
Possible Futures



Facilitator Guide: How to Prepare for This Lesson



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STEMPLORATION

Health Sciences – Lesson 8

Biomechanics

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About This Facilitator Guide

This facilitator guide provides the details to help you enable students to complete the lesson on **Biomechanics**.

Instructions for using the SCORM files in Blackboard and Canvas can be found at this [link](#). Instructions for using Flipgrid can be found in this guide.

While this lesson is designed for online learning, you will find information in this guide about In-Person Learning Adaptations to help you facilitate your students who may be completing this lesson in the classroom instead of online. Call-outs will provide guidance on how to adapt various activities for in-person learning.

Before You Get Started

Before you get started with this lesson, please be sure to:

- Read through the facilitator guide.
- Download SCORM. (You will only need to add SCORM once. After that, you will be set to use SCORM for any remaining lessons.)
- Review the Rise lesson.
- Prepare any resources needed for the lesson.
- Set up Flipgrid.

Flipgrid Instructions – Setting up Flipgrid

Both educators and students will need to set up Flipgrid for use.

Educator Step-by-Step Guide

Set up your free educator account at [Flipgrid.com](https://flipgrid.com) and create a **Topic** for the class. Please copy and paste the heading from the facilitator guide that pairs with the Flipgrid so that the topic aligns with student expectations. A Topic is a discussion prompt for students. Students respond to the Topic with a short video using our fun, social-media-style camera. Students can watch and comment on videos from peers, with the educator in complete control.

1. Create a Topic

Topics start the conversation in Flipgrid. Just write a prompt and include anything for students to review before responding, such as videos and links.

When you create a new Topic or Group, a Join Code is automatically created for it. To share the Join Code to your Topic or Group, log in to your educator account and select the blue Share button to access your Join Link and Join Code, as well as other ways to share your discussion.



The Join Code also creates a link. Copy/paste the link in emails, texts, social media, Google Classroom, or other websites to invite your students to join. You can download/print QR codes for students to scan on the Flipgrid app. The Flipgrid app and flipgrid.com offer a QR scanner on the homepage.

The student receives the Join Code in the form of a link, a code, a QR code, or a guest username and password. The student can then enter the student username or password.

2. Set Access and Share

After creating the Topic, choose how students will access it. If they have email addresses, add the domain (everything after the @ symbol in their email address). If students do not have email addresses, create usernames for each student. Invite families and guests by adding a guest password.

Share the Topic by using one of the Share buttons or copy and paste the unique Join Code wherever you connect with your community.

3. [Students Respond](#)

After entering the Join Code, students gain access by logging in via email or username.

Students can share their voices by recording a short video with Flipgrid's fun, simple, and powerful camera. It is packed with everything they need to tell their story, including text, emoji, inking, boards, screen recording, and the ability to upload clips.

References:

[Educator Step-by-Step Guide](#)

[Educators: A Teacher's Guide to Flipgrid \[YouTube\]](#)

[Educator Guide to Flipgrid](#)

Student Step-by-Step Guide

A student can create a video to submit to the educator in a few easy steps!

1. Locate the Join Information From Your Educator

Your educator would have given you one of these ways to join the discussion:

- A Join Code (e.g., FGrid3567, a591dc5d) or a QR code
 - A Join Link (e.g., <https://flipgrid.com/FGrid3567>, <https://flipgrid.com/a591dc5d>)
 - If you don't have a school-provided email, then a unique username or guest password
- Flipgrid works on most web browsers and mobile devices. Microsoft Edge or Google Chrome is recommended for the best web experience. For easy access to Flipgrid, download the Flipgrid extension. On mobile devices, download the free Flipgrid app for iOS and Android devices.

2. Join the Discussion

Get the educator's discussion by using the link or code provided by your educator in Step 1.

- If you have a Join Link, select that link.
- If you have a Join Code,
 - Go to your web browser and enter <https://flipgrid.com>. You'll see an area to enter a Join Code. Type the Join Code and press Enter on your keyboard.
 - On the Flipgrid mobile app, enter the code.
- If you have a QR code, scan the QR code with your device camera or the Flipgrid mobile app.

You'll see a prompt to log in. Enter the student username or password. If your student username or password is not working, be sure to double-check the case and space sensitivity.

Tip: If you're prompted to log in, choose Google if your school uses Google Classroom, Docs, and Drive. Choose Microsoft if your school uses Word, OneDrive, or Microsoft Teams.

3. Record and Submit

Once you've joined, you'll see your educator's Topic or discussion prompt. Follow the instructions and when you're ready to record, select the red Record a Response button or the Flipgrid logo for the camera to start.

When you're in the Flipgrid camera, you can record a video in these three easy steps:

- Tap to record: Tap the record button on the bottom to start. Add fun stickers, filters, text, and more. Tap the arrow on the bottom-right to advance.



Review your video: Trim, split, rearrange, or add more. Tap the arrow on the bottom-right to advance.



Submit your video: Edit your cover image and name, add a title, or attach a link. Then submit!

The Flipgrid camera offers a lot of fun and creative ways for you to share your ideas and voice! [Check out all the camera features here](#). Learn [how to import a custom video](#) or [how to include a screen recording](#).

References:

[Getting Started: Students](#)

[Getting Started with Flipgrid - Students \[YouTube\]](#)

Using Editable PDFs

Most lessons include the use of an editable PDF for students to capture responses to questions and other activities.

Guiding language is included in the lesson to help students access and use the editable PDFs where they appear.

For students who will be using Chromebooks, they need to use the Print to PDF function to save their editable PDFs to their device. Here's how to do this:

1. Open the editable PDF and select CTRL + P.
2. Open the file destination where the file will be saved.
3. Select Save as PDF.
4. Select Print. Your document is now "printed" as a PDF file which will save your work.

PDFs cannot be submitted via the Rise activities. If you plan to collect these documents for career planning portfolios or grading, you will need to coordinate that with your students.

To view a video on using Flipgrid and editable PDFs in the lessons, select [this link](#).

Ask an Expert Interviews (Optional)

You may choose to include an "Ask an Expert" interview in this lesson.

An interview provides an opportunity for students to talk with and ask questions of experts who work in various professions to learn about their career journeys, current job roles and responsibilities, and glean valuable insights.

Additionally, an interview also provides the following benefits to the students:

- Real-world information about careers
- An awareness of the workplace habits and interpersonal skills needed to succeed in any job
- Further encouragement to go to college or post-secondary training, apprenticeship, etc., and get ready for the career of their choice
- An understanding of the fact that each person’s career journey is unique and that most people encounter obstacles and challenges that they must overcome to reach their goals

When selecting experts to participate in the small group interviews, look for “down to earth” people who you think are good speakers and who would be comfortable talking to young students, ages 12 to 14. An ideal ratio is one expert for every five students.

There are two options that can be used if you choose to use an Ask an Expert interview:

- Schedule a Zoom/Skype call with an expert in the field.
- Find an existing YouTube video of an expert to share with the students.

In-Person Learning Adaptation: For in-person learning, project/share the Zoom/Skype call with an expert with your class. YouTube videos may also be projected/shared in-person. You can consider facilitating further discussions on the key takeaways from the session and/or a specific topic discussed in the session.

Review the following resource for additional information:

[Career and College Exploration Experiences: Planning for Success](#)

How to Implement This Unit

In this unit, students will follow the case of a young skateboarder from accident to recovery. Students will be introduced to the skateboarder in Lesson 1 and then meet up with him in other lessons throughout the unit as he receives care from different kinds of allied health professionals. For students to get the most value from this unit, please plan on implementing all lessons in this unit in sequential order.

When it may not be possible to implement the entire unit, we recommend implementing the following lessons to support optimum student learning based on the time available:

- Mini Unit: Lessons 1 through 5 in sequential order
- Standalone Lessons: Lessons 1 through 11 can each be used as standalone lessons.
- Pairs: Lessons 8 and 9; Lessons 3 and 11; Lessons 7 and 11; Lessons 1 and 8
- Trios: Lessons 4 through 6; Lessons 2 through 4

Alignment of Learning Outcomes

The program learning outcomes for Possible Futures 2.0 are:

- A. Gain awareness of and exposure to a wide array of careers.
- B. Increase self-awareness and begin to form their potential occupational identity.
- C. Develop employability skills.
- D. Develop foundational technical skills as appropriate.
- E. Be positioned to make more informed educational choices.
- F. Transition to high school with an actionable plan for next steps.

The curriculum learning outcomes for the Health Sciences unit are:

1. Students learn the basics of first aide and health sciences.
2. Students explore career options within the health sciences industry.
3. Students identify their strengths and interests in the field of health sciences.
4. Students connect their strengths and interests in the field of health sciences to potential careers.
5. Students explore the local labor-market data and education opportunities for careers in the field of health sciences.

The Arizona Career Literacy Standards for grades 5 through 8 can be found at [this link](#).

This lesson's learning outcomes align with the program learning outcomes (PLOs), curriculum learning outcomes (CLOs), and Arizona Career Literacy Standards (CLSs) as follows:

CLOs	Lesson Learning Outcomes	PLOs	CLSs
2, 4	Explain the role of a physical therapist.	A, B, E	1.0
1	Explain muscles and bones of the human body function together as levers.	C, D	2.0
1	Justify categorization of lever types.	C, D	2.0

Tracking Completion of Lessons

If you are using SCORM Cloud or Canvas with the lessons in this unit, completion tracking options are available. If you are not using either platform, please determine if and/or how you plan to track the completion of lessons by the students.

Lesson 8 Components

Guiding Question

The guiding question is intended to provide a focal point for each lesson. This lesson's guiding question is:

- **How Is the Body Like a Machine?**

Lesson Overview

Biomechanics is the application of the principles of mechanics (physics) to the living body. The body's skeletomuscular system is comprised of levers that give it mechanical advantage when working with the force of gravity to produce movement. In this lesson, students explore the action of levers and how the body is made up of many levers.

Vocabulary in This Lesson – Flip Card Activity

Students should use the flip card activity to familiarize themselves with key vocabulary terms and definitions for this lesson.

- **Biomechanics:** The study of the mechanical laws relating to the movement or structure of living organisms
- **Fulcrum:** The point on which a lever rests or is supported and on which it pivots
- **Effort:** A force exerted by a machine or in a process
- **Load:** A weight or source of pressure borne by someone or something
- **Mechanical advantage:** The ratio of the force produced by a machine to the force applied to it, used in assessing the performance of a machine
- **Obstacle:** A thing that blocks one's way or prevents or hinders progress

Learning Targets

By the end of this lesson, students will be able to:

- Explain the role of a physical therapist.
- Explain muscles and bones of the human body function together as levers.
- Justify categorization of lever types.

Rehabilitation Real Life Scenario

Now, back to our skateboarder scenario. Your latest patient, an adolescent boy with a brain contusion and a broken arm, has been assigned to your case. In analyzing his case, you will focus on physical therapy exercises to regain movement and strength in his broken forearm.

Students will be asked to assume the role of a physical therapist specializing in physical therapy, whose work is important in helping the patient regain movement and strength post

injury. The ultimate goal of the treatment should be to ensure the patient recovers from the injury.

In-Person Learning Adaptation: For in-person learning, teachers can discuss the role description of a physical therapist. Teachers can even consider doing a role-play of the operating room.

Let's Talk About It – Flipgrid Activity

In this section, students will use Flipgrid to share their experience with physical therapy.

The students will see the following instructions on Rise:

“Use the flipgrid to discuss the following question prompts.

1. What do you think physical therapy is?
2. Have you or anyone you know needed physical therapy? What was the experience like?

Remind students that Flipgrid has a limit of five minutes so it can be helpful to organize their thoughts before they start videoing. Suggest jotting down some ideas or notes to help plan what they'd like to say. Remind the students to **include your class hashtag in the title of the post.**

Biomechanics: An Exploration in Levers

In this section, students will learn how Our bodies use a lot of levers to accomplish the work of movement by watching [How to do a One Arm Elbow Lever Tutorial](#) video.

In-Person Learning Adaptation: For in-person learning, teachers can show the video in class and discuss student observations.

Lever Basics

In this section, students will learn about the basics of a Lever.

This is a hotspot interactivity in which the learners will select the hotspots on the image represented by a  (a + sign inside a blinking circle.)

Learners can also use navigation arrows < or > to move in between hotspots.

Classification of Levers

In this section, students will learn about Class 1, Class 2, and Class 3 levers..

This is a tab interactive. Learners will see the information in each tab by selecting the respective tab.

Which Type of Lever Is It?

In this section, students will have to answer the quiz questions based on their knowledge of levers.

This is a sorting activity where the learners will have to drag and drop the cards with the names of machines to the options given below. Learners will have multiple attempts on Rise.

Careers in Biomechanics

Before students begin this activity, they are asked to download the editable PDF document for this lesson titled “Lesson 8 - Biomechanics - Editable PDF” They will respond as instructed in the “**Careers in Biomechanics**” section of the PDF after going through the job descriptions of professions. They will see the following information in the PDF:

“From the careers you viewed on biomechanics, select two careers that interest you. Think about why these careers may rely on biomechanics. Record your response in the following textbox.”

This is a flashcard stack activity. Learners can use < and > to navigate. Each flashcard can be flipped on selecting it. The flashcards consists of job descriptions of:

- An Athlete
- A Coach
- An Athletic Trainer
- An Orthopedic Surgeon
- A Biomechanic Researcher

Superhuman Biomechanics

In this section, students will learn more about biomechanics by watching [Usain Bolt anchors world record 4x100 relay at 2012 Olympics | NBC Sports](#) video.

Students will also learn about some tips from a physical therapist for back pain by watching

In-Person Learning Adaptation: For in-person learning, teachers can show the video in class and discuss student observations.

the [Back Pain Tips from a Physical Therapist](#) video.

Career Spotlight

In this section, students will gain background knowledge of the role of a physical therapist by watching the [Physical Therapists - Career Spotlight](#) video.

Take a Stand: Physical Therapist

In this section, students will be asked to consider whether or not a physical therapist's career appeals to them by taking a values self-assessment. They will be asked to respond as instructed in the "**Biomechanics - Editable PDF**" section of the editable PDF. They will see the following instructions in the PDF:

"As a physical therapist, you get to learn about a specific branch of science, or biomechanics, which literally means "how the body is a machine." Biomechanics is the field of science in which biology and physics meet. Physical therapists then get to apply that knowledge to patient assessment and recovery of function and mobility after an injury. What aspects of this career might you like the most?"

You will look at this career through your lenses to think about not only physical therapy, but also transferable skills. Take a moment to consider more closely whether or not this career might appeal to you by completing a values self-assessment. If this career appeals to you, you would select a spot close to the Yes end of the line. Think of it as a 0-100 space where you can fill in all of the quantities in between."

In-Person Learning Adaptation: For in-person learning, teachers can discuss about what students think about a physician assistant's career.

Thinking About Your Future

At the end of the lesson, students will see the following statement on Rise: "In this lesson, you explored the physical therapist career and biomechanics."

Before moving on to the next lesson, think about the following questions:

- Do you find the physical therapist career interesting?
- What new perspective do you have of biomechanics and physical therapy?

Career Pathways

At the end of each lesson, students will be reminded that it is never too soon to start exploring future career options! Encourage students to check out this resource to help them learn about:

- Various jobs in the Allied Health Sciences field
- Projected growth

- Potential earnings

Students can access the resources at this link: [Pipeline AZ Information Allied Health Sciences Careers.](#)

Lesson Completion

At the end of the lesson, students will see the following message on Rise:

“In future lessons, you will learn more about different aspects of the health sciences field. Topics will include exploring mental health and healing, and safety and epidemiology.”