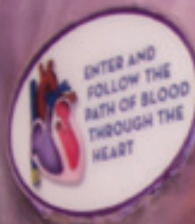




**THE
FRANKLIN
INSTITUTE**



THE GIANT HEART

K-12 EDUCATOR'S GUIDE

A microscopic view of numerous red blood cells, which are biconcave discs, filling the frame. The cells are a vibrant red color and are set against a dark, almost black background. The lighting creates a sense of depth, with some cells appearing more prominent than others. The overall composition is dense and textured.

THE HUMAN HEART BEATS STRONGLY, PUMPING BLOOD THROUGHOUT THE BODY.

How does the human heart work?

How does it control the circulatory system?

How do healthy lifestyle choices protect the heart?

**The Giant Heart exhibit
invites you and your students
to consider these questions
as you explore one of the
Institute's all-time most
popular exhibits.**



DURING YOUR VISIT, STUDENTS WILL:

- Discover foundational life science concepts related to human physiology.
- Interact with devices and displays that are designed to help them learn about the structure of the heart and the circulatory system.

AFTER YOUR VISIT, STUDENTS WILL:

- Think about how their hearts work to circulate blood throughout their bodies.
- Understand how important it is to make healthy choices in order to protect the heart.



QUICK TIPS

- The exhibit is located on the second floor of the museum. Enter the exhibit via Key Hallway which is alongside the Pendulum Staircase.
- On average, most groups will spend about 40 minutes in the exhibit, if carefully examining all of the displays. Restrooms are located in the Bartol Atrium at the opposite end of Key Hallway.
- No food or beverages are allowed in any of the exhibit galleries.
- Running through the exhibit is not allowed. Designate a meeting location within the exhibit when you arrive in case someone gets separated. Please do not congregate at the entrance/exit, however, so as to enable other guests to enter and exit easily.

THE BIG IDEA

Take care of your heart and it will take care of you.

ABOUT THE EXHIBIT

The Giant Heart exhibit invites learners to learn about the structure of the human heart and how it functions as the pump for the circulatory system. In many ways, the human heart is a very simple four-chambered organ. However, the role it plays in human life is extraordinary.

The exhibit showcases the heart's structure most vividly through the giant walkthrough heart. Surrounding the experience are other devices and activities that engage learners with content related to the human heart. The exhibit also highlights ways to prevent disease by making healthy lifestyle choices. Finally, when disease does occur, the diagnostic strategies, treatments, and therapies are presented.



EXHIBIT OVERVIEW

The centerpiece of the exhibit is the giant walkthrough model of the human heart, described below. Surrounding it is a free-flowing arrangement of interactive devices which are loosely grouped according to several themes, listed below. The experience is intended to be non-linear and there is no particular pathway for exploring the exhibit.



BLOOD

As the pump for the circulatory system, the heart pushes blood throughout the body. Students can learn about the fluid of life as they explore devices and concepts related to blood. Stand on a scale and see a visualization of how many pints of blood your body contains. Listen to a catchy tune, performed by They Might Be Giants, about the work that the blood does while it circulates. Learn about various vessels—how each varies in size based on its function. Compare the colors of blood from one life-form to another. Valves help visualize the complexity of the circulatory system, especially how blood wins the “uphill” battle of returning to the heart.



STRUCTURE

The giant model heart is, of course, the most effective way for students to learn about the heart’s structure. Other devices, however, allow further exploration of the idea. Use your feet to follow the “dance steps” which simulate the movement of blood between the chambers. Compare the sizes and shapes of a spiraling display of animal hearts. Listen to the sounds they make and discover that, generally, the smaller the heart, the faster the beat.



HEALTHY CHOICES

Make healthy choices in order to protect your heart. Participate in the Exercise Opera and feel the benefits of strenuous activity. Spend some time selecting snacks from the vending machine and learn some healthy eating habits. Age your face and see how healthy lifestyle choices can help your appearance as you age. See evidence of how smoking pollutes human lungs and leads to disease and death.



DISEASE & TREATMENT

When heart disease does strike, how do we diagnose it? Learn about ultrasound and other visualization technologies. Travel through time as you explore ancient treatments as well as more modern medicinal practices. See how external defibrillators work. The surgical theater invites older students to step up and observe video of an open-heart procedure.

THE GIANT HEART

The star of the exhibit is our giant model of a human heart. Since 1954, a walk through the giant heart has been a rite of passage for generations of schoolchildren. No visit to The Franklin Institute would be complete with a circulation or two through the atria and ventricles. Your students act as the blood, moving through the chambers and passing through the lungs for oxygenation.

The model heart is the approximate size for a 220-foot tall person. The model was intended to be a temporary exhibition but became so popular, it remains accessible to this day. Over the years, it has become a “must-see” attraction for tourists as well as a beloved tradition for local families. The original designer had a background in “fun house” design which helps explain its surprising twists and turns. As a beloved icon of The Franklin Institute, we strive to take excellent care of our heart. Annual “check-ups” help to keep it fully functional and available for visits. Minor patching and repairs, along with fresh paint and upgraded lighting, help keep it in great shape. The underlying structure, however, is exactly the same as it was the day it first opened to our visitors.



CLASSROOM AND AT HOME ACTIVITIES

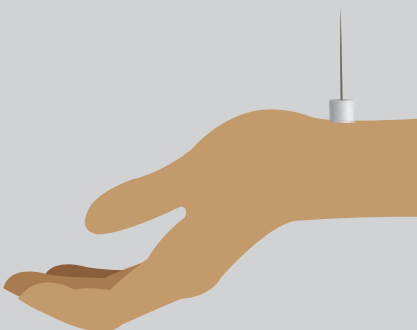
TRY THIS!



Over 170 years ago, a man named Laennec invented the first stethoscope. It was a wooden tube about 1 inch in diameter and about 10 inches long.

- Have your students simulate the experience of using a stethoscope using cardboard tubes.
- You'll need 1 cardboard tube from a paper towel roll for every 2 students.
- Have students pair up and listen for their partner's heartbeat by placing the tube over the partner's heart.
- Count the number of beats per 15 seconds. Multiply by 4 to find how many times each minute the person's heart beats.
- Have one partner run in place for one minute, then listen again.
- Have the students write down what they hear and calculate the new beats per minute.
- The heart beats faster after exercise in order to pump more blood (oxygen) to the working muscles.

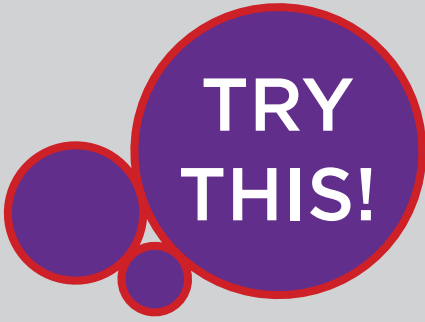
TRY THIS!



THE HEART BEATS!

Your students can visualize their heartbeats in this simple activity.

- Each student will need one mini-marshmallow and one toothpick.
- Insert the toothpick in the marshmallow.
- Lay one hand, palm up and still, on a desktop or table.
- Find your wrist pulse by touching the index and middle fingers of the opposite hand to locate a blood vessel. Stand the marshmallow on top of the pulse point and carefully watch the tip of the toothpick.
- Hold still to see it twitch with each pulse.
- Count the number of twitches in fifteen seconds and then multiply by four to find your pulse. 72 beats per minute is the normal average for adults. Depending on the age of your students, the rate may be higher as younger children can have pulse rates as high as 100 beats per minute.
- Have students work in pairs or trios to compare and discuss results.
- This simple activity is visible proof of the heart's pumping of blood through the circulatory system.



THE GIANT HEART WORD SEARCH

L	H	Q	O	G	M	C	L	R	U	U	M	O	D	D
X	E	A	I	S	Z	I	M	U	D	V	X	B	I	P
Q	I	S	M	H	J	R	A	Z	N	Y	J	P	F	Z
S	U	I	S	Y	G	C	E	A	G	G	L	C	Q	C
U	F	B	F	E	X	U	U	E	T	Z	S	Y	A	R
L	B	N	B	Y	V	L	N	K	N	R	N	P	Y	E
A	R	T	E	R	Y	A	N	B	N	Y	I	R	J	B
E	E	L	C	I	R	T	N	E	V	L	E	U	M	M
T	S	V	C	T	P	I	L	E	L	G	H	D	M	A
N	U	I	N	U	U	O	I	A	R	Q	E	O	I	H
K	Y	A	C	I	L	N	R	U	X	Y	A	O	W	C
M	I	Z	L	R	S	Y	S	F	Y	N	L	L	L	U
G	Z	F	D	H	E	A	R	T	S	E	T	B	B	T
M	E	T	S	Y	S	X	S	D	N	H	H	P	E	O
D	H	K	D	T	V	Z	E	G	H	D	L	Y	H	D

ARTERY
ATRIUM
BLOOD
CAPILLARY
CHAMBER
CIRCULATION

EXERCISE
GIANT
HEALTH
HEART
LUNGS
OXYGEN

PULSE
SURGERY
SYSTEM
VEIN
VENTRICLE
VESSEL

SUGGESTED RESOURCES FOR K-12 CLASSROOMS AND LIBRARIES

Elementary School

A Drop of Blood
by Paul Showers
ISBN 006009110X

Dr. Frankenstein's Human Body Book
by Richard Walker
ISBN 0756640911

My Bodyworks
by Jane Schoenberg
ISBN 1566565839

The Circulatory Story
by Mary K. Corcoran
ISBN 1580892094

The Heart: Our Circulatory System
by Seymour Simon
ISBN 0688114075

Middle School

*Circulating Life: Blood Transfusion from
Ancient Superstition to Modern Medicine*
by Cherie Winner
ISBN 0822566060

The Circulatory System
by Christine Taylor-Butler
ISBN 0531207307

The Complete Human Body
by Alice Roberts
ISBN 075666733X

High School

Medical Ethics: Life and Death Issues
by Karen Judson
ISBN 0766015858

Smoking 101
by Margaret O. Hyde
ISBN 0761328351

*The Anatomy Student's Self-Test Visual
Dictionary*
by Ken Ashwell
ISBN 0764147242

Recommended Websites

American Heart Association
Select "Educator" on the navigation menu
www.heart.org

**NIH Curriculum Supplements
for K-12 Teachers**
science.education.nih.gov

CURRICULAR STANDARDS

An exploration of The Giant Heart exhibit can help students achieve learning objectives as called for by national standards.

Next Generation Science Standards

1: Structure, Function, & Information Processing
3: Inheritance and Variation of Traits:
Life Cycles and Traits
4: Structure, Function, & Information Processing
5: Matter & Energy in Organisms & Ecosystems
MS: Structure, Function, & Information Processing
MS: Growth, Development, & Reproduction
of Organisms
HS: Structure & Function

National Science Education Standards

K-4 C: Life Science
5-8 C: Life Science
9-12 C: Life Science

Benchmarks for Science Literacy

6. The Human Organism
6a. Human Identity
6b. Human Development
6c. Basic Functions
6d. Learning

Common Core English Language Arts

K-5: Reading Informational Text
6-12: Literacy in Science & Technical Subjects

Common Core Mathematics

K-12: Measurement & Data



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