patients, when they’re really just in pain. ... then some things have happened in the past... different historical things that have made folks distrusting [of formal healthcare]."

“A lot of times the paperwork and things like that are so cumbersome that patients just kind of give up.”

“[A patient was] on a fixed income and a lot of times the different programs want so much paperwork. They wanted two years of bank statements. So you know, at $5 a pop, [patient] couldn't afford it. So we had to find another avenue, and [the patient] just really needed someone to walk along on this journey and make phone calls and things like that.”

*When speaking about a patient who needed supportive devices in order to be able to get outdoors:* “A patient of mine was having issues just getting around... an amputee who didn’t have a chair, nothing at all. No support at home. They didn’t know how to navigate or get one.”

“...improve people's quality of life, but also their mental health and emotional wellbeing... just being confined and restricted can be, you know, pretty depressing.”

“Some folks don't have electricity... so if they don't have electricity, they can't use their oxygen concentrator... so that's where we come in as well, just helping with shut-off notices and contacting the utility companies to seeing about payment arrangements or any programs that are available that can help with utility bills.”

“I want to say to the visitors to promote love, and to practice concern for others. At some point... you're going to need someone to care for you, whether you're an infant or an elderly senior, you're going to need someone to look after you at some point.”
Marion Suba is a Nurse Midwife in Liberia in West Africa. She has served as a Nurse Midwife for over 40 years in both Liberia and the United States. Marion participated in an interview with a member of MICRO’s team. The full recording and transcript of this interview are available on MICRO’s website (https://micro.ooo/museum-of-care#marion_playlist). Provide students with access to this interview audio, or a transcript of the interview, to investigate the challenges brought to light through their conversation.

If limited for time, specific quotes from Marion are below:

“I have now become more of a nurse leader looking at the whole health system in terms of a health system leader... presently I’m the county director of Last Mile Health in Liberia, where I lead a team of people dedicated to bringing healthcare within reach of everyone, everywhere.”

“It’s mainly mothers and children, newborns, and then under five year olds... I do an assessment when I’m with patients, whether I’m looking or whether I’m touching... to find out what’s going on... then you may have to do some other tests, some other diagnosis... you have a lot of interaction with mothers because sometimes you have a baby and they don’t speak- they cannot tell you what is wrong with them. So you have to do a very good examination and then whatever it is, discuss it with the mother.”

“In Liberia, we have a lot of children come in, sick with fever, so we need to make sure to check them and to make sure they do not have malaria. We need to have the tests to do the malaria smear and make sure we have the tests called the rapid diagnostic test.”

“...making sure that people who are providing services in remote communities have the correct training...have the materials they need to work with...”

“...our leaders are people in healthcare who use data. You must have decision-making based upon data, based upon evidence...”

“Another thing I like to consider about leaders is that you have to be able to manage resources. You have to be able to be good stewards. You have to be someone who will be able to assist in getting resources.”

“...respectful maternity care... you have to be able to communicate with them properly.”

“You have to have the right number of people to take care of them. Expeditiously... for me, my number one challenge in terms of healthcare, it comes to this whole thing of quality, resources, quality human resources- you know, nurses, doctors, physicians assistants, to take care of people. The other challenge we have is having the resources... you see a child needs immunization, but then you don’t have enough of these immunizations or you don’t have enough needles to be able to give or use a clean and sterile one for each child.”
Case Study 4: Health Worker Voices From The Frontline

Center For Health Worker Innovation

Johnson & Johnson's Center for Health Worker Innovation showcases Frontline Health Worker stories from all over the world on their website (https://chwi.jnj.com/). We encourage you to visit this space for many interviews and personal stories of Frontline Workers from all over the world.

A Few Direct Links (many more stories are available on the Center for Health Worker Innovation webpage):

**Auxiliary Nurse Midwife Arti Gajanan Modshe: Bringing Healthcare to Remote Villages in India**

**Nurturing Health Worker Resilience in Latin America**

**Harriet Nayiga: Committed to Transforming Standards of Midwifery in Uganda**

**Redesigning PPE: Personal Protective Equipment Should Be Fit For Women, Not Just Men**
<table>
<thead>
<tr>
<th>Barrier or Challenge in the Case Study</th>
<th>Effects on the Character(s)</th>
<th>What Could You Do? What Should We Do?</th>
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Rationale

As Part Of Any Stem Project Or Class, Students Should Find Guided Opportunities For Experimentation, Data Collection, And Analysis, And To Draw Conclusions. Though There Are Other Spaces Within The Micro Museum Of Care Curriculum For Looking Closely, Observation, And Gathering First-Hand Accounts, A Classic Laboratory Experiment Related To Healthcare Fields And Industries Provides Students A Scientific Approach. Participating In A Class Laboratory Will Connect Students With The Field Of Healthcare And Relevant Testable Pieces Or Procedures That May Regularly Occur In Their Local Health System.

Scaffolded Procedures For A Laboratory Experiment For Grade-Level Bands Along With Data Collection And Analysis Sheets For Students Can Be Found On The Following Pages (47-52).
K-5: Lab Experiment: Testing Bandages

Materials

- Small potatoes, such as yellow dutch, approximately 6-8 per group
- Unique types of bandages, such as cloth or plastic bandages, patch adhesives, gauze, butterfly bandages, and generic vs. name-brand quality, (4-5 per group)
- Optional Plastic bag (1 per group) for cast test
- Optional Rubber band (1 per group) for cast test
- Clear plastic 5-10L tub, 1 per group
- Optional knife (teacher use) and red acrylic paint and dropper (teacher use)
- Paper towels

Procedure

- Read the following scenario to students:
  On the last day of school, Darren took a tumble at recess and scraped his ankle pretty badly. His ankle started bleeding, and he saw the school nurse to get cleaned up. Darren remembered that the end-of-year pool party is happening right after school today, and he wants to attend, but is worried about his scrape coming in contact with the pool water. The nurse has a variety of bandages available that he could use. Which one is the best for Darren and the nurse to choose? In today’s experiment, we will test different common bandages to see if they keep Darren’s scrape separate from the pool water and also, if any will be harder or easier to remove after getting wet.

- Optional experiment add-on: Before class, remove a small sliver of potato skin (approximately the size of what the scrape would be in the story). Using the paint and dropper, place a few drops of acrylic paint into the “scrape.” Let the paint dry overnight. This will simulate whether or not the bandages “leak” when tested in class the next day.

- Distribute 2 potatoes, 1 tub of water, and 2 of the same kind of bandage to groups. Walk through the below procedure once together. Then students may repeat the experiment for the remaining types of bandages.
- Direct students to unwrap two bandages and carefully place them onto two separate potatoes.
- Keep one potato dry. This will be the “control” for this experiment.
- Place one potato, with bandage, in the water. Submerge the potato for 30 seconds.
- Remove the wet potato from the water and dry briefly with a paper towel.
- Have the same group member remove the bandage from the dry potato and the wet potato. This group member should record their observation in the data collection chart. If also attempting the optional experiment add-on, students should record whether or not any of the red paint leaked into the water.
- Allow students to rotate roles and repeat the experiment with more potatoes and bandages. They may re-use the same dry potato over and over with each new type of bandage, as long as no residue is left from the previous bandage. Allow the students to also try wrapping the potato in a layer of gauze as a bandage option.

- Optional experiment add-on: Simulate an injury that has been cast by first wrapping the potato in gauze, then using a plastic bag and rubber band to simulate covering the cast with a bag needed while showering, bathing, or swimming. Students can determine this effectiveness by seeing whether or not the gauze bandage gets wet after submerging in water for 30 seconds.
- Based on age-group, analysis and conclusion questions can be answered individually, in small groups, as a whole class, or with teacher guided discussion. Students could also complete the questions for homework or part of a more-formal lab write-up.
Data Collection:

<table>
<thead>
<tr>
<th>Bandage Name</th>
<th>Did The Bandage Stay Attached Underwater?</th>
<th>Was It Easier or Harder to Remove after Getting Wet?</th>
<th>Did It Leak? (Optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes / No</td>
<td>Easier / About The Same / Harder</td>
<td>Yes / No</td>
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<td>Easier / About The Same / Harder</td>
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<td>Easier / About The Same / Harder</td>
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</tbody>
</table>

Analysis

1. Which bandages fell off (did not work) when they got wet?

2. Which bandages were easier to remove after getting wet?

3. Which bandages were harder to remove after getting wet?

4. Which bandages leaked underwater?

5. Did the plastic bag keep the bandage dry after it was submerged?

Conclusion Questions

1. Did a certain brand work better than another? Why do you think this was the case?

2. Based on the data you collected, which bandage would you choose if you were in Darren's position?

3. Can you sort your data into groups? Worked, didn't worked, easy to use, hard to use, etc.

4. When you purchase bandages, what do you usually think about? (size, design, feel, etc.)

5. How might the information you collected today change how you shop for bandages in the future?
Background
In this experiment, students will test bacterial growth from various surfaces in their school environment. Students should select an inorganic surface to test that is frequently used but infrequently sterilized (elevator button, door handles, bathroom sink handle, computer keyboard, locker room surface, copy machine, etc.). Try to guide students to select different areas so many different surfaces are tested across your entire class’s collection.

Materials (per student)
- 6 Petri dishes with lids
- Nutrient agar for dishes
- Petri seal tape
- Pipette droppers
- Cotton swabs
- Disinfectants in liquid form (such as household cleaners, bleach, anti-bacterial or regular soap, hand sanitizer, generic disinfectants, natural-based disinfectants, dissolved solid disinfectant). You can provide a large variety for students to choose from by having everyone bring something in, etc.
- Masks, gloves for student PPE

Procedure
- Students should make a plan for the location in the building they will test.
- Distribute materials to students, keeping Petri dishes closed until the last possible moment.
- Show students how to correctly swab an area:
  - Open cotton swab
  - Take five easy passes on the surface to be tested
  - Open Petri dish, and swab across the agar in a zig-zag fashion, then once around the surface of the agar
  - Immediately close and seal the Petri dish.
  - Label the dish with testing information: Student name, swab location, date, and numbers 1-6.
  - Seal the Petri dish with Petri tape
  - Toss cotton swab in trash - use a new cotton swab for each test.
- Have students complete 6 Petri dishes from the same area. One of these dishes will be designated as the control, and one will be used for just water as the cleaning agent. One dish will be used for soapy water as the cleaning agent. The 3 additional dishes will be used to test 3 additional types of cleaners.
- Place all 6 dishes in the class Petri warming station for 48 hours.
Procedure

-Two Days Later-

- Students wash hands.
- Students should wear masks, gloves, and work in a hood if at all possible to reduce contact with any grown bacteria.
- Retrieve dishes from the warming station. Keep dishes sealed.
- Photograph each dish to record microbial growth. (If no microbial growth has occurred, dish may need to be heated for an additional 24-48 hours, or a different area selected for swabbing.)
- Have students count and record growth clusters on the dish.
- Carefully, and working quickly, open Petri dish 2. Place 2mL of water on the bacterial growth. Close and reseal dish 2.
- Carefully, and working quickly, open Petri dish 3. Place 2mL of soapy water on the bacterial growth.
- For dishes 4, 5, and 6, have students place 2mL of various cleaning agents on the dishes. Record which cleaning agents were used in the data collection table.
- Return all dishes to the warming station for an additional 48 hours of growth.
- Toss PPE and wash hands thoroughly.

-Two Days Later-

- Students wash hands.
- Students should wear masks and gloves.
- Retrieve dishes from the warming dishes. Keep dishes sealed.
- Photograph each dish to record microbial growth.
- Have students count and record growth clusters on the dish, noting the impact of the cleaners.
- Record all results in the data collection table.
- Dispose or autoclave all dishes at the completion of the experiment.

If results are inconclusive, you can extend the student in 24-hour increments until results are observed.
### Data Collection

Area Swabbed: ________________________________________________________________

<table>
<thead>
<tr>
<th>Petri Dish</th>
<th>Photo Day 0</th>
<th>Photo Day 2</th>
<th>Cluster Count Day 2</th>
<th>Photo Day 4</th>
<th>Cluster Count Day 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Control</td>
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<td>2 - Water</td>
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<td>3 - Soapy Water</td>
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<td>4 - Cleaning Agent:</td>
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<td>6 - Cleaning Agent:</td>
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</table>

### Analysis

1. Calculate the effectiveness of each type of cleaning agent. Use the formula

\[
\frac{(\# \text{ of Clusters Day 2} - \# \text{ of Clusters Day 4})}{\# \text{ of Clusters Day 2}} \times 100\%
\]

= Percentage of Growth Reduced by Cleaner

Water:

Cleaning Agent 1:

Cleaning Agent 2:

Cleaning Agent 3:
Analysis

2. Did water promote or inhibit growth?

3. What microbiomes were present in your sample? Utilize Google Images to search for different types of microbial clusters (clear, opaque, different colors, etc) to determine what was likely present.

4. What sources of contamination existed in this experiment?

5. Create a graphical representation of your results.

Conclusion Questions

1. Within the class, what areas had the highest count of contaminants? Can you group the collected class data into different types i.e. handles, floors, surfaces, etc) or different amounts of sterilization per day?

2. Did a certain brand have more effectiveness against contaminants? What key ingredients might be more effective?

3. How did dishes treated with water and soap fare against dishes treated with just water? How does this tie in to the effectiveness of hand-washing?

4. When you purchase cleaning supplies, what do you usually think about? (design, brand awareness, scent, feel, size of bottle, cost, etc)

5. How might the information you collected today change how you shop for cleaning agents in the future?

6. What may lead to decreased effectiveness of cleaners?
Rationale

As students have “looked closely” at many aspects of healthcare, they are now prepared to select and pursue deeper research related to one particular facet of care. Ultimately, the topic chosen for research will be the focus of the MICRO DIY Museum of Care they create. During Guided Research, students may utilize first-person resources from your community, internet tools, magazines, books, guest speakers, personal experience, or set up their own experiments, when relevant, to gain deeper insight into their topic of choice. They may take observational data, conduct interviews, collect samples and quotes, read books, contact local legislators, and/or shadow at a healthcare site. Students should have the opportunity to select an area of interest and know that they will become experts in this area, eventually creating their MICRO DIY Museum around their research and what was learned.

It is important to spend some time with students reviewing and vetting sources. Your school or library may have access to published materials online and in print that are relevant to their topic. A local doctor’s office or hospital may have additional quality resources that can be copied or reviewed by students during their research. The internet may provide sources for research, but time should be spent with students reviewing the quality and accuracy of such sources. Select videos could also be used, with students enabled to stop frequently to jot a few notes or words on a card or sticky note, to save their notes for future. For younger students, you may consider forming groups so the teacher can direct finding and learning from sources. Picture books may also present a valuable resource for younger students.

A list of potential research topics is provided on pages 54 and 55. Scaffolded procedures for grade-level bands are on the following pages (56-59) and a Research Notes Template for students to use can be found on pages 60-62.
Guided Research Topics

Possible Topics for Students To Research
- Jobs/careers in Healthcare
- How to Brush Your Teeth and Why It Is Important
- How to Wash Your Hands and Why It Is Important
- Common Medical Devices (Glasses, Hearing Aids, Wheelchairs)
- Casts: What Happens When A Bone Breaks? How Does A Cast Help It Heal?
- What Do Newborn Babies Need?
- Scrapes: How Does Your Skin Heal?
- How To Help A Friend Who Is Sick
- Common Older-Age Illnesses/Diagnoses and How To Help
- Food-Based Health & Wellness: What Does A Healthy Plate Do For You?
- Who Else Works At The Hospital? Non-Medical Support Careers
- Data Collection: How Many, How Often... Looking up Facts Relevant To Health of Your Community

Additional Research Topics for 3-5 Grade and Above
- General Hygiene (Soap, Deodorant, Shampoos) and How They Work
- What Nutrients Does A Rapidly Growing Adolescent Need?
- Viruses vs. Bacteria: What is the Difference and How Do They Effect Humans?
- Sports Injuries: Common Types, and How To Help the Body Heal
- Braces: How Do They Work and Why Are They Needed?
- Drinking Water Safety & Access Around The World
- First Aid Kits: What Comes Inside and When To Use Each Component
- The Human Body: Different Body Systems and What They Do
- The Ear: How Hearing Works in Humans
- The Eye: How Vision Works in Humans

Additional Research Topics for 6-8 Grade and Above
- Mental Health: Different Disorders, Signs, and What To Do
- Food Deserts: Mapping Access to Nutritious Food Choices
- Common Medical Procedures (Blood Draw, Anesthesia, Tooth Extraction, Stitches....)
- Economics of Healthcare: Costs and Where The Money Goes
- New Medical Technologies (surgeries, procedures, implants, imaging, diagnostic tests, prosthetics)
- Development of Vaccines
- Global Infant Mortality Rates (and causes)
- Local Laws, the Americans with Disabilities Act - History and Impacts
- Health Insurance: Costs, types of plans, providers, what is covered
- Daily Hygiene, and Why It Is Important
- Who Else Works At The Hospital? Non-Medical Support Careers
- Screen Time: How Much is Too Much?
Additional Possible Research Topics for 9-12 Grade

- The Human Body: Different Body Systems and What They Do
- Color Vision: How It Works and Its Evolution
- Mental Health: Different Disorders, Signs, and What To Do
- Teen Pregnancy: Rates, Experiences, Outcomes
- Legislation Impacting Healthcare Access
- Surgical Procedures: What happens?
- Body Organs: Detailed look at Structure & Function
- Hospice Care: Access, Process, Legalities, Facilities
- Transportation Options To and From Care
- Universal Design in Cityscapes & Architecture (to allow for greater access)
- The Opioid Crisis: History, Effects, Geographic Areas, Recovery
- Concussions in Sports: Frequency, Avoidance, Effects
- Triage, ER, ICU, Recovery, Outpatient: Understanding different sections & functions at a hospital
- History of Medications (i.e. Penicillin, smallpox vaccine, epipens, etc.)
- Cultural Diplomacy in Healthcare - Supporting/Working With Other Nations
- Public Health Organization and Management
- Vaccine Development and Production
- Vaccine Distribution from One Country To Another - Political Relationship and Aspects to Pandemic Care
- Health Initiatives in our Region that Have Impacted The World (i.e. clean water nonprofits, MedWish, hospital outreach, Doctors Without Borders, etc.)
- What Are Different Cultural Approaches to End-Of-Life Care?
- Environmental Health Concerns: Issues Linked to Toxic Waste Sites, Air Quality, etc.
- Carriers & Hosts of Disease: Zika, Malaria, Swine Flu, etc.
- Health Issues related to Clean Water Access
Teaching Procedure

- Create a method to share research opportunities with your students. Students should be able to choose areas that most interest (or are relevant to) them. Students may work in pairs or small groups to research a topic. Consider that the researched topics will eventually become a component of the MICRO DIY Museum of Care display. Students can draw topics, be assigned, or ideally, be able to choose topics most important to them.

- Provide a list of research topics (and relevant images or icons that describe this topic) for your class. Have a class meeting where you share the topics that need deeper research, in order to create the MICRO DIY Museum of Care display. Selected topics should stem from the areas students expressed most interest in during the earlier phases of this unit.

- Once students have been sorted into who will study which area, direct them to relevant resources. We suggest you have earmarked or saved 2–3 resources per topic. For example, for the topic of Careers in Healthcare, you may want to have a short PBS video saved, a picture book on different types of medical careers, and have a parent or community volunteer familiar with medical professions available to visit and speak with your students.

- You may wish to designate 2-3 blocks of time to dive deep into the resources you have provided. Students should take notes to be able to answer basic questions. Teach students how to pause a video, and jot a quick word or note on a sticky note. Review with students how to read a printed resource or picture book for facts (perhaps stopping at the end of each page to record or share aloud one fact that was learned).

- At the conclusion of research time, students should spend a few minutes reviewing the information they learned. Work with small groups to scribe a short paragraph (3 sentences) listing what they learned. For younger students, they could use audio recording to answer you when you ask “what did you learn about your topic?” For older students, ask the group to write a short paragraph. These could be compiled into a class recording or small booklet that can be distributed to everyone in the class.
Teaching Procedure

- Create a method to share research opportunities with your students. Students should be able to choose areas that most interest (or are relevant to) them. Students may work in pairs to research a topic, but we recommend no more than 2 students select any one topic, in order to have a larger representation of areas related to care researched. Researched topics will be tied to the eventual display they create for the MICRO DIY Museum of Care.

- Provide a list of research topics and available sources to your class. Have a class meeting where you share the topics that need deeper research, in order to create the MICRO DIY Museum of Care display. Selected topics should stem from the areas students expressed most interest in during the earlier phases of this unit.

- Once students have been sorted into who will study which area, direct them to relevant resources. This might be a great opportunity to book time in your school's library or have a research specialist join your class to help students find and review possible sources. We suggest you have earmarked or saved 2–3 resources per topic. For example, for the topic of Careers in Healthcare, you may want to have a short PBS video saved, a book on different types of medical careers, and have a parent or community volunteer familiar with medical professions available to visit and speak with your students.

- You may wish to designate 2-3 blocks of time to dive deep into the resources you have provided. Students should take notes to be able to answer basic questions.

- At the conclusion of research time, students should spend a few minutes reviewing the information they learned. They should scribe a short paragraph listing the information they learned (3 sentences). At the conclusion of all the research, you can collect these paragraphs for inclusion into a class booklet containing information related to healthcare. This can also be linked to your MICRO DIY Museum of Care displays, during the Fabrication Phase.
Teaching Procedure

- Working as a class, students should identify and select areas to research that are most interesting/relevant to them, while making sure a broad range of topics related to healthcare will be covered. Create a method to ideate topics for research with your students. A pair may research two closely related topics. Students may also choose to work alone. Researched topics will be tied to the eventual display they create for the MICRO DIY Museum of Care.

- Have a class meeting where students propose research topics. Compile the list of topics (you may add some of your own or those suggested, below) and available sources to your class.

- Once students have been sorted into who will study which area, direct them to relevant resources. This might be a great opportunity to book time in your school’s library or have a research specialist join your class to help students find and review possible sources. We suggest you have a few general resources already available in your classroom that can cover these topics. Students should be able to vet resources for their quality and comprehensiveness. Resources may include published books, videos, medical or industry professionals who may visit your class or who may be available to answer student questions, magazines or medical journals, and select websites.

- You may wish to designate 2-3 blocks of time to dive deep into the resources you have provided or that students have found. Students should take notes that will be used to drive information included in their MICRO DIY Museum of Care.

- At the conclusion of each research time, students should spend a few minutes reviewing the information they learned. They should scribe a short paragraph listing the information they learned (three sentences). At the conclusion of all the research, you can collect these paragraphs for inclusion into a class booklet containing information related to healthcare. This can also be linked to your MICRO DIY Museum of Care displays, during the Fabrication Phase.

- At the conclusion of each research class, students should compile an updated list of citations.
Teaching Procedure

- Working as a class, students should identify and select areas to research that are most interesting/relevant to them, while making sure a broad range of topics related to healthcare will be covered. Create a method to ideate topics for research with your students. Students should work independently for this part of the work, but may create small groups around like topics in order to share resources. Researched topics will be tied to the eventual display they create for the MICRO DIY Museum of Care.

- Have a class meeting where students propose research topics. Compile the list of topics (you may add some of your own or those suggested below) and available sources to your class.

- Once students have been sorted into who will study which area, direct them to relevant resources. This might be a great time to book time in your school’s library or have a research specialist join your class to help students find and review possible sources. We suggest you have a few general resources already available in your classroom that can cover these topics. Students should be able to vet resources for their quality and comprehensiveness. Resources may include published books, videos, medical or industry professionals who may visit your class or who may be available to answer student questions, magazines or medical journals, and select websites. For this age group, we suggest students utilize at least one first-person source/interview/expert in their research, if not design a small study to get input from several people within a designated field.

  - Students may be able to design a small study to conduct first-person research or gather data. Work with students to identify a location to go to gather data, generate a testable question, and create strong questions or observation markers to gather that data. As one example, students could visit a hospital waiting area (with approval) and chart arrivals of different kinds of medical emergencies across different bands of time during the day.

- You may wish to designate 2-3 blocks of time, in addition to homework time, to dive deep into the resources you have provided or that students have found. Students should take notes that will be used to drive information included in their MICRO DIY Museum of Care.

- At the conclusion of each research time, students should spend a few minutes reviewing the information they learned. They should scribe a short paragraph listing the information they learned (three sentences). At the conclusion of all the research, you can collect these paragraphs for inclusion into a class booklet containing information related to healthcare. This can also be linked to your MICRO DIY Museum of Care displays, during the Fabrication Phase.

- In addition, at the conclusion of each research class, students should compile an updated list of citations.
My Research Topic:

Questions I Want To Research For My Topic:

My Sources:
<table>
<thead>
<tr>
<th>Research Notes</th>
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<tr>
<td>Facts or Quotes</td>
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## Fabrication Phase

<table>
<thead>
<tr>
<th>Activity</th>
<th>Goal</th>
<th>Notes &amp; Resources</th>
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<tbody>
<tr>
<td>Group Norming</td>
<td>If students will work in pairs or groups, designate time to form group goals, organize collaboration, and smoothe over tensions as they may arise.</td>
<td>Students can also use the <a href="#">Group Work Guide</a> provided on pages 65-67 to delegate tasks to complete their MICRO DIY Museum of Care exhibit.</td>
</tr>
<tr>
<td>MICRO Museum Exhibit Design Challenge/Prompt</td>
<td>Presented to students to kick-off their authentic assessment and design thinking process.</td>
<td></td>
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</tbody>
</table>
| Design Sprint Playbook                      | Walk students through The MICRO DIY Museum of Care Design Sprint Playbook to brainstorm, collaborate around initial design sketches, migrate to final design sketches, and identify materials. | The [MICRO DIY Museum of Care Design Sprint Playbook](#) for Teachers is provided on pages 69-74.  
The [MICRO DIY Museum of Care Design Sprint Playbook](#) template for students follows the teacher guide on pages 75-87. |
Rationale

Before embarking on the Fabrication Phase of this unit, students will benefit greatly from taking some time to structure their collaboration. Explicit teaching of group forming and norming will help students, especially in younger grades, maximize their creative potential as a group. If clear group goals are set at the beginning of their work, they can return to those goals to focus each time they may experience conflicting ideas about how best to move forward. Provide students time to write their personal goals and reflections for group work, then come together to share those goals, recognizing everyone’s strengths. As steps are laid out to construct their MICRO DIY Museum of Care, students can use the task list to decide who will be responsible for what and determine their timeline for completion. Provide students regular checkpoints (the last few minutes of each class, perhaps) to reflect on their work as a group and set goals for moving forward during the following class.

Younger students can also participate in group norming. While they may not be able to fill out written materials independently, they are certainly capable of stating goals for group unity and describing how they want to feel and be treated as part of a group. If students are not yet able to read or fill in these tools on their own, a teacher can join their group to jot down ideas, take a group photo, and provide a simple written caption underneath, including the words the group decided on to guide their feelings of inclusion during the work.

Collaboration does not always come naturally. By modeling a process of guided collaboration and delegation of tasks, a teacher is also modeling a real-world environment just like the experience of a health worker. Collaboration is more important than ever to face major health challenges, provide quality care, effectively use medical technologies and facilities, and create an equitable care experience to those in need. Through these tools, students will learn collaboration is not just essential for their efforts in constructing their MICRO DIY Museum of Care, but in any real endeavor in a healthcare environment.
My Group Members (and a few special facts about each person):

Does your group have a name, logo, mascot, motto, or other signature feature?

How do I want to FEEL during group work?

What are some of the words **our group** used to describe how we want to FEEL during this project?

Going into this next phase of the unit, what are each of us EXCITED for or about?

During the Fabrication Phase, your group will DESIGN, REFINE, FABRICATE, ITERATE, TEST, AND LAUNCH. What skills can you contribute to these steps? Share those with your group.

When conflicts arise (and they always will!), what strategies will we use to come back together? Remember, your teacher can always provide support in the moment and has many ideas for how your group can strategize around tough moments.
**Group Work Journal**

Use the space below to write a few notes and reflections at the end of each class. How are things going? Is everyone following the goals for collaboration, and working toward their individual pieces? Do you need your teacher to be more involved in anything?

<table>
<thead>
<tr>
<th>Day</th>
<th>Reflections</th>
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Who is Doing What?

Use the below chart to write the tasks to complete this project, and who will be responsible for each task. There may be some tasks where more than one person (or everyone) may need to be involved.

<table>
<thead>
<tr>
<th>Task</th>
<th>Who is Completing This?</th>
<th>Deadline</th>
<th>Check When Complete</th>
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MICRO DIY Museum of Care

Project Description

For this capstone project, students will use gathered information from their study of frontline health workers, healthcare, medicine, access to care locally and globally, and lifelong health, as the foundation to construct a museum exhibit. The exhibit will be a MICRO DIY Museum of Care, housing all the information anyone would ever want to know about healthcare in a small, modular system, capable of travel and display in any place. Following their research to become experts in healthcare, students will use design principles, fabrication elements, and communication skills to convey information on a topic of their choosing.

The MICRO DIY Museum of Care could include fabrication elements such as laser cut designs, incorporation of electronics, scannable technology such as QR codes to link to web-based resources, movement elements, layered displays, models, and a constructed casing.

As each student creates a MICRO DIY exhibit on a specific topic within the large umbrella of “health” and “care,” the exhibits will come together to create an interactive, informative, and innovative display. This connected MICRO DIY Museum of Care will serve the purpose of sharing elements of care, barriers and access to care, history, innovative developments, and real-world tips on living healthier lives and being better caregivers and people.

A final showcase will provide students a chance to share their individual unit of the MICRO DIY Museum of Care, their design process, prototypes, research, vision, and facts learned during this unit. The groups will then combine their pieces together to create the modular MICRO DIY Museum of Care. Authentic visitors from the healthcare community should attend the showcase as well as teachers, other classes, and community stakeholders to gain insight into the students’ learning and process and to celebrate the culmination of their work.

Project Requirements

On the day of the Showcase, a completed project should include the following elements. Students will be assessed on completion, quality, and timeliness of:

- First and Final Concept Maps, and Reflections
- Notes from Health Worker Interview
- Lab Report from Experiment
- Research notes from Guided Research
- Vision Board/Gathered Information
- Design Sprint Playbook:
  - Evidence of Design Process
- Maker’s Journal/Prototyping Record
- 1-2 Prototypes (Paper, Cardboard, Chipboard)
- Design Files for laser cutter, 3D printer, etc., as needed
- Final Fabricated MICRO DIY Museum of Care
- Citations in proper format (for this age group)
- Showcase Display and Notes for sharing project process
- Effort during class activities, collaboration during group work, etc.
- Creative ideas and choosing and developing the most feasible ones
This Design Sprint Playbook is a tool to guide students’ design process as they work to create their MICRO DIY Museum of Care exhibit. This step-by-step tool will help students generate ideas; focus their design; practice sketching, drawing, and blueprinting; collaborate with group members, and document their iterations.

Students can work through the Playbook over the course of the unit or in a rapid (90 minutes or so) design sprint. This can be paired with any other design-based activity you may be able to incorporate into your class experience and lessons.

These materials should be featured during the student showcase as part of the evidence of learning and process, critical to sharing how their creative exhibit was developed.

Phase 1: Notice/Look Closely/Understand

Design Challenge Or Prompt
Create an explicit design challenge or prompt to share with students. A few examples are below for this specific MICRO DIY Museum of Care project. You may wish to provide an expanded list of prompts for students to select their focus or have your whole class work together on the same prompt.

Contribute to our class MICRO DIY Museum of Care by creating a 6” x 9” rectangular box that communicates all the information you gathered on your topic during your research.

Contribute to our class MICRO DIY Museum of Care by creating a 12” x 6” rectangular box exhibit showcasing the history, production, use, and effectiveness of a piece of PPE.

Contribute to our community MICRO DIY Museum of Care by creating a rectangular box (dimensions to be determined as a class, based on space available) documenting a day in the life of a health worker within our community. Utilization of media, images, audio, and/or other art forms are encouraged.

Create a modular component to clip into the class MICRO DIY Museum of Care that juxtaposes healthcare in our community to another community (rural vs. urban, United States vs. another country, etc.).

Based on your research, showcase steps people within your age group can take to lead healthier lives. Your showcase piece will join a MICRO DIY Museum of Care to be displayed in our school cafeteria.

Based on your research, showcase steps people within your age group can take to make a healthier impact on an area of their community. Your showcase pieces will join a MICRO DIY Museum of Care to be displayed in our local library.
Gathered Information
Students use this space to catalog and pull together gathered information, observations, research notes/links, challenges, quotes, images, graphs, data, and more that may be relevant to tackling the Design Prompt. Students should sift through all the activities and documentation from the curricular phase of this unit to begin to hone in on the most relevant information. This “vision board” of sorts could be digital or a collage from notes, or highlights/sticky notes that note the most important information toward this design challenge. Encourage students to think about what they saw, observed, witnessed, and/or read from primary sources, and note what patterns stood out to them.

Identity
As makers, our identity is the default lens through which we view the world we’ve focused in on; we feel drawn to, connected or disconnected, impacted, and moved from what we’ve learned as we looked closely at a topic. Spending time with students considering elements of their personal identity and their experiences, especially related to the topic of healthcare, will provide immeasurable value to them as they work to create an artifact others will truly wish to see, and feel connected to. Students should feel free to incorporate information about their identity into their reflections and showcase display. They should have a sense of how their identity may bias, impact, influence, and shape the artifact and exhibit they will create. It may make sense to check in with identity at several points throughout this unit, as students react to and draw conclusions from information they gather and receive. As students create their work, what lens(es) are they looking through? What voices are they including? What voices are not present, but probably should be? What assumptions and conclusions are they drawing from their information?

User Statement
Who is this work for? Who is the audience?
Students should spend time crafting a focused user statement to anchor the MICRO DIY Museum of Care exhibit they will create. User statements can take several forms, but should be a simple sentence that provides actionable design goals. The Stanford d.School uses the following format to generate Design Statements for Users:

_____________________________ (adjectives to describe and noun labeling user) NEEDS ____________________ (items, objects, services, feelings, processes) SO THAT ____________________ (problem that will be solved by this initiative).

Examples:

Aging residents in the city of Cleveland need grocery stores with produce within walking distance so they can prepare nutritious food without requiring access to a car.

Residents of a housing community in the South Bronx need Spanish Language signage in their apartments and common spaces so that they can understand emergency response options and locations for care.

New parents need a quick reference list of basic newborn health conditions so that they know what and how to manage at home and when to reach out to pediatricians or urgent care.

Teenagers need simple hygiene kits available at schools, community centers, and libraries so that they have frequent access to supplies whenever needed.
Teacher Guide

Phase 2: Design Sprinting

Students will spend time in the Design Sprint moving through the steps from rapid ideation to a focused design for their MICRO DIY Museum of Care exhibit.

Thumbnail Sketches
Six boxes have been provided in the template, but students can always think of more ideas! Feel free to use chart paper, sticky notes, Padlet, Google Jamboard, Flipgrid - whatever suits your teaching and class style. After reading over all their research notes, students should have 5-8 minutes to rapidly write out or draw ideas for their MICRO DIY Museum of Care exhibit. Each box should represent a new idea. They should be encouraged to push their creative brainstorming beyond their first idea and really reach for 6 (or more) possible ideas or features of the exhibit they will create.

The sketches should be rapid, include text or graphics, a quick drawing, a reminder or reference to something in notes, etc. This is the space for them to get their ideas out. This is a fantastic way for exuberant students to focus their ideas, and for someone who is more reticent to have documented notes to guide their next phase of the design process, and guide all styles of student to sharing ideas in a focused, equitable way.

Choose 3
Students should begin to hone in on their “favorite 3” or most effective ideas from the rapid thumbnail sketch activity.

If working in a partnership or group, students could collaborate to choose three ideas at this point, or just develop out their personal thoughts a bit more before sharing to their team. This phase should take about 10 minutes.
Details are encouraged. Students may even begin to think about size and materials. You may wish to introduce a few design parameters here, such as the overall size of the eventual MICRO DIY Museum of Care or where it will be located.

First Design Sketch
This is where students draw their first sketch of their idea, in as much detail as possible. If working in a group, the group should work together to create a sketch that represents ideas they have agreed on to feature within their MICRO DIY Museum of Care exhibit.

Second Design Sketch
Students may wish to use graph paper (some is included in the template) or a separate design sheet to now create the best drawing they can of their exhibit, and features. Orthographic (side, birds’ eye, top, etc) views may be considered. Movement features should be noted and included.

3D View(s)
As students may be able (especially older students), encourage development of 3D visualization and drawing by assigning a hand-drawn 3D view of what will be fabricated. It could be an element of the MICRO DIY Museum of Care Exhibit, or the whole modular piece.
Phase 3: Digitize

As needed and possible, transfer design work into software.

Students have several options for creating design files that will eventually lead to their fabricated components of the MICRO DIY Museum of Care. Depending on the age group, readiness, and access to technology, you may want to encourage different levels of computer-based design work. If your students have access to fabrication tools at school or another community center like a library, you will likely need to generate digital files to use machines.

At this point, you may want to lead a class to explicitly teach how to use relevant design software for this project. If all students are going to incorporate a blinking light feature, you will likely need to lead some sessions teaching the basics of the tools such as Circuit Playground Express, Micro:bit, Arduino, or others. If all students are going to use a laser cutter to fabricate their box, time may need to be spent on Inkscape, Adobe Illustrator, or CorelDRAW. If students will vinyl cut a feature for their museum, they may need to have a sense of how the vinyl cutter operates and consider colors available for this project.

Options that will work with students for this type of design work:

**Tinkercad:** Transform a 2D sketch into a 3D visualization. Students can use their design sketches as a guide to create a 3D model in Tinkercad. They can then export a screenshot of the designed views from Tinkercad to use as a guide for construction. Students should include printed versions of their Tinkercad blueprint alongside their fabricated exhibit on the showcase day. In this way, Tinkercad acts as a 3D visualizer and modeling software, allowing students to generate a blueprint for their fabrication, instead of using it solely as a means to create 3D printed objects. Here is a resource for converting 2D images into 3D objects in Tinkercad: [https://thelibguy.wordpress.com/2020/08/20/tinkercad-beyond-basics/](https://thelibguy.wordpress.com/2020/08/20/tinkercad-beyond-basics/)

**Design software** like Inkscape, Adobe Illustrator, or CorelDRAW. After files have been created, a screenshot of the digital file should be printed for inclusion in the showcase. Students may also link the design file as part of their digital portfolio for a project.

**Hand draw, then photograph/scan.** Students draw a crisp, bold drawing or trace their own hand drawn images and handwriting with a black marker (like a Sharpie). Photograph students’ drawings and submit for digitization using design software.

**Step-By-Step Instructions for Digitizing Hand Drawn Images and Handwriting:**

1. Use plain, smooth, white paper.
2. Use a NEW black marker (such as a Crayola or Sharpie) - the goal is to just have a design in BLACK and WHITE; no gray, pencil marks, etc.
3. Leave about 1” margin from the edge of the page and the design work. The black lines should not touch the edge of the page.
4. Draw or trace the final draft of the design onto the paper.
5. Go over the black lines a few times to make sure they are thick enough to be scanned: ⅛” thickness is ideal. This is about 2 widths of a brand new Sharpie marker tip.
6. Hold the design up to a light or window.
7. Take a quality photo of the work. Limit or eliminate any shadows cast onto the paper. Crop or snip the photo to eliminate any excess background.
8. Share, email, submit, upload etc. this photo to your makerspace resource computers.
9. Open the photo with design software such as CorelDraw. Use this software to convert the drawing to a vector graphic (often, this is through the Bitmap menu). Apps like JotNot may also provide this bitmap tracing all in one step.
10. Once the work has been digitized (leaving behind all black markings, set onto a clear background), incorporate the design into or onto the template for your Museum of Care element.
Phase 4: Prototype

Students will need varying amounts of time to produce their MICRO DIY Museum of Care Exhibit. Every student should start with the opportunity to prototype with inexpensive, readily-available materials (paper, chipboard, cardboard).

Use of hand tools, glue, and tape is favored here. There are a multitude of easy fabrication techniques and guides online. Additional references for prototyping techniques are available in the Additional Resources section on page 93.

Materials should be considered in this phase. As students consider their final designs, what materials will they need to use? Which materials will best showcase their learning and the message they are trying to convey? Should everyone in the class use a similar kind of material, color scheme, or style in order to create cohesiveness for the completed Museum? How will the modular pieces be constructed (i.e. boxes) and what will they be made of?

Phase 5: Iterate and Gather Feedback

A culture of helpful, critical, and relevant feedback should be cultivated within your classroom. An initial question all students may ask themselves is, “does my idea work?” Simply, does the box clip together? Do all the pieces fit? Is my craftsmanship neat and crisp, or did the design come together in a messy way? Did I use materials in a responsible way, or did I create a lot of extra waste in this work? Does it move or make noise, is it supposed to? As students refine their design, more nuanced feedback should be collected: What does the user gain from interacting with my exhibit? What was noticed? What was unclear? What voices are present in my exhibit? Which are left out? What questions remain for further study? What was my intent and was it actually conveyed?

It is critical, as the teacher, to guide feedback to be positive, specific, and focused on moving the project forward. This is not necessarily a place for ratings, scores, or grades. Students need feedback delivered in a positive, supportive, and clear manner, and in actionable steps they can iterate to improve their design within the timeframe available.

Maker’s Journal

We recommend using an “Maker’s Journal” template for students to document their iterations, record feedback, and plan for their next fabrication day. This is a key element to display as part of the eventual showcase. This is also a perfect, concrete component for students to use as they reflect on the process of creating their MICRO DIY Museum of Care Exhibit. You may wish to utilize the Maker’s Journal as part of your grading when considering student effort, completeness, management of their tasks, and contributions to the group.
PHASE 6: Showcase and Launch
The celebration is upon you and your students! After all of this learning, design, creative energy, physical work in fabrication, trial and error - you are ready to present a comprehensive, fabricated element out into the world for real user interaction and feedback. For this MICRO DIY Museum of Care, students will have created a modular piece that connects together to showcase many facets of healthcare. Their exhibit may remain in your school, library, or hub lobby, your classroom, or may travel around and go everywhere in your community. You may have the opportunity to share the elements to an unlimited audience, digitally. It is time to share your work and celebrate.

A key component of the showcase is going to be inviting and hosting an authentic audience. All community members who assisted in this project should be invited. Key stakeholders from your community (such as administrators, curriculum coordinators, school nurse, other medical professionals) should be invited. Students may also wish to launch their work to peers and their families.

Preparation for the day should include each student having a designated space or platform (this can be digital) to share their process, iterations, key information, and talk about their work. Their pre- and post-concept maps should be part of the display. Consider a time of day that is helpful for most of the guests of your community to join (i.e. right as the school day is starting). Perhaps, as part of the showcase or at the conclusion, each student joins their fabricated component to the central MICRO DIY Museum of Care module. Allow time to cheer for student work and create an overall positive atmosphere of celebration in the deep learning and vast growth that was experienced during their development of your MICRO DIY Museum of Care.

Plan For Showcase Day
Students should have a clear list of items to include and display in this showcase; refer them back to the Design Challenge Prompt as a sort of checklist. Students may also share physical items (like the pages of their Design Playbook) on the table. Perhaps the opportunity to make a slideshow, website, flyer, or quick video to share their process, can be worked into the showcase display. Spend time (at minimum, the day before the showcase) setting up the space and also resetting your fabrication area (as a class community) so guests enter into a clean and open space.

Design Work Displayed Should Always Include
- Design Sketches
- Paper, Cardboard Prototype(s)
- Final Piece
- Written statement describing the product/exhibit
- Vision Board - collected inspirational images from the design process
- Any sketches, math, test results to go along with the exhibit
- Speaker notes: brief notes students can practice to share and say about their idea
- Further elements specific to this project (refer to the Design Challenge Prompt)
Phase 1: Notice/Look Closely/Understand

Design Challenge of Prompt:

Gathered Information
This “vision board” of sorts could be digital or a collage from notes, or highlights/sticky notes that note the most important information toward this design challenge. Images, quotes, snips from news articles, data, facts, and stories can all be included here. What have you seen, observed, witnessed, and/or read from primary sources? What patterns stand out to you?

You may create this summary of information below or on a separate sheet of paper, slide deck, or poster if you would like more space to work.
Phase 1: Notice/Look Closely/Understand

Identity
Your identity will influence the way you see the world and the way you create things for others. Use the space below to draw, write, and reflect on who you are as a person, maker, and creator. What experiences do you bring to this work? What lens(es) do you look through? Your teacher may also provide some prompts, ideas, templates to fill in, or other conversation questions to use as you begin this work.
Phase 1: Notice/Look Closely/Understand

User Statement

Focus your design by generating a clear user statement. This will serve as the guide for what you are about to create. When you finish your eventual MICRO Museum exhibit, your pieces should clearly reflect the needs of your users, as identified in this statement. Who is this design work for? Who is your Audience?

Format:
_____________________ (adjectives to describe, and noun labeling user) NEEDS ____________________ (items, objects, services, feelings, processes) SO THAT ____________________ (problem that will be solved by this initiative).

Example: Aging residents in the city of Cleveland need grocery stores with fresh produce within walking distance of their home so that they can prepare nutritious meals without requiring access to a car.

_________________________ NEED(S)

_________________________ SO THAT

_________________________.
Phase 2: Design Sprinting

Thumbnail Sketches
Rapidly create. Include text, graphics, a quick drawing, reminder, etc. Just get your ideas out. Feel free to make more than 6!

Choose 3
Do a rapid share with a partner or small group of your favorite two or three ideas from above. Provide a bit more detail for those ideas, below:
Phase 2: Design Sprinting

First Design Sketch
Revise your design to one sketch that includes the features you feel most passionate about including in your design. If working in a group, include features from the group in this initial sketch.
Phase 2: Design Sprinting

Second Design Sketch
Use graph paper (provided, or a separate piece) to create a design sketch that includes dimensions for sides, pieces, and parts of your exhibit.
Phase 2: Design Sprinting

3D Views
Sketch different views of your design for a three-dimensional view of what will be fabricated.
Phase 3: Digitize

Transfer Your Design Work Into Software

Option: Tinkercad (take 2D visualization to create a 3D view). Export a screenshot of your view and insert below.

Option: Use Design software like Inkscape, Adobe Illustrator, or CorelDRAW. Paste a screenshot of your design below.

Option: Hand-draw, then photograph your drawing. **Use the space below** for a crisp, bold drawing with a black marker (like a Sharpie). Photograph your work and submit for digitization using one of the software options listed above.

**Note:** Keep your drawing within the frame below, and do not touch any of the black edges.
Phase 4: Prototype

Plan For Materials:
Phase 5: Iterate and Gather Feedback

**Your Maker’s Journal**
Daily log of work done on your prototype, feedback you gathered, and changes you hope to implement for next time.

Next to each date, list at least **two** iterations made or attempted during class to improve or enhance your design. Gather feedback from a peer, have another group test your prototype, or meet with your teacher. List at least two steps you will take next class to continue to refine. You can also use these spaces to list new materials you’d like to work with or gather before next class.

<table>
<thead>
<tr>
<th>Date</th>
<th>Iterations and Adjustments Made to Prototype</th>
<th>Feedback Received</th>
<th>Plans for Next Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>
Phase 6: Showcase and Launch

Plan For Showcase Day
Make a list of items to include & display during your showcase. Refer to the Design Challenge Prompt. You may be sharing physical items (like the pages of this Playbook) out on a table. You might also have the opportunity to make a slideshow or website to share your process. Take photos of your steps along the way and share all of your information.

Design Work Displayed Should Include:
- Design Sketches
- Paper, Cardboard Prototype(s)
- Final Piece
- Written statement describing your exhibit
- Vision Board - collected inspirational images from your design process
- Any sketches, data, results to go along with your exhibit
- Your speaker notes - brief notes you can practice to share and say about your idea
- Further elements specific to this project (refer to the Design Challenge Prompt)
MICRO DIY Museum of Care Reflections

Written Description of My Exhibit:

Reflections on What I Learned:
Showcase Notes

Facts, Details, Notes I Want To Share With Visitors To My Showcase:
## Launch, Advocate, Share

<table>
<thead>
<tr>
<th>Activity</th>
<th>Goal</th>
<th>Notes &amp; Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Showcase Notes and Reflections</td>
<td><em>Students can provide a written statement of work and overall reflections to go along with their work. They should also prepare basic notes to share with visitors to their MICRO DIY Museum of Care display.</em></td>
<td>Space is provided in the MICRO DIY Museum of Care Design Sprint Playbook for students’ reflections and showcase notes on pages 86 and 87.</td>
</tr>
<tr>
<td>Blueprint For Advocacy</td>
<td><em>Guide students to enact real community change by writing a personal or class Goal Statement and Blueprint for Advocacy.</em></td>
<td>Templates and a resource for the Blueprint for Advocacy are located on pages 89 and 90.</td>
</tr>
<tr>
<td>Share Your Work with MICRO</td>
<td><em>Participate in an international community of learners and makers by uploading photos and videos of your work to MICRO’s website. You can also view what other classes and students have created at <a href="https://micro.ooo/diy">https://micro.ooo/diy</a></em></td>
<td>Share your students’ work with MICRO via the form located here: <a href="https://micro.ooo/share-your-museum">https://micro.ooo/share-your-museum</a></td>
</tr>
</tbody>
</table>
Goals Statement:

Given all you have learned here, what do you wish to DO to make a new impact in your community? What is your grand vision for how you will advocate for yourself or others, to live a healthier life and provide higher quality care for everyone?

I will / My goal is...

After writing a clear Goal Statement, spend some time planning how you will achieve this goal. You may have a personal goal for your own health or have noticed a need within your community or close relationships as you completed the research and learning for your MICRO DIY Museum of Care. In order to make real change and impact toward your goal, you should create a Blueprint for your Advocacy. A template to outline some of the key pieces of your plan is on the next page.
<table>
<thead>
<tr>
<th><strong>Key Partners</strong></th>
<th><strong>Activities</strong></th>
<th><strong>Value Propositions</strong></th>
<th><strong>Relationships</strong></th>
<th><strong>Members</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Who are the key partners and partnerships to help achieve your goal?</td>
<td>What are the key activities you will do in order to provide the health needs you are going to meet?</td>
<td>What problems will your involvement and support solve? What needs does it satisfy? What is the service being offered? What features meet the health needs of people in your community?</td>
<td>How will you get keep, and grow the people who are connected to this event, or served by your advocacy?</td>
<td>Who are the people you will support with this goal? What are their characteristics?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Resources</strong></th>
<th><strong>Pathways</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>What resources are required for you to complete your Value Propositions?</td>
<td>Through what channel would someone link up for your support? How do you reach the members?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Losses &amp; Costs</strong></th>
<th><strong>Gains &amp; Revenue</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>What are the costs to keep accessing and working toward your health care goals?</td>
<td>What is gained through your advocacy and work?</td>
</tr>
</tbody>
</table>
The Common Core State Standards for Literacy and for Mathematics are grade-level standards in the United States, provided to guide the acquisition of content knowledge as students progress from Kindergarten (age 5) through High School (age 18). While not all schools follow the progression outlined in a set of National or State Standards, providing markers here may inform teachers and districts of content addressed, at minimum, within this unit. The MICRO Museum of Care curriculum does not explicitly teach granular standards, but many are accessed and addressed through this learning module. We encourage teachers who utilize this curriculum to feel confident building on the materials provided, in order to bring in even more explicit content connections for students. Among its many benefits, this curriculum provides a strong avenue for pursuing the markers of College and Career Readiness, as stated in the introductions to the National documents for the Common Core State Standards, through its consistent focus on student inquiry, real-world acquisition of knowledge, and application of research to a fabricated showcase piece (the MICRO DIY Museum of Care).

Common Core State Standards for English Language Arts, addressed in the MICRO Museum of Care curriculum:

**Grades K-2**
- Reading for Informational Text (1-4, 10)
- Foundational Skills (4)
- Writing Standards (2, 5-8)
- Speaking & Listening (1-6)
- Language (1-4, 6)

**Grades 3-5**
- Reading for Informational Text (1-4, 7, 9, 10)
- Foundational Skills (4)
- Writing Standards (2, 4-10)
- Speaking & Listening (1-6)
- Language (2, 4)

**Grades 6-8**
- Reading for Informational Text (1-3, 7)
- Writing Standards (1, 2, 4-10)
- Speaking & Listening (1, 4-6)
- Language (6)
- Reading Standards for Literacy in Science (1-3)
- Writing Standards for Literacy in science (2, 4-10)

**Grades 9-12**
- Reading for Informational Text (1, 7)
- Writing Standards (1, 4-8, 10)
- Speaking & Listening (1, 2, 4-6)
- Language (1, 2, 6)
- Reading Standards for Literacy in Science (1-3)
- Writing Standards for Literacy in science (2, 4-10)
Connection to Content Standards

The Common Core State Standards for Literacy and for Mathematics are grade-level standards in the United States, provided to guide the acquisition of content knowledge as students progress from Kindergarten (age 5) through High School (age 18). While not all schools follow the progression outlined in a set of National or State Standards, providing markers here may inform teachers and districts of content addressed, at minimum, within this unit. The MICRO Museum of Care curriculum does not explicitly teach granular standards, but many are accessed and addressed through this learning module. We encourage teachers who utilize this curriculum to feel confident building on the materials provided, in order to bring in even more explicit content connections for students. Among its many benefits, this curriculum provides a strong avenue for pursuing the markers of College and Career Readiness, as stated in the introductions to the National documents for the Common Core State Standards, through its consistent focus on student inquiry, real-world acquisition of knowledge, and application of research to a fabricated showcase piece (the MICRO DIY Museum of Care).

Common Core State Standards for Mathematics, Addressed in the MICRO Museum of Care curriculum:

**Grades K-2**
- 1.MD 4
- 2.MD 10

**Grades 3-5**
- 3.MD 3
- 4.MD 4
- 5.MD 2
- 5.G 2

**Grades 6-8**
- 6.EE 9
- 6.G 4
- 7.G 1 & 2

**Grades 9-12**
- G-CO 12
- G-MG 3
Additional Resources

What's In Your Water? - Brains On Podcast and Article
https://www.brainson.org/episode/2018/05/01/whats-in-your-water

Growing vegetables and expanding horizons - Robert Wood Johnson Foundation video for grades 3-5
https://www.learningforjustice.org/classroom-resources/texts/growing-vegetables-and-expanding-horizons

Food Desert Statistics

Managing Day-to-Day Care of Diabetes

Day-In-The-Life of A Person Living With Diabetes
https://www.healthline.com/health/type-1-diabetes/living-with-type-1/day-to-day-guide-for-managing-type-1-diabetes

https://drive.google.com/file/d/1rxnT0cNlrpiYVxS6xuS5GZJuObqWeKx-g/view

Community Care During COVID-19: A Message To and From AAPIs

Cultural Competency and COVID-19

Communicating, Motivating and Teaching the Significance of Public Health - Current Topics in Public Health
https://www.intechopen.com/chapters/44664

Environmental Public Health - PBS LearningMedia Collection
https://ideastream.pbslearningmedia.org/collection/enh/

Unnatural Causes: Is Inequality Making us Sick? Documentary Series
https://unnaturalcauses.org/

Environmental Triggers of Asthma
https://www.atsdr.cdc.gov/csem/asthma/environmental_triggers_of_asthma.html

#BacktheFrontline ACTION Hub - Johnson & Johnson Center for Health Worker Innovation's place to learn how to support frontline health workers
https://chwi.jnj.com/actionhub

Current Event Articles & Activities for Science Classrooms
www.scienceinschool.org

Source for Science Materials, Further Laboratory Experiments and Kits
www.Carolina.com

Brooklyn Library’s Children's Resources Booklist for Healthcare
https://www.bklynlibrary.org/search?booklist=552108

Basic Prototyping Techniques with Cardboard
https://sites.google.com/view/fabplayhome/maker-challenges/hawken-challenges/all-about-cardboard/1-1-cardboard-attachments?authuser=0

Getting Started with Design Thinking (from the Stanford d.School)
https://dschool.stanford.edu/resources/getting-started-with-design-thinking
Extension Activities

**Scratch**
Extend your students’ work with Scratch: Visit [https://scratch.mit.edu/educators](https://scratch.mit.edu/educators)

Your students can use Scratch to extend their learning and research related to the Museum of Care by coding their own interactive stories, animations, and games. Visit the Scratch website for resources on how to get started with Scratch in your classroom.

**Museum of Care Virtual Museum**
Visit [https://museumofcare.org](https://museumofcare.org) to view the content of MICRO's Museum of Care. The Virtual Museum presents the exhibits in animated slide format, allowing you to project the content in your classroom or school. You can also create your own Virtual Museum by creating and customizing slides that are relevant to you and your community. When you’re done creating slides, you’ll be able to view your museum and share it with your classroom, school, and/or community.

**MICRO DIY at Home**
Encourage your students and their families to continue curating, designing, and fabricating at home! Visit [https://micro.ooo/diy](https://micro.ooo/diy) to download MICRO DIY, our free resource that is designed to walk you through MICRO’s museum design process as you research, curate, and design your very own mini museum at home. The document is also located on the following pages for easy access.
MAKE YOUR OWN MUSEUM OF CARE

MICRODIY
Welcome to MICRO DIY! We're thrilled you've decided to make your own museum. As we walk you through each step of the museum making process, you'll need to take on different roles!

Here are some things to know before you begin...

WHAT WE DO

This is a MICRO Museum.

At MICRO, we're a small team working together to build six-foot-tall museums. We replicate the museums and install them where people spend their daily lives, like libraries and hospitals.

LIGHTS, CAMERA, ACTION!

Documenting your progress is instrumental to any creative process. We encourage you to take photos, videos, and notes along the way. This will help later with making decisions and learning from mistakes.

Plus you will have some great photos to share with your visitors and the MICRO DIY community!

NEED MORE HELP?

* Feeling lost? Need inspiration? Head over to www.MICRO.ooo/diy for more help.*
NEED INSPIRATION?
Existing Museums

New and exciting museums are popping up all the time! Here are some amazing museums made by builders from all around the world!

Let us introduce you to...

THE MUSEUM OF FLAT-NOSED DOGS!

THE MOONSEUM!

THE MUSEUM OF DRUMS!
SELECT A TOPIC
The Visionary

Is there something very important to you that you want people to care about? Or have you always wanted to learn more about something? Maybe there’s a problem you want to solve, but don’t know where to begin? How can you turn these ideas into a museum?

Brainstorm your ideas below, list at least five ideas, then choose your museum topic!

I COULD MAKE A MUSEUM ABOUT...

I WILL BE MAKING THE MUSEUM OF...
LEARN ABOUT THE TOPIC
The Researcher

There are infinite ways to learn more about your topic! A great place to begin is with a book or educational website, or by talking to an expert. Make sure to keep track of your sources, the places where you are collecting the information from.

How to know if your sources are trustworthy...

PAY ATTENTION TO WARNING SIGNS

Honest phrases
“I don’t know”
“I might be wrong”
“this new evidence changed our minds”

Unrealistic claims
“we are right, they are wrong”
“always”
“never”

When was it published?
“The earth is flat!”
- Someone in Europe (800 BC)
“The earth is a round shape that changes constantly!”
- NASA (2017)

STICK TO THE FACTS

Belief
Soccer is better than any other sport in the world!

Fact
A wide-scale survey completed by FIFA, Soccer’s World Governing Body, indicates that over 240 million people, in over 200 countries regularly play soccer - more than any other sport in the world!

IDENTIFY THE PURPOSE

Why was the information written?
Does the writer or speaker have something to gain by convincing you of something?
LEARN ABOUT THE TOPIC

The Researcher

No matter how much you may already know about your topic, there will always be new information you have not yet encountered.

Use this page and the next one to collect the information you find.

HELPFUL HINTS

**Power facts** are bits of information that make people want to learn more about your topic!

*Circle any power facts you find.*

**Fact checking** is one method to test that something is true. If you find multiple trustworthy sources have the same information, it is more likely that the information is true!

*Put a check next to a fact each time you find a source that supports it.*
CONSTRUCT YOUR STORY
The Storyteller

One of the most important steps of making a museum is storytelling. You will now use the research you collected to create a story that keeps your audience interested.

Here's an example of how we did it...

THE MUSEUM OF OCTOPUSES

Main Idea | Explanation
--- | ---
Introduction | Why should people care? / How does it relate to their daily lives?
Octopuses are amazing! | Humans often think of octopuses as aliens, as different from us as we can imagine, but believe it or not, we're more like octopuses than you might think. In fact, we are related.

Power Facts | What parts of your research make your story exciting?
--- | ---
1. Octopuses have brains in their arms! | While human brains are in our skulls, an octopus’ brain is all over its body! Some of it is behind their eyes, but most is spread across each of their eight arms. That means each arm can think for itself!
2. Octopus skin has a higher resolution than a phone screen! | The same way your electronic screens are covered in tiny color changing pixels, octopus skin is covered in tiny chromatophores: little colored sacs of pigment (sort of like water balloons!). An octopus can control each balloon to change their skin color to blend in with their surroundings.

Conclusion | What is the message or future of this story?
--- | ---
You can help octopuses! | Human actions are putting octopuses at risk. Today, animals are dying up to 1,000 times the normal rate and mollusks are dying faster than any other group. Take 10 minutes to learn about octopuses and find ways that you can help make the world a better place.

HOLD THE APPLAUSE

Now that you know so much about your topic, make sure you explain new information to your visitors so they can easily understand what you are saying!
Good storytelling is achieved through thoughtful writing. Take time to write a story that is exciting and educational by putting yourself in the shoes of your museum visitors.

Use this page and the next one to write the outline of your story.

**INTRODUCTION - TELL US WHY YOUR TOPIC IS IMPORTANT**

**POWER FACTS - BLOW US AWAY WITH 2-3 INCREDIBLE POWER FACTS**
CONTINUE ENGAGING YOUR VISITORS WITH AMAZING POWER FACTS!

CONCLUSION - WHAT DO YOU WANT US TO KNOW WHEN WE LEAVE?
Great design is one of the most important ways to explain different ideas and help people understand your message.

Here are some tips that the MICRO design team uses to help them tell a visual story...

**EXCITE YOUR AUDIENCE**

*What is the most interesting way to explain my message?*

One way to do this is to think about how to engage different *senses* with your museum. Does your museum glow? Should it make sound? What does it smell like?

**DRAWING ATTENTION**

*How can I make the important stuff stand out?*

You can use size, or *scale*, as a way to focus a visitor’s attention.

Another way to do this is by using different colors to create *contrast* making important elements pop and drawing visitors in!

**KEEP IT SIMPLE**

*What is the simplest way to show my story?*

Sometimes the best way to share a message is through *simple* visuals.
How can you use visuals to successfully share your ideas, information, and story? Try out a few ideas before you decide the best way to represent your story.

Sketch your ideas below.
HINT: ASK OTHERS FOR FEEDBACK TO TEST YOUR IDEAS OUT!
BRING YOUR IDEAS TO LIFE
The Engineer

There is no wrong way to build a DIY museum. Try something new. Make mistakes. Think outside the box. Get your hands dirty. Have fun!

Tips for constructing your museum...

USE WHAT YOU HAVE

Look around your home for supplies. You can use anything you already have lying around to make your museum exciting! A good place to start is with a strong base that can hold all your design elements.

This could be:
- a cardboard box
- an old shoe
- under the bed
- in Minecraft
- or anything else!

LEVEL UP

Every time you try something again you are not starting from scratch, you are building your knowledge!

Give yourself a point every time you try again and see how much knowledge you have collected at the end!

🌟🌟🌟🌟
SHARE YOUR MUSEUM
The Photographer

You did it! Thank you for participating in the MICRO DIY Museum challenge. Now it's time to share your museum with the world!

Ways to share your work...

RECORD YOUR ACHIEVEMENT

Introduce yourself!
Keep the background squeaky clean
Capture some close-ups!
Take a glamour shot!
Make a video tour!

JOIN THE MICRO COMMUNITY

Add to the MICRO collection
We love to see your work! Share your museum with us and it will be featured in the MICRO DIY online gallery.

Post on social media
Tag @themicromuseums
Use the hashtag #MICRODIY

Go to www.MICRO.ooo/diy
CONGRATULATIONS!
You are a museum maker.

WHAT WILL YOU DO NEXT?