



University Health Care

PRESENTS

Gunther von Hagens'

# BODY WORLDS

The Original Exhibition of Real Human Bodies

& The Story of the Heart



EDUCATOR'S GUIDE

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HOSTED BY

**The Leonardo**

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Please review all of the material contained in this resource guide, and use it to prepare you and your students 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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**Dear Educator,**

The Leonardo invites you to take your students on an eye-opening journey through the inner workings of the human body when one of the most anticipated touring exhibitions in the world, *Gunther von Hagens' BODY WORLDS 3: The Original Exhibition of Real Human Bodies & The Story of the Heart* visits The Leonardo in Salt Lake City from September 2008 – January 2009. *BODY WORLDS* exhibitions have opened to critical praise and public acclaim in 45 cities around the world, and more than 25 million people have seen these ground-breaking events.

Never before has an exhibition offered such an intimate look at the human body. The primary goals of *BODY WORLDS* exhibits are to educate visitors about health science, human anatomy, and physiology. More than 200 specimens provide insight into the major systems and organs of the human body. Comparisons of healthy and diseased organs, such as lungs from both a smoker and non-smoker, highlight the benefits of healthy lifestyle choices. Additionally, the exhibit conveys powerful lessons about the form, function and beauty of the human body and the interconnectedness of the body's systems. Students come to understand that people are as unique on the outside as they are on the inside — position, size, shape, and structure of skeleton, muscles, nerves, and organs determine our “interior face”. The authenticity of the real specimens coupled with careful observation, illuminates the miracle of the human body.

**Important information for educators:**

- The human body specimens in the exhibition derive from people who have, in their lifetimes, generously donated their bodies for Plastination, to specifically educate future generations about health.
- The whole-body specimens are without skin, enabling the visitor to see the bones, muscles, tendons, nerves, organs and blood vessels. Eyes and genitals remain in many of the plastinates. Written descriptions accompany all specimens.
- This exhibit includes a separate area containing specimens documenting prenatal development and includes embryos and fetuses. Visitors may choose whether or not to view this area.
- Plastination is a ground-breaking method for specimen preservation invented by Dr. Gunther von Hagens in 1977. All bodily fluids and soluble fat from anatomical specimens are extracted to stop decomposition and replaced through vacuum-forced impregnation with reactive resins and elastomers, such as silicon, rubber and epoxy that harden with gas, light, or heat curing, giving the specimens rigidity and permanence.

**School Group Rates:**

Student (K - 12)	<b>\$8</b>
Chaperone (One for every eight children)	<b>FREE</b>
Each additional chaperone	<b>\$20.50</b>
Student Audio Guide (per person)	<b>\$3</b>

To receive the school group rate, a group must pay as a single entity and have at least 12 students in K – 12th grades. School group rates are only available Monday through Friday from 10 a.m. – 5 p.m. All groups will be charged a \$5 service fee.

If you have any further questions or to book your field trip please contact The Leonardo's group sales department at (801) 220-1100.

## PLANNING YOUR VISIT - FIELD TRIP GUIDELINES

Please review our guidelines carefully. If you have any questions or concerns, please call The Leonardo's group sales department at (801) 220-1100.

### **Arrival & Departure**

*BODY WORLDS 3* is a timed entry exhibition. Groups must check in 30 minutes prior to their timed entry to provide adequate time for orientation and processing. A staff member will be available to assist your group with payment, orientation and entry into the exhibit.

### **Payment Policy**

School groups may pay onsite the day of your visit by cash or check only.

### **Final headcount must be given 48 hours prior to the date of your visit.**

Should your headcount change from the number on your confirmation sheet, please call (801) 220-1100 or email us at [education@theleonardo.org](mailto:education@theleonardo.org). If cancellation is necessary, you may cancel your scheduled visit or reschedule your visit with no penalty up to **5 business days** before your scheduled visit date. If you cancel your visit after this time period or your group does not show up on the day of your scheduled visit, the group will be charged a \$40 cancellation fee.

If fewer individuals in your group arrive on your visit date, the group will be responsible for payment of all reserved tickets. If you arrive with more individuals than you reserved, extra ticket availability is not guaranteed. If you have more than one adult for every 8 students in your group, extra adults are admitted at the adult group rate of \$20.50.

### **Chaperones**

The Leonardo requires at least one chaperone for every 10 children—please ensure that your school group will meet this ratio. The Leonardo is pleased to offer free admission for adults accompanying school groups at the ratio of one chaperone for every eight children.

During your scheduled visit, all qualifying teachers and chaperones will enter the museum at no charge, but must be counted in your confirmation. Chaperones must be 18 years or older. Teachers and chaperones are expected to stay with and monitor their group at all times.

### **The Student Symposium**

The Leonardo's Student Symposium is designed to enhance the school group's experience after visiting the *BODY WORLDS 3* exhibit by providing an open forum for discussion. The Leonardo staff will engage students and teachers in a discussion for 20 – 25 minutes. Topics may include, but are not limited to, exhibit Q & A, health, lifestyle choices and other related topics. Students will walk away from The Leonardo with a better understanding and appreciation for their bodies, health and the consequences of their future lifestyle choices. The Student Symposium is a free optional add-on to your *BODY WORLDS 3* visit.

## **Lunch Area**

Lunch space is available for our visiting school groups. Coats, bags and bagged lunches may be stored in your assigned storage area. Lunch times will be allotted to groups for a designated period (normally about 30 minutes) and are subject to availability. Please request a lunch space when you book your field trip.

Check your confirmation form to ensure your lunch space and/or lunch orders have been reserved. Please note that in order to make the best use of capacity and due to timing of exhibit entry, some groups may have to share the lunch area with other groups.

If your group plans to purchase lunches in the cafe you must place your order one week in advance by calling the reservation line at (801) 220-1100. Please see the Les Madeleines school lunch menu on page 14. Lunches are \$5 each.

## **Storage Needs**

Secured storage is available in the museum for school groups to store coats and lunches. Access to your assigned storage area will be given only to the group's leader. The Leonardo does not take any responsibility for items left behind or removed from the area without authorization.

## **Behavior**

Students should stay with their group and be respectful of The Leonardo's exhibits. For the enjoyment and safety of all visitors, museum staff and volunteers will monitor visitor conduct.

We reserve the right to ask any group, student, educator, or chaperone to leave the museum. Your school group is responsible for any damage to museum property during your visit. We will not issue a refund under these circumstances.

No food, drinks, water, gum, backpacks or cameras are permitted in the exhibit.

No photography whatsoever is permitted in the exhibit.

No cell phone use is permitted in the exhibit as a courtesy to other visitors.

Strollers are permitted in the exhibit as long as there is enough space.

No large bags or backpacks are permitted within the exhibit.

All children younger than 13 must be accompanied by an adult.

There is no re-entry into the exhibit.

## **Additional Information**

The average school group dwell time is 1 hour 30 minutes.

# FIELD TRIP PREPARATION CHECKLIST

## Review Your Confirmation Letter

- Please look over the student and chaperone number, lunchroom reservation and schedule. If your confirmation letter is not correct, please call The Leonardo's reservations department at (801) 220-1100, or email us at [education@theleonardo.org](mailto:education@theleonardo.org). If any scheduling information changes before the scheduled visit, it is your responsibility to alert the museum of these changes. This includes the size of the group and contact information.

## Prepare Your Chaperones

- Prepare your chaperones with trip information, agendas, schedules and a copy of the Student Guide. You may also recommend in advance they visit our website at [www.theleonardo.org](http://www.theleonardo.org) or [www.bodyworlds.com](http://www.bodyworlds.com) to help them answer student questions.
- Groups need to be divided into smaller groups of 10 or less (one chaperone for every 10 students). Please remind chaperones to monitor and remain with their group at all times.
- If a group does not have the required number of chaperones, the group will be charged an additional administrative fee of \$15.00 for each chaperone that you do not have. This fee will be added to your total balance.

## Prepare the Students

- Students who are prepared to view the exhibition have a more meaningful experience. Prepare students by reviewing the Student Guide. Discuss the visit with students and explain what they are going to see and why.
- Permission forms are not required by The Leonardo to view *BODY WORLDS 3*. However, if your school desires, send the permission form home with students to be signed by their parents/guardians.
- Other pre-trip preparations may include reviewing the day's scheduled activities and behavior expectations.

## Review the Available Educator Resources

- To maximize your student experiences visit our website at [www.theleonardo.org](http://www.theleonardo.org) to download the **Classroom Activity Guide**, which includes pre- and post-visit materials organized by grade level. The **Student Guide** is also available for school students preparing to visit *BODY WORLDS 3*. It contains information about Plastination, tips on what to look for in the exhibition and cool facts about the human body. Free **DVDs** are also available for educators by contacting The Leonardo's group sales department at (801) 220-1100.
- While at the exhibit, consider purchasing the *BODY WORLDS* catalog.

# THE DAY OF YOUR VISIT

## **What to Bring**

- Confirmation letter
- Payment
- We require full payment upon arrival before your group is permitted to enter the exhibit. We accept cash or checks.
- If fewer individuals in your group arrive on your visit date, the group will be responsible for payment of all reserved tickets. If you arrive with more individuals than you reserved, additional ticket availability is not guaranteed. If you have more than 1 adult per 8 students in your group, your extra adults are required to purchase adult tickets at the group rate of \$20.50.

## **Arrive Early**

- Remember, groups must check in 30 minutes before scheduled exhibit entry time to provide adequate time for orientation and processing.
- If you are going to be late please contact The Leonardo as soon as possible by calling (801) 220-1100.

## **Storage Needs**

- Secured storage is available in the museum for school groups to store coats and lunches. Access to your assigned storage area will be given only to the group's leader.

# GETTING TO THE LEONARDO

## Directions

The Leonardo is located at 209 East 500 South in downtown Salt Lake City, in Library Square, just south of the Salt Lake City Library. See below for more detailed directions.

### From North (Ogden)

Merge onto I-15 South toward Salt Lake. Take the 400 South Exit (exit 307) and head east. Continue east on 400 South and turn right at 300 East. Continue to head south on 300 East, turn right at 500 South and turn right again on 200 East.

### From South (Sandy)

Merge onto I-15 North toward Salt Lake. Take the 600 South Exit (exit 306). Take the 600 South ramp and head east. Continue to head east on 600 South and turn left at 200 East.

## Bus Driver Information

### Arrival

Upon arrival, buses should drop off students on 200 East just before the light located midway between 400 South and 500 South (west side of Library Square).

### Bus Parking

Free bus parking is available in the lot situated one block east of The Leonardo. Enter the lot from Blair Street (340 East 400 South on eastbound 400 south). Blair Street is the first right turn east of 300 East. Buses may park at the north central section of the lot, this area will be coned off.

### Departure

The bus should be in the drop-off zone no more than five minutes prior to scheduled departure.

### Entrance

Direct your group to the School Group entrance, located on the north side of The Leonardo building.

## EXHIBIT FAQs

### **What is *BODY WORLDS*?**

The *BODY WORLDS* exhibitions are first-of-their-kind exhibitions through which visitors learn about anatomy, physiology, and health by viewing real human bodies, using an extraordinary process called Plastination, a groundbreaking method for specimen preservation 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 stem 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 the *BODY WORLDS* exhibits.

### **What is the purpose of the exhibition?**

The *BODY WORLDS* exhibitions aim to educate the public about the inner workings of the human body and show the effects of poor health, good health and lifestyle choices. They are also meant to create interest in and increase 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 informative 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 death, their bodies for educational purposes in the exhibitions. Currently, the Institute for Plastination has a donor roster of more than 9200 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 1920's 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 the visitor to relate the plastinates to his or her own body.

**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 the *BODY WORLDS* exhibitions around the world. It is important to note that the exhibition includes full-body plastinates with exposed genitals. We recommend the *BODY WORLDS* exhibits for children 10 and older. Visit [www.theleonardo.org](http://www.theleonardo.org) to read our full content advisory and parents guide.

**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.

**Why are there not more women plastinates in the exhibits?**

Sensitive to perceived community concerns, Dr. von Hagens did not want to appear voyeuristic in revealing too many female bodies. Further, he sees himself in the tradition of Renaissance anatomists, whose works traditionally included far more masculine than feminine bodies, since all but the reproductive systems are essentially the same. The musculature of male bodies is generally more pronounced and illustrates more aspects of the muscle system. The organs on display come primarily from the female body donors. However, since opening the exhibits, Dr. von Hagens has received numerous requests from women visitors to see more examples of female anatomy. Based on this, Dr. von Hagens has already added and will add more female plastinates to future exhibits.

## PERMISSION FORM

The Leonardo invites your student to take an eye-opening journey through the inner workings of the human body at one of the most anticipated touring exhibitions in the world, *Gunther von Hagens' BODY WORLDS 3: The Original Exhibition of Real Human Bodies & The Story of the Heart*. *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.

### Important information to know about the *BODY WORLDS* exhibition

- The *BODY WORLDS* exhibitions rely on the generosity of body donors; individuals who made declarations of will and gave their legal consent that, upon their death, their bodies could be used for educational purposes in the exhibition. All of the full-body plastinates and the majority of the specimens are from these body donors; some specific specimens that show unusual conditions and the fetuses shown in the prenatal development area stem from old anatomical collections.
- Most are without skin so you can see the bones, muscles, tendons, nerves, blood vessels and organs. Eyes and genitals on most of the bodies remain. Written descriptions accompany specimens.
- A separate section of the exhibition highlights prenatal development and includes embryos and fetuses. Visitors may choose whether or not to view this area.



### Parent / Guardian Permission Form

By signing this form, you are acknowledging that your child has permission to view the exhibition with a teacher, school supervisor or other school representative. If you do not wish for your child to see this exhibition, please ask the teacher to make other arrangements.

Date of field trip \_\_\_\_\_

Yes, I give (child's name) \_\_\_\_\_ permission to view the *BODY WORLDS 3* exhibition.

Parent/guardian's name (please print) \_\_\_\_\_

Parent/guardian signature \_\_\_\_\_

Date \_\_\_\_\_

# AMAZING FACTS ABOUT THE HUMAN BODY

## **The Skeletal System**

- The largest bone is the pelvis, or hipbone. In fact 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 oesophagus 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 .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 vapour 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.



To place lunch orders call (801) 220-1100 one week in advance of your field trip.

**Option A: # \_\_\_\_\_**

Peanut butter and Jelly on wheat bread

OR Sliced ham and cheese on wheat bread

Apple Slices

Brownie

Juice box

**Option B: # \_\_\_\_\_**

Tuna salad on wheat bread

Carrot Sticks (with or without dip)

Oatmeal raisin cookie

Bottled water

**Option C: # \_\_\_\_\_**

Turkey wheat wrap

Carrots or Edamame

Brownie

Bottled water

ADDITIONAL INFORMATION NEEDED:

Contact \_\_\_\_\_

School Name \_\_\_\_\_

Tax exempt number \_\_\_\_\_

Phone number \_\_\_\_\_

Email \_\_\_\_\_