School Matinee Series • Study Guide

Cirque Mechanics
42FT—A Menagerie of Mechanical Marvels

Thu & Fri • December 6 & 7 • 10 am
Welcome to the Hop

A performance needs an audience, so be prepared to play your part!

Theater Etiquette

When entering the Hopkins Center, show consideration for all those sharing the building by remaining quiet and respectful in common areas.

Be aware and use quiet voices. Remember that live theater differs greatly from watching television or movies or attending a sporting event. Live performers can hear and see you and are easily distracted by any talking or moving around in the audience. Even the smallest sounds can be heard throughout the theater, so it’s best to be quiet so that everyone can enjoy the performance. Applause is the best way to show your enthusiasm and appreciation!

Important to remember: Backpacks, food, drink, and gum are not allowed in the theater. Please turn off all cell phones and note that recording the performance or taking any photos is strictly prohibited. Hats off! It is respectful to remove hats during your time in the theater.

Information for Teachers

Prepare—review this study guide for context that will help your students engage with the performance. Check in with the Hop if you have any questions or concerns about content. Read the email that accompanies this guide—Hop staff often request details about your visit including how many buses you’ll be bringing and what accommodations you need.

Arrive—arrive 30 minutes prior to start time to allow time for Hop staff to check you in and escort the students to their seats. Hop staff will ask you for a head count of students. Please review our bus policy before arrival: hop.dartmouth.edu/online/plan_a_successful_visit

Lunch—sometimes we are able to offer a space for schools to eat bag lunches following the show. Check the email that accompanies this guide to confirm. If staying for lunch, please confirm with Hop staff one week prior to show. The day of the show, please bring lunches in boxes or tubs labeled with school’s name. Hop staff will take lunches to the lunch space and escort school group there following the show. Schools are responsible for calling their own bus back to the Hop when they are ready to leave.

Ticketing Policy—no tickets are issued for school matinee performances. Seating placement for each school group is determined by Hop staff. Please let them know if you have a seating request or accommodation; we do our best to keep each school group seated together. Payment is required 30 days before the performance regardless of whether all students are able to attend on the day of the show—please feel free to bring extra chaperones or school staff to fill any empty seats.

Photography—though photography by the audience is prohibited, the Hopkins Center may take photographs during the performance for use on our website or other promotional materials. If you or your students do not wish to be photographed, please let Hop staff know.

The Show Must Go On!—we do not cancel events due to school closings for inclement weather. Performances will only be cancelled if the artist is unable to reach the theater. Schools will be notified by phone if this occurs. We do not issue refunds for performances missed due to school closure. Please contact Hop staff if you find your school unable to attend for this reason.

This study guide was created by the Hop’s Outreach and Arts Education team. To download copies of this and other guides, visit hop.dartmouth.edu/online/outreach

Enjoy the Show!

Hopkins Center Outreach Department:
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The Hopkins Center Outreach and Arts Education department embodies the Hop’s mission to “ignite and sustain a passion for the arts.” It provides Dartmouth, the community and beyond rare personal contact with artists and a broad context for the performing arts. Unveiling the creative process of extraordinarily diverse artists, Outreach programs touch more than 14,000 lives each year.

Did You Know?

• The Hopkins Center opened in 1962.
• The Hopkins Center was designed by Wallace Harrison, architect of Lincoln Center and the United Nations Building in New York City.
• In The Moore Theater, the area over the stage, called the “fly loft,” is 63 feet tall.

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About the Show

At the center of traditional, big-top-style circus is a ring measuring 42 feet in diameter. *42FT: A Menagerie of Mechanical Marvels* is an action-packed tribute to the power of the circus ring and the traditions and history that surround it. Known for their innovative use of engineering and machines combined with astonishing acrobats, clowns and aerialists, Cirque Mechanics brings *42FT* to life with features such as a mechanical metal horse that travels across the stage and a rotating circus tent frame that is more than meets the eye.

What you might see in *42FT*:

**GERMAN WHEEL**

Originally created for gymnasts, this large wheel consists of two metal circles connected with six spokes. The diameter of the wheel depends on the height of the performer, who needs to be able to place hands and feet on opposite edges of the circle, then use the weight and placement of his or her body to move the wheel—rolling, turning and spinning.

**ACROBATICS**

Good acrobats must be able to cartwheel, flip, twist, turn and balance. They must also have strong muscles. Some acrobats can contort their bodies, twisting their arms and legs into places they don’t normally go, like putting their feet behind their head! Acrobats are very flexible and strong and often get their start by doing gymnastics.

**AERIAL WORK**

These performers, known as aerialists, do many of the same things an acrobat does, but they do them while hanging above the stage. Depending on their training and the style of the performance, aerialists perform on trapeze, rings, ropes, lengths of fabric known as silks and other apparatus.
About the Artist

Cirque Mechanics was founded in 2004 by Boston native, BMX bike stunt rider and German wheel artist Chris Lashua. The group is known for engineering unique mechanical devices for their productions—all powered by the performers pulling, pushing and pedaling. They combine these mechanical elements with great stories, particularly those of people discovering and exploring new frontiers. Past Cirque Mechanics shows were inspired by factory workers, the American Gold Rush and the invention of the bicycle. The group’s one-of-a-kind performances excite, astound and showcase the relationship between the acrobatic and mechanical worlds. Cirque Mechanics last performed at the Hop in 2016 with their show Pedal Punk.

Local Connections

The New England Center for Circus Arts, located in Brattleboro, Vermont, offers classes for all ages and professional training for circus performers. You can even celebrate your birthday with a party that includes circus play. You don’t have to travel far to learn amazing circus skills. necenterforcircusarts.org

Contextual Background

Circus History

The word “circus” comes from the Greek kirkos meaning “a circle, a ring.” The word was used in ancient Rome to refer to large, round or oval spaces used for performances, contests or races. The first well-known circus was the Circus Maximus which operated from c. 31 B.C.E through the end of the 5th century C.E.

Modern circus developed in the 1770s in England, when horseback riding schools began teaching and performing trick riding in their training rings. In the late 18th century, a group of performers traveled from England to Philadelphia to entertain an audience that included George Washington. The show included trick riding, a tightrope walker, an acrobat and a clown troupe. The group performed outdoors in a ring enclosed by low wooden walls. Circus performances began to take place up and down the east coast of America. As they grew in popularity, there were not very many ideal spaces to perform in, and getting from place to place was problematic. Circus groups often had to build their own rings—or even entire buildings—since existing buildings were not big enough to hold their performances. It was also a long journey to travel from town to town in carts and wagons because roads were often rutted and difficult to navigate. The first innovation to move circuses forward was the invention of the circus tent. This allowed the performers to take their venue with them so they didn’t have to start from scratch in each town. They could set up a tent anywhere there was an open space. The next innovation that skyrocketed the modern circus to great heights was the transcontinental railroad, which stretched from coast to coast, making travel easier for everyone, not just circuses. Circus companies invented special train cars designed to load and unload the show quickly and efficiently, so they could perform in as many towns as possible.
In the late 1800s, many circuses were traveling across America and competition was fierce, but a few impresarios rose to the top. P.T. Barnum, James Bailey and the five Ringling Brothers were all leaders of massive and popular circuses in this era. In 1880, Barnum and Bailey combined their individual circus companies into one huge company, creating a circus with three rings that could accommodate an audience of 10,000 people. The Barnum and Bailey circus went to Europe for a five-year tour. On their return to the U.S., they found that the Ringling Brothers circus had surpassed them in popularity. After Bailey died unexpectedly, the Ringling Brothers purchased the Barnum and Bailey circus and combined it with their own, creating the now well-known Ringling Brothers Barnum and Bailey Circus. This circus—known as “The Greatest Show on Earth”—was in operation for 146 years, eventually closing in 2017.

In the 1980s, a new type of circus emerged, spearheaded by a group called Cirque du Soleil (sirk duh so-LAY) which means “sun circus” in French. This new, contemporary circus sought to heighten the drama of the performance by incorporating theatrical elements and eliminating some of the more expensive elements of a show, such as animals. They created elaborate sets, costumes and lighting. Their shows featured cutting-edge acrobatics and aerial acts. Clowns were no longer garishly covered in makeup but instead performed intricate juggling and engaged in physical comedy. Rather than present separate, short pieces that stand alone, contemporary circus weaves each performer into a broader story that unfolds like a theatrical spectacle. Cirque du Soleil has been very successful, and has inspired other circus groups—including Cirque Mechanics—to create new work using a similar structure and philosophy.

**Machines and Motion**

**MACHINES**

Simple machines have few or no moving parts and are used to apply force. We all use simple machines in our day-to-day life, often without thinking about it. They help reduce the amount of effort we exert. Cirque Mechanics uses simple machines and other basic engineering in their shows.
Here are six simple machines:

**PULLEY**
This machine has a grooved wheel and a rope that fits in the groove. One end of the rope is attached to a load, then the other end is pulled to lift the load, turning the grooved wheel.

**WHEEL AND AXLE**
The axle is a rod that goes through the center of the wheel, allowing it to turn freely.

**INCLINED PLANE**
Often called a ramp, an inclined plane is a flat surface that is higher on one end. It is used to easily move objects from higher to lower or lower to higher.

**WEDGE**
A wedge is made of two inclined planes. These two planes meet and form a sharp edge, which is used to push two things apart.

**LEVER**
The lever is a long tool such as a pole or a rod that is placed under an object to lift it.

**SCREW**
A screw is an inclined plane that winds around itself. Screws are used to lower and raise things and hold things together.

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**Motion**

Motion is important in our everyday lives. Even if you are standing still, the earth is moving around the sun and the sun is moving around our galaxy. There are many examples of motion in 42FT. There is motion in the acrobatics—leaping, spinning, jumping—and in the scenery and props, especially the mechanical horse!

Sir Isaac Newton was an English physicist, mathematician and astronomer. He wrote a long essay, published in 1687, defining three laws of motion. These laws are evident in Cirque Mechanic’s performance, and also in our everyday lives.

**First Law:** An object at rest remains at rest unless acted upon by an outside force. Nothing begins moving or stops by itself—initiating movement requires a force, like friction, wind or gravity.

**Second Law:** The rate of change in momentum of a body is proportional to the applied force and takes place in the direction in which the force acts. The smaller an object, the less force you need to make it move, and an object will always move in the direction toward which the force is directed.

**Third Law:** For every action, there is an equal and opposite reaction. If you're pushing on something, there is resistance to its moving, even if you don't feel it.

**More Local Connections**
The Montshire Museum of Science in Norwich, Vermont features a variety of hands-on science exhibits for all ages. Explore the scientific concepts behind the art of circus in their fun and inviting spaces! montshire.org
Pre-performance discussion questions

• Young and old, rich and poor: many of us love to watch circus. What it is about circus that appeals to such a wide range of people?

• When you think of circus, what images come to mind? Have you seen a big-top-style circus before? What about a modern-style circus? How do you think 42FT might be the same or different from what you have seen before or what you imagine?

• How do you think someone decides to be a circus performer? What do you think they should study in school to prepare?

• Where do you see simple machines in your everyday life? What kinds of work do they do? How would life be different if we did not have these machines?

• Many big-top-style circuses include animals in their performances. What are the pros and cons of having animals in the circus?

Post-performance discussion questions

• Discuss the ways you saw circus being used to tell a story. How is this way of storytelling different from movies, theater or other forms of entertainment? What do you think happens next in the story?

• Where in the show were you aware of one or more of Newton's laws of motion at work?

• How did Cirque Mechanics incorporate the circus ring into the performance?

• Name all the simple machines you saw in the show.

• If you were training to be a circus performer, what type of apparatus or acrobatics would you want to train for?

Learning Activities

Penny for Your Thoughts (Grades 3–4)

Experiment with Newton's Laws of Motion. Students will need a small plastic cup, a playing card or postcard, a coin and note-taking materials. They can work individually or with partners. Review Newton's laws and ask students to keep these questions in mind: What outside forces are acting on the coin in this experiment? How much force is at work and in what direction? What actions and reactions are happening?

Have students place the playing card or postcard on top of the plastic cup, then put the coin on top of the card. Next, have them pull the card quickly toward themselves. Have students write down their observations of the coin's movement and form a hypothesis about how many times out of ten the coin will repeat the same behavior it just exhibited. Repeat the experiment nine more times, challenging students to maintain the same force when pulling the card. Students will write down observations of the coin's behavior each time they pull the card. Change force (pull faster or slower) and repeat ten pulls, again noting what the coin does.

Discuss and share data with a partner or another pair. What conclusions are reached based on their observations? How did changing the force change the coin's motion? What is the role of gravity on the coin? On the card? Was there one law at work more than the others? What was difficult about this experiment? What was easy?
Making Machines (Grades 3–8)

Using moves inspired by both simple machines and the body’s ability to move, have each student explore repetitive movements and sounds, as if he or she were a piece of a machine. A movement should use multiple parts of the body and be easily repeated and sustainable. The accompanying sound can be anything that complements the movement choice.

After experimenting, have students determine what will be their movement and sound for the game. As a group, ask students to start doing their movement and sound (this part may be a little loud!). Gently move students—now parts of a machine—together to create a machine whose individual parts are moving in ways that inform each other. Once the machine parts are all in place, have students freeze and look around at the at the machine they just built. Identify different points of cause and effect in the motions, for example “When Allie moves that way, it makes Titus move this way.” Next, have them start up the machine again, this time slightly altering the individual movements to better connect to each other. Begin by identifying a starting point and having each student observe the movement of others before choosing their alterations. Emphasize that this is about what the machine as a whole needs, not what one individual feels like doing. Brainstorm what the machine might be making.

Repeat, with students selecting a new movement and sound. Try having one or two students arrange the moving parts to create the larger machine.

EXTEND: With students sitting on the floor, leave some open floor space for working. Invite one student to step into the open space and do a machine-inspired movement and sound. Add the rest of the class into the machine, one student at a time. Challenge the students who are watching to come up with their motions and sounds based on what is already in the machine. Once all the parts are in place, explore speeding the machine up and slowing it down. In what ways do you see cause and effect changing from one student to another? Are some moves repeated more than others? Why?

Cirque Critique (Grades 6–8)

Ask students to write a review of 42FT: A Menagerie of Mechanical Marvels. Things to consider when writing a review:

**A strong review answers these three questions:**
1. What is the artist trying to do?
2. How well are they doing it?
3. Was it worth doing?

**A critic’s job is to:**
1. **Share an experience** — What did it feel, sound, look like?
2. **Provide context** — Build a broader frame of reference around what happened to help readers understand the importance or significance of the experience.
3. **Evaluate** — Was it any good? Why or why not?

**Critics typically use two modes of thought when writing a review:**
1. **Analytical** — describes the structure of the artwork, its execution and interpretation by the performers, and its historical, cultural and social relevance; use concrete language, terminology and facts
2. **Impressionistic** — describes the overall experience, using abstract language, feelings and emotions

Encourage students to take a strong stance on aspects of the performance and back up their positions with evidence.

**BEFORE THE PERFORMANCE**

Have students, in groups or as individuals, conduct background research on elements of the 42FT: A Menagerie of Mechanical Marvels performance. Students should research and take notes on the following:

- The art form
- History of the art form including the culture(s) in which this developed
- Terminology
- The artists’ background
• Comparisons to similar artists and art forms

Some of this information can be found in this Guide, including links in the References and Resources sections at the end.

Before the performance begins, consider the following questions:
• What expectations do I have for the performance?
• Do I already have an opinion about what I will experience at the performance? If so, what is it?

DURING THE PERFORMANCE
Ask students to take mental notes during the performance. As soon as the performance ends, have students write down thoughts and words that come to mind, related to the performance.

Encourage students to consider these prompts:
• What is striking to me?
• Is it vastly different from what I thought it would be?
• Did the theater transform into something else during the performance? If so, how?
• What images or ideas are popping into my head?
• Is there something about the performance I may remember forever? What made it so memorable? Is there part of the performance I want to forget?
• Is the audience quiet and drawn in to what is happening? Are they loud? Are they interacting directly with the performers? Are the performers directly interacting with the audience?

AFTER THE PERFORMANCE
Instruct students to compare their pre-performance notes to their post-performance observations and write a 2–3 page review.

Vocabulary

**Apparatus:** the equipment or machinery needed for a particular activity or purpose

**Diameter:** the measurement of a circle from edge to edge

**Exert:** make a physical or mental effort

**Force:** energy used to change the motion of a body or produce motion in a stationary body

**Garishly:** done in a flamboyant or showy manner

**Impresarios:** people who organize and finance large performances

**Innovative:** new, never done before

**Philosophy:** a theory or attitude held by a person or group of people that acts as the guiding principle for the work of the group.

**Spearheaded:** being among the first to do something

**Troupe:** group of performers who travel to different places

**Venue:** place where performances take place
Resources

Read more about Cirque Mechanic at: cirquemechanics.com
Learn more about simple machines at: msichicago.org/education/field-trips/learning-labs/simple-machines/activities
New England Center for Circus Arts: necenterforcircusarts.org
The Montshire Museum of Science: montshire.org

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