



University Health Care

PRESENTS

Gunther von Hagens'

BODY WORLDS 3

The Original Exhibition of Real Human Bodies

& The Story of the Heart



FAMILY GUIDE

Tickets on Sale Now at www.theleonardo.org

HOSTED BY

the Leonardo

Opens September 19

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Please review all of the material contained in this resource guide, and use it to prepare you and your family for your visit to *BODY WORLDS 3 & The Story of the Heart*. If you have any further questions, please contact The Leonardo at (801) 220-1100.

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209 East 500 South at Library Square
Salt Lake City, Utah 84111
www.theleonardo.org

LETTER TO PARENTS

Dear Parents,

Beginning September 19, the most successful touring exhibition in history will open on Library Square. Hosted by The Leonardo and presented by University Health Care, *Gunther von Hagens' BODY WORLDS 3: The Original Exhibition of Real Human Bodies & The Story of the Heart* will take visitors on an eye-opening journey through the inner workings of the human body.

BODY WORLDS exhibitions have opened to critical praise and public acclaim in 45 cities around the world and have been seen by more than 25 million people. Never before has an exhibition offered such a detailed look at the human body. *BODY WORLDS 3 & The Story of the Heart* presents a one-of-a-kind anatomy and physiology lesson.

Important information to know includes:

- The specimens come from voluntary donors who agreed that, upon their deaths, their bodies would be part of *BODY WORLDS* exhibits to help educate visitors.
- The whole-body specimens reveal bones, muscles, tendons, nerves, blood vessels and organs. Genitals of the bodies remain, and there are several areas within the exhibit that explore reproductive systems.
- A separate section of the exhibit highlights prenatal development and includes embryos and fetuses. **Visitors can choose whether or not to view this area.**
- All specimens are accompanied by a written description.
- Audio tours are available to rent for a nominal fee. One is a basic tour, the other is more advanced.
- The exhibit is open to visitors of all ages. We recommend that a parent or responsible adult accompany children younger than 13.

BODY WORLDS 3 begins with a detailed exploration of major body systems: nervous, respiratory, cardiovascular, digestive, and reproductive. You'll also see whole-body plastinates in various poses to demonstrate how all of these systems work together.

We invite you to review the information in this guide with your children. Preparing them for this incredible educational experience will make it more valuable for the entire family.

Sincerely,

The Leonardo

THE DAY OF YOUR VISIT

As you explore *BODY WORLDS 3*:

- Try to relate elements of the exhibition to experiences in your children's lives and others around you. For instance: "Did you have any idea that you used so many muscles when you play soccer?"
- Answer your children's questions honestly. It's okay not to know all the answers. You might say, "I don't know the answer to that question, but we can look it up in a book or on the Internet when we get home."
- Be sensitive to your own and your children's reactions. People come away from this exhibition with many different interpretations.

Talk about the exhibition with your children. Allow them to voice their opinions and share your thoughts with them.

Try these questions:

- What effect did the exhibition have on you?
- Do you feel differently about your body now?
- What did you learn about your own body from seeing this exhibition?
- What can you do as an individual and as a family to keep your body healthy?
- Why do you think the donors wished to have their bodies used for this purpose? Do you agree with their decisions?



EXHIBIT FAQs

What is *BODY WORLDS*?

BODY WORLDS is a first-of-its-kind exhibition where visitors learn about anatomy, physiology, and health by viewing real human bodies. The bodies are preserved using an extraordinary process called Plastination, a groundbreaking method invented by Dr. von Hagens in 1977. Each exhibition features more than 200 real human specimens, including whole-body plastinates, individual organs, organ configurations and transparent body slices. The specimens on display come from the body donation program that Dr. Gunther von Hagens established in 1983. The exhibitions also allow visitors to see and better understand the long-term impact of diseases, the effects of tobacco consumption and the mechanics of artificial supports such as knees and hips. To date, more than 25 million people around the world have viewed *BODY WORLDS* exhibits.



What is the purpose of the exhibition?

BODY WORLDS educates the public about the inner workings of the human body and shows the effects of poor health, good health and lifestyle choices. It creates interest in and increases knowledge of anatomy and physiology among the public.

Couldn't I learn just as much from books or models of human anatomy?

Real human bodies show the details of disease and anatomy that cannot be shown with models. They also allow us to understand how each body has its own unique features, even on the inside. Visitors are drawn to real specimens in a way that they are not to plastic models. One of the special features of museums and science centers is that they offer people a chance to see the real thing in a safe and educational environment.

What is Plastination?

Invented by scientist and anatomist Dr. Gunther von Hagens in 1977, Plastination is the groundbreaking method of halting decomposition and preserving anatomical specimens for scientific and medical education. Plastination is the process of extracting all bodily fluids and soluble fat from specimens, replacing them through vacuum-forced impregnation with reactive resins and elastomers, and then curing them with light, heat, or certain gases, which give the specimens rigidity and permanence.

Where did the specimens on display come from? Will we know who the plastinates are or how they died?

The *BODY WORLDS* exhibitions rely on the generosity of body donors — individuals who bequeathed, upon their deaths, their bodies for educational purposes in the exhibitions. Currently, the Institute for Plastination has a donor roster of more than 9,200 individuals; 590 are already deceased. All of the whole-body plastinates and the majority of the specimens are from these body donors. Some specific



specimens that show unusual conditions, including the fetuses on display, come from morphological institutes and old anatomical collections that predate the 1920s and were previously part of natural history museums, hospitals, and other historic collections. As agreed upon by the body donors, their identities and causes of death are not provided. The exhibitions focus on the nature of our bodies, not on providing personal information.

Why are the plastinates posed the way they are?

The poses of the plastinates have been carefully thought out and serve educational aims. Each plastinate is posed to illustrate different anatomical features. For instance, the athletic poses illustrate the use of muscle systems while playing sports. The poses allow visitors to relate the plastinates to their own bodies.

Will I be able to touch any of the plastinates?

While you will be able to get very close to the plastinates, as a rule, visitors are not allowed to touch them. At a certain area in the exhibition, however, visitors have the option of touching a select group of plastinated organs to better understand both the human anatomy and the process of Plastination.

Are these exhibitions appropriate for children?

More than 25 million people, including young children, have viewed *BODY WORLDS* exhibits. It is important to note that the exhibition includes full-body plastinates, some with exposed genitals. We recommend *BODY WORLDS* for children 10 and older; however, many children younger than 10 have viewed and learned positive lessons from the experience. Parents know their children best and should be the ultimate judges of what is best for their families. Visit www.theleonardo.org to read our full content advisory.

Why is it important for the public to see these exhibits?

We believe that when people understand more about how the body works and how it can break down, they are more likely to choose healthy and sustainable lifestyles. We also hope it will inspire visitors to learn more about the life sciences. Knowledge about what the human body looks like and how it functions is basic life science information that should be available to everyone.



AMAZING BODY FACTS

The Skeletal System

- The largest bone is the pelvis, or hipbone. It is made of six bones joined firmly together.
- The longest bone is the “femur,” in the thigh. It makes up almost one-quarter of the body's total height.
- The smallest bone is the “stirrup,” deep in the ear. It is hardly larger than a grain of rice.
- The ears and end of the nose do not have bones inside them. Their inner supports are cartilage, or “gristle,” which is lighter and more flexible than bone. This is why the nose and ears can be bent.
- After death, cartilage rots faster than bone. This is why the skulls of skeletons have no nose or ears.

The Muscular System

- There are about 60 muscles in the face. Smiling is easier than frowning — it takes 20 muscles to smile and more than 40 to frown.
- The longest muscle in the body is the sartorius, from the outside of the hip, down and across to the inside of the knee. It rotates the thigh outwards and bends the knee.
- The smallest muscle in the body is the stapedius, deep in the ear. It is only 5mm long and thinner than cotton thread. It helps you hear.
- The biggest muscle in the body is the gluteus maximus, in the buttock. It pulls the leg backwards powerfully for walking, running and climbing steps.

The Circulatory System

- The heart beats approximately 3 billion times in the average person's life.
- About 2 million blood cells die in the human body every second, and the same number are born each second.
- Within a tiny droplet of blood, there are some 5 million red blood cells, 300,000 platelets and 10,000 white cells.
- It takes about 1 minute for a red blood cell to circle the whole body.
- Red blood cells make approximately 250,000 round trips of the body before returning to the bone marrow, where they were born, to die.
- Red blood cells may live for about 4 months circulating throughout the body, feeding the 60 trillion other body cells.

The Nervous System

- The brain looks like a giant, wrinkled walnut.
- Unlike other body cells, brain cells cannot regenerate. Once brain cells are damaged they are not replaced.
- The brain and spinal cord are surrounded and protected by cerebrospinal fluid.

The Immune System

- The skin secretes antibacterial substances. These substances explain why you don't wake up in the morning with a layer of mold growing on your skin — most bacteria and spores that land on the skin die quickly.
- Tears and mucus contain an enzyme (lysozyme) that breaks down the cell walls of many bacteria.
- Lymph nodes contain filtering tissue and a large number of lymph cells. When fighting certain bacterial infections, the lymph nodes swell with bacteria and the cells fighting the bacteria, to the point where you can actually feel them. Swollen lymph nodes may therefore be a good indication that you have an infection of some sort.

The Digestive System

- Adults eat about 1102 pounds of food per year.
- 1.5 quarts of saliva are produced each day.
- The esophagus is approximately 10 inches long.
- Muscles contract in waves to move the food down the esophagus. This means that food would get to a person's stomach, even if they were standing on their head.
- An adult's stomach can hold approximately 1.5 quarts of material.
- Every day 3 gallons of digested food, liquids and digestive juices flow through the digestive system, but only 0.3 oz of fluid are lost in feces.
- In the mouth, food is either cooled or warmed to a more suitable temperature.
- We get two sets of teeth. Our 20 "baby teeth" are replaced starting at around 6-7 years of age with our 32 "Adult Teeth."

The Respiratory System

- At rest, the adult body takes in and breathes out about 1.5 gallons of air each minute.
- The right lung is slightly larger than the left.
- Hairs in the nose help to clean the air we breathe as well as warming it.
- We lose about 1 pint of water a day through breathing. This is the water vapor we see when we breathe onto glass.
- The breathing rate is faster in children and women than in men.
- The highest recorded "sneeze speed" is 102 miles per hour.
- A person at rest usually breathes between 12 and 15 times a minute.
- The surface area of the lungs is roughly the same size as a tennis court.
- The capillaries in the lungs would extend 994 miles if placed end to end.

ABOUT THE LEONARDO

Inspired by the spirit of ingenuity that guided Renaissance master Leonardo da Vinci, The Leonardo is an educational and cultural center fusing science, technology, and the arts in experiences that inspire human creativity and innovation. When the center permanently opens its doors in a few years, The Leonardo will be part of Library Square, a vibrant civic and educational hub that already draws over three million visitors each year.

A NEW APPROACH

The Leonardo's multidisciplinary approach integrates traditional science exhibits with historical and contemporary developments in the world of arts and culture. By offering myriad pathways to explore each topic, visitors can learn in ways that are more personally engaging, meaningful, and inspiring.

BEYOND HANDS-ON

The Leonardo will also allow visitors to reach beyond the traditional “hands-on” science center experience and actively explore topics of their own choosing. Workshops, on-site experts, and classes will ensure visitors encounter fresh, exhilarating realms of understanding.

YOU MAKE THE MUSEUM

Visitors to The Leonardo will help shape the experience. Each person who comes through our doors brings a different understanding and set of skills. By archiving and sharing visitor input, The Leonardo will become a living gallery, library, and lab, where the conversation is continually developing in unexpected and thought-provoking directions.

CURRENTLY AT THE LEONARDO

Although it will not permanently open its doors on Library Square for several years, The Leonardo will continue to offer exhibits, workshops, public dialogs and educational outreach programs to the community. One of these programs, The Leonardo on Wheels-Science, brings hands-on science to junior high and middle schools across the state. Each year, the program travels to over 20 schools and serves about 8,000 students. The Leonardo on Wheels-Science features interactive science, engineering and mathematics activities that support Utah state curriculum standards. Most school visits also include a Community Night for parents and families.