

*Nasco's*



**University of  
Wisconsin-Whitewater**

# **Autopsy Kit**

**CRIME SCENE**



**Anticipated Lab Time**

2-3 hours

2-3 students per team



**Autopsy Kit Contents**

**Kit Contents**

3 modified fetal pigs

Data card (coded with gender, type of damage represented in pig)

3 toe tags

4 Nasco *Whirl-Pak*® bags

Observation sheets

**Suggested enhancement available from Nasco**

***Fetal Pig Items***

Dissection map (SB32578M)

Pictorial anatomy book (SB42389M)

Pro-Sect™ fetal pig (LS03725M)

Aprons (SB35157M)

DVD (SB45504M)

***Dissection Items Needed***

Instrument set

Scissors

Bone cutting shears

Scalpels

Forceps

Teasing needles

Probes

Dissection pins

Dissection tray

Dissection pan

Thread & sewing needle

Small ruler

Electronic Balance

String or thread

Hand lens or microscope

# Autopsy Kit Introduction

## OVERVIEW

This kit was developed to give you an introduction to the steps and typical results of an autopsy. We have substituted a fetal pig for a human, in consideration of the cost and the availability. However, we have kept most of the protocol the same. Each pig has been altered in some way to mimic a cause of death; it is your assignment to perform an autopsy to determine what is unusual, and therefore probably associated with the cause of death.

Some of the modifications may suggest criminal activity, while others may point to an accident. You are provided with a detailed protocol for your examination. As you work your way through the different stages, there will be descriptions of both normal and abnormal situations: finding an intact heart is normal, finding a heart with a bullet in it is not. You will record observations of both normal and abnormal appearance on the appropriate data collection forms. When you have completed the external and internal examinations, you and your team will review your findings and then submit your hypothesis of the cause of death.

## AUTOPSY

Millions of people die every year. In most cases, a person dies of a known cause. However, there are thousands of people who die of unknown causes or from traumatic injuries. In many of these cases, detailed examination may be desired or even required by law. When does an autopsy take place? It depends on the jurisdiction, but autopsies may be requested or required under the following circumstances:

1. If the person died suddenly, with no obvious disease and no recent medical attention.
2. If there were suspicious circumstances, especially involving drugs, alcohol, or other toxic substances.
3. If the death was violent or traumatic, and may have been homicide, suicide, or an accident.
4. If the person died on the job.
5. If the death occurred as part of diagnosis or treatment for a disease.
6. If the body was unidentified or unclaimed.

Autopsy is the term for the examination of a body following the person's death. It may be limited to external examination, or it may include an internal examination along with testing of tissues and bodily fluids for the presence of chemicals (drugs, toxins, etc.).

An autopsy may be conducted for medical reasons, to assess the impact of some treatment for a disease. An autopsy may be conducted to determine the specific cause of death of someone who died under suspicious or criminal circumstances. For example, a body is recovered after a fire — did the person die because of the fire, or was the fire staged to hide the death of the person?

An autopsy is typically performed by a team. The membership of the team varies from one location to another.

Death investigation includes many teams: police working at the scene and with survivors, witnesses, etc., as well as those people who examine the dead body. In the U.S., there are two models for gathering information about a body. Historically, Americans used the coroner system, in which an official (elected or appointed by the local government) was in charge of questionable deaths. This system was replaced in many locations in the 20th century by hiring medical examiners (ME), who were trained physicians, to work full-time or part-time to examine dead bodies. Many of these sought further specialized training to become forensic pathologists, trained specifically to examine dead bodies.

The advantages of the ME system are the higher level of training and more experience working with dead bodies. This system works well for large cities, with larger budgets and a higher number of cases to keep such people employed. The obvious limitation is cost — many communities, or even counties, cannot afford a position devoted to just this work. Many coroner systems have a physician on retainer (bringing the person in when there is a case) or send the body to a city or state lab.

## **BONES**

As you work through this exercise, you will be examining the external and internal anatomy of a fetal pig. The pig is a mammal, as are humans, and it has a similar anatomical structure, as seen in the similar locations of its internal organs.

You do not need to be an expert at anatomy to do this lab. In this guide, we have provided some labeled drawings, as well as descriptions of the major structures. You should use this information to identify the structures and to judge if they are significantly damaged or different from normal. The written descriptions include information on the normal function of each structure.

Mammals have an endoskeleton. Bones provide support and protection with low flexibility. Bones connect to each other at joints and are held together by ligaments. At the end of bones, and in your nose and ears, cartilage acts to provide support with more flexibility than bone.

In mammals, there are two groups of bones: the axial and the appendicular skeletons. The axial skeleton consists of the skull, vertebrae, ribs, and sternum, while the appendicular skeleton consists of shoulder, arms, hips, and legs.

A bone begins as cartilage, a flexible structure made of cells and protein, which grows in size and shape, to an approximation of the final bone. Early on, new cells migrate into special locations (centers of ossification) in the model bone. These cells will begin converting the cartilage model into bone by a combination of cell division and deposition of proteins and minerals into the area around them, forming a rugged structure. Thus, cartilage is replaced by bone, and this begins before the cartilage reaches the full, final size of the bone. There is a pattern to the process, usually starting in the middle of a bone and progressing outward. The timing of growth and replacement generally corresponds to the individual's biological age, and this can be used to estimate the age of a young person's skeleton. Beyond telling us about the developmental age of an individual, bones can also reflect the health and nutrition of a person during those developmental years — poor nutrition is reflected in spindly or malformed limbs.

Conversion (ossification) is completed in young adults, usually in the early twenties. However, bone is far from being inert. Bones serve as a storage site for calcium, each of which is also used in daily physiology (chemical reactions that the body performs). If a person does not provide enough calcium in their daily diet to cover their calcium expenses, the remainder of the calcium is supplied by the bones. However, removal of calcium from bone means the bone becomes thinner and weaker. Taking calcium out of the bones is like taking money out of your bank account — occasional withdrawals are not a problem, as long as they are followed by deposits. However, repeated loss of calcium is just like repeatedly raiding the piggy bank — eventually you are broke. Repeated loss of calcium leads to osteoporosis (bones with holes). These bones are likely to break under stress, even the daily work of supporting the body (hips) or the head (dowager's hump).

Bones can provide a fairly accurate age range estimate for children. They can also provide age or experience indicators in adults. Bones are not immutable — they are going to change throughout a person's life. If a person has poor nutrition, bones will weaken. If a person is active, bones will be stronger. The bones of an active aerobics instructor will be noticeably stronger (denser, heavier) than those of someone with a desk job who does not exercise. In fact, the pitching arm of a major league baseball player has detectably thicker bone than his catching arm — the stress of throwing the ball repeatedly and at high speeds causes the arm to add even more calcium. As mentioned above, bones may lose mass during a person's life if there is inadequate calcium intake. Calcium is lost on a daily basis — it is used for physiological activities, goes into the bloodstream, is filtered out by the kidney, and is lost in urine in small quantities; this must be replenished in diet. If there are inadequate amounts of calcium in the diet, the missing amount is supplied by removal of calcium from bones. This occurs to a higher degree when a woman is pregnant. During pregnancy, the fetus benefits from high priority signals to the mother's body; these signals direct the release of crucial materials out of storage and into the bloodstream of the mother, which then allows for transfer into the fetus's bloodstream.

Other changes to bone include fractures and breaks, each of which will leave scars as the bone is repaired naturally, as well as the pins, plates, and screws associated with surgical repair. Bone can even become infected; the repair process will often deform the appearance of the bone, leaving a record of the person's experience. Arthritis (inflammation of bones at joints) leads to a repeated cycle of bone damage and repair, which also leaves scars and damage.

## ORGANS

Think about vertebrates, mammals, and primates. We share many physical and chemical characteristics. In particular, we have similar skeletons and similar organs.

The organs of mammals have the same functions and are located in comparable sites within our bodies. The sizes of organs vary among mammals, relating mostly to the size of the animal, and sometimes to gender for those species that show gender differences in size. Obviously, there are some differences in which organs are present with male and female mammals, but otherwise we are remarkably similar inside. This reminds us that usually little information on identification comes from internal organs. On the other hand, organs are an invaluable source of information about the cause of death, even in the absence of external signs.

## **SAFETY**

1. Read the instructions before the lab — know what you are going to do.
2. Listen to any specific instructions given by your teacher.
3. Wear appropriate clothing and a coverall if directed. Wear safety glasses or goggles to protect your eyes from splashes.
4. Wear gloves.
5. Use the tools responsibly. The scalpel has a sharp edge and probes can penetrate soft tissue, as can pins.

## **RESPONSIBILITIES**

Before entering the examination suite (the lab), read the instructions for the entire section of the autopsy you will be performing. You may be asked to switch roles.

There are four roles in this activity. The diener, a German term, is the term for the technician, who performs the preparation and assists the pathologist. The pathologist, or the medical examiner, is the person doing the central role — examining the body and identifying key structures. In this activity, there is a leader, who reads the script, and a recorder who makes notes of observations. At the end, all members of the team will sign the evidence sheets, indicating they all agree with the observations recorded. Divide these duties among your team members.

You are responsible for performing the work in a serious manner. You also need to clean up after your team, disposing of materials as indicated by your instructor.

## **TOOLS AND PROCEDURES**

The key tools for the internal examination are a scalpel, a pair of scissors, a pair of forceps, a probe, and pins.

The scalpel is essentially a thin-bladed knife. It is used in surgery and dissection to cut soft tissue that is long or wide, but shallow, or to begin cutting into the surface of a structure. Use it essentially the same way you use a knife during a meal: hold it in your dominant hand and press lightly so the sharp edge makes contact with the surface to be cut. Begin pressing firmly but gently, then progressively increase the pressure applied. Many soft tissues are thin and easy to cut, while others offer significant resistance.

The scissors are familiar, a cutting instrument with two blades that trap and cut material as the blades slide past each other. Scissors are particularly useful for cutting small, defined structures (blood vessels, things up to 1 cm in diameter). With both of these tools, try to avoid multiple small cuts (hacking) — try to make the cuts continuous.

Forceps are the medical instruments that resemble tweezers and are used for the same purpose: grasping an object and holding it firmly. This may be useful to keep an object in place while cutting, or to move an object out of the way while examining structures underneath it.

In surgery and dissections, a probe is an instrument used to examine an area. It can help to lever something out of the way, or it can be pushed into an opening to determine if a cavity is empty or full. Probes can be pointed or blunt. Pins are used to secure an object to something else — here, you will use pins to prevent a flap of skin that has been partially cut away from returning to cover the area where you are working.

There is one special step. In the preparation stage, before cutting into the body, the diener will need to do a double ligature on the carotid artery. Ligature refers to the material (e.g., surgical thread) used to tie a body part, like stitches following surgery. Here, thread needs to be tied around the main artery supplying blood to the brain, closing the vessel. Because the vessel may have fluid valuable in the later investigation, the diener needs to tie thread around this vessel and close it. Do this two times and then cut between these two constrictions.

# Forensic Autopsy — Student Instructions

## EXTERNAL EXAMINATION

To begin the autopsy, you need to examine all the external surfaces thoroughly.

Begin by removing the body (fetal pig) from the cooler or other storage area. Place it on the examination table. The body must have a toe tag, as described in the Introduction, to indicate that permission has been obtained for the autopsy.

Take out the page labeled “External Examination Form.” This form provides you with locations to record your observations of the overall appearance of the body.

First, fill out Boxes 1, 2, and 3. These provide identification of the subject, the location of the examination, and the names of the examiners.

Next, fill out Box 4, describing the external appearance of the body. Describe the overall coloring of the body. Pigs are usually described as white, black, or red. If the pig is multicolored, draw in the pattern on the diagrams. Look for any distinguishing marks.

Use the instructions that follow to help you identify and describe additional characteristics. Use the directions on the “External Examination Form” to help you identify and evaluate additional characteristics.

Use Box 5 to record any evidence of external trauma. Use the definitions on the “External Examination Form” to classify any markings, then note the positions of these markings on the drawings corresponding to the appropriate view of the body.

## INTERNAL EXAMINATION

Transfer the pig to a dissecting pan. The body of the pig will tend to tip onto its side, so you must secure the body before starting to cut it open. Tie a string around one fore foot of the specimen. Pass the string under the dissecting pan. Tie the string to the opposite fore foot, stretching the fore limbs out at right angles to the body. Do the same with the hind limbs. The ventral (abdominal) surface is now exposed. If you do not finish today, you will untie the limbs, store the body, and then repeat this next time.

### INITIAL CUTS

Prepare to cut open the body. When opening the abdominal and thoracic (chest) cavities, be sure that you cut only through the skin. Do not cut deeper and damage any underlying structures. Cut slowly, lift the edge of the cut as you go, watching the ends of the scissors. This is important advice to follow as you cut internally.

Open the trunk (the main part of the body) by making a Y-shaped incision. You will make three cuts that should meet at the xyphoid process, which is at the bottom of the sternum (the bone they warn you not to break during manual CPR). Make one cut from the upper left chest, near the shoulder, angling down toward the tip of the sternum. Make a similar cut on the right side, ending in the same place. From that intersection, cut along the midline of the body to the pelvis. Cut slightly to one side around the umbilicus. This cut ends at the pubic symphysis, the joint in the pelvis where bones meet in front.

Once the Y incision has been made, measure the depth of the fat pad (in cm) at the umbilicus (navel). Record this value.

Record the gender of the pig. If the specimen is male, remove the skin in the midline before opening the body cavity. Identify the penis and scrotal sac.

## ***The Chest Cavity***

Pull the skin away from the ribs and fold it over and out from the body. Sever connective tissue as you pull the skin outward. This process, of folding soft tissue over to reveal material underneath, is called reflection. Once the skin is reflected from the chest, check the ribs for fractures.

Cut through the ribs with strong scissors to remove the breast plate (the chest ribs and the sternum), being sure not to cut too deeply. Begin the cut at the anterior (top) edge of the ribcage on the side. Cut connective tissue while lifting out these bones. This exposes the heart and lungs. Note if there is a large volume of fluid in the spaces around the heart and lungs.

Removal and examination of the internal organs from the chest and abdomen follows one of two methods. With the Virchow technique, widely used in the U.S., organs are removed one by one. We will follow the Virchow method.

### **HEART**

Examine the heart in place (in situ). The heart is positioned in the center of the chest, just below the sternum, which you removed with the ribs. There is usually a small amount of fluid in the pericardial sac, the membrane around the heart. An excessive amount of fluid in this space may indicate severe blunt force trauma suffered in the chest region. Start the examination with a small incision into the membrane to determine the amount of fluid surrounding the heart, then open it fully to expose the heart.

Remove the heart by cutting the major blood vessels (the aorta, the superior and inferior vena cava, and the pulmonary arteries and veins). Weigh the heart.

### **LUNGS**

Examine the lungs in situ before removing them. Run your hand along the perimeter of the lungs, searching for adhesions, places where the lungs have stuck to the internal walls of the chest. Healthy lungs should be free-floating. Describe the color of the surface of the lungs.

Remove the lungs. Lift each lobe of the lungs, and cut the bronchus and pulmonary blood vessels. Lift the lungs out from around the aorta, esophagus, and trachea.

Separate the lungs into the left and right sections by cutting the primary bronchial attachments. Remove and weigh each lung.

### **THE NECK**

Reflect the flap of skin at the top of the chest upward, gently pulling while cutting connective tissue, until the chest flap is at chin level. Examine the structures of the neck and nearby areas for damage. This includes muscles, the trachea, the esophagus, and the tongue. In particular, look for petechiae, bruising and fractures.

### **TRACHEA**

Remove the trachea from the body. Dissect the thyroid gland away from the rear surface of the trachea with scissors. Weigh the thyroid.

Cut the rear (dorsal) surface of the trachea lengthwise (longitudinally). Examine the trachea for the presence of particulates, bleaching or change of color, and fractured cartilage rings.

## ***The Abdominal Cavity***

Begin your examination of the abdomen by reflecting the skin of the abdomen to expose the remaining organs. Note if large volumes of fluids are present here. Note the position and condition of the organs. Examine the organs carefully for openings associated with projectiles.

Begin the dissection of the abdomen by cutting connective tissue anchoring the large intestine, since it overlies the other organs. These cuts can be made either with scissors or scalpel. Cut the organs apart, trimming away connective tissue. As you remove each organ, weigh it and then dissect it. Keep a section of the intestines for later examination.

### **LIVER**

Examine the liver. The surface should be smooth and glistening. Cut the liver away from its blood vessels. Weigh the liver. Slice the liver open — is it firm or is it fatty?

### **GALLBLADDER**

Remove the liver, weigh it, and place it facedown to expose gallbladder. Open the gallbladder and examine the contents.

### **KIDNEYS**

Remove the kidneys, cut the renal artery and vein and cut the ureter. Weigh the kidneys. Cut one kidney lengthwise and examine the interior.

### **BLADDER**

Examine the ureters and the bladder. Open the ureters, bladder, and urethra, and look for stones.

### **SPLEEN**

Remove the spleen and weigh it.

### **ADRENAL GLANDS**

The adrenal glands sit on the upper surface of the kidneys.

### **PANCREAS**

Lift the stomach and clear away the thin peritoneal membrane. Find the pancreas. Remove and examine the pancreas.

### **STOMACH**

To collect each organ of the gastrointestinal tract and its contents, you need to tie it closed at each end with a knot, or ligature. To do this, cut a piece (4 inch/10 cm) of string or thread. Loop it around the tube, then pull it snug and make a knot. Leave space (about  $\frac{1}{2}$  inch/ $1\frac{1}{2}$  cm) when two ligatures need to be near (after stomach, before small intestine) for space to cut. Remove each section of the GI tract, gently cutting away connective tissue holding the organs in place.

The stomach, small and large intestines are usually the last internal organs examined and removed. Open the intestines over a sink or other leak-proof container.

Remove the stomach by cutting its connections to the esophagus above and the duodenum (first section of the small intestine) below. The stomach is directly beneath the diaphragm, in the left region of the upper abdomen.

Cut open the stomach along the greater and lesser curvatures. Empty the contents into a shallow container and weigh them. Describe the stomach contents, measure the amount of fluid, food and other material.

## **SMALL INTESTINE**

Cut open the jejunum (the second section of small intestine), remove a small section and place in a dish of water. Examine the inner surface under a hand lens or a dissecting microscope.

## **LARGE INTESTINE**

Cut open the large intestine, remove a section of descending colon, and place it in a bowl of water. Compare to the section of small intestine.

## **LYMPHATIC ORGANS**

Remove any remaining portions of the duodenum and descending colon. After the small and large intestines have been removed, examine the mesentery.

Remove the peritoneum and connective tissue from the ventral surface of the abdominal cavity. Identify the reproductive organs, do not remove yet. Examine the inner surface of the ribs and vertebrae visually and by palpation. Record any damage to the bones themselves or to the connections between them.

## ***The Head***

Examine the scalp closely for injuries hidden by hair. Such injuries might require shaving the perimeter of the wound.

Examine the eyes and eyelids for small red dots. These are petechiae, blood from burst capillaries. They are found in the conjunctivae, the mucous membrane found across the surface of the eye and also lining the eyelid, of individuals who die of strangulation.

## **ORAL CAVITY**

Use bone clippers and scissors to cut at the angles of the jaw, exposing the oral cavity. Beginning with the nares (the nostrils), identify the hard palate, the soft palate, the nasopharynx, the esophagus, the glottis and the epiglottis, and the tongue. Examine the interior of the mouth, inside the cheeks and under the lips, for evidence of trauma.

## **TONGUE**

Examine the tongue for damage.

## **TEETH**

Record which teeth have erupted.

## **EYES**

Examine the eyes for petechiae.

## **EAR CANALS**

Look in the ear canals for blood. Evidence of hemorrhage may indicate a traumatic head injury.

## **SKULL**

To examine the brain, it is necessary to cut through the skull. Raise and support the head above the shoulders with a head block. Use a scalpel to make the incision, starting behind the right ear, encircling the back of the head, and ending behind the left ear. Peel the skin of the scalp forward and over the face; pull the skin below/behind the cut down over the neck and toward the shoulders and back. Examine the skull.

## **BRAIN**

Observe the brain in place. Examine the brain for injury. Remove the brain. Weigh the brain and record this weight. Identify the olfactory bulb, cerebrum, cerebellum, and spinal cord. Cut a slice of brain for later examination.

Strip the remaining dura mater from the cranial cavity. Examine the interior of the skull for signs of fractures or other injuries.

## ***The Musculoskeletal System***

### **MUSCLES**

Examine the muscles for incisions and puncture wounds.

### **BONES**

Examine the major bones and cartilage (arms, legs, skull, jaw, nose, ribs, sternum, pelvis, vertebral column) for evidence of fractures, recent or older. Look at all the bones that are visible. Run your gloved fingers over bones and cartilage, checking for bumps that are not at joints.

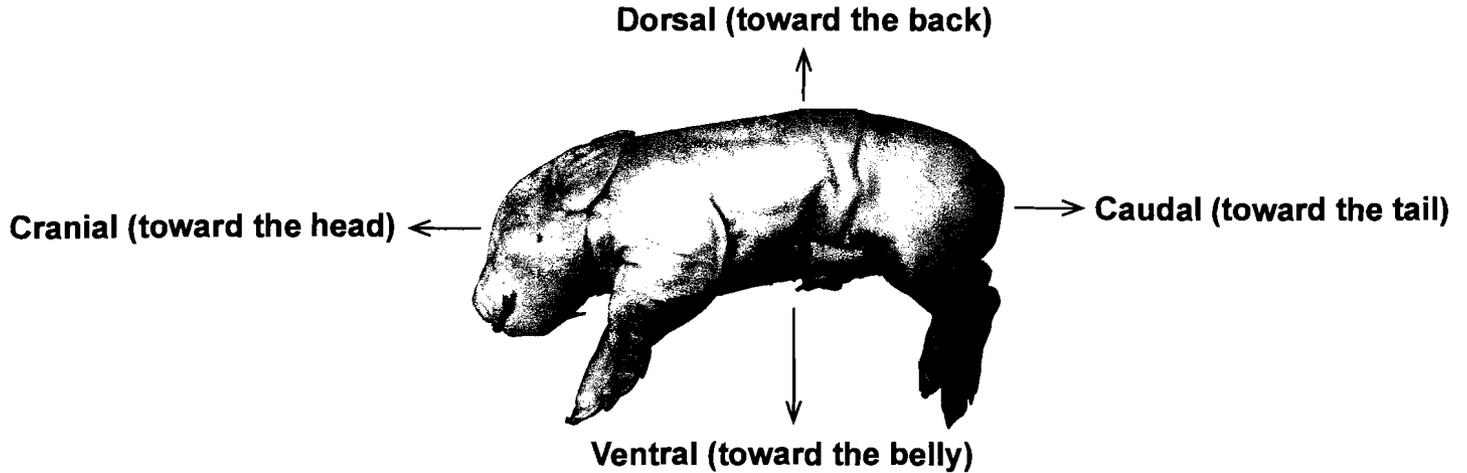
## ***Completion***

When you have completed your examination, close the **Whirl-Pak**<sup>®</sup> bag and place it in the body cavity. Replace the breast plate and close the skin over the abdomen. Gently sew the Y-incision closed. This is a standard procedure in the morgue.

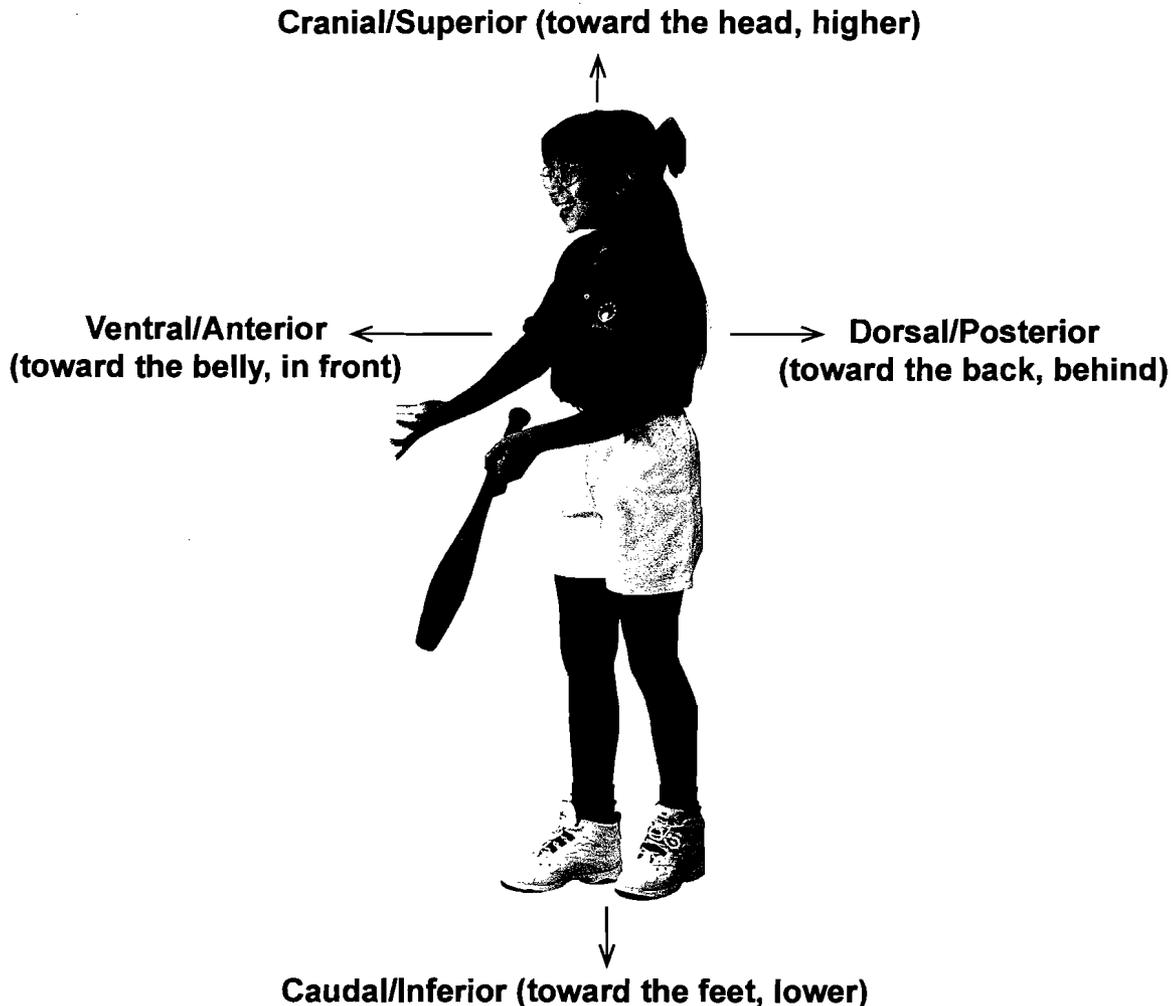
# University of Wisconsin-Whitewater Autopsy Kit

## Anatomical Directions and Positions

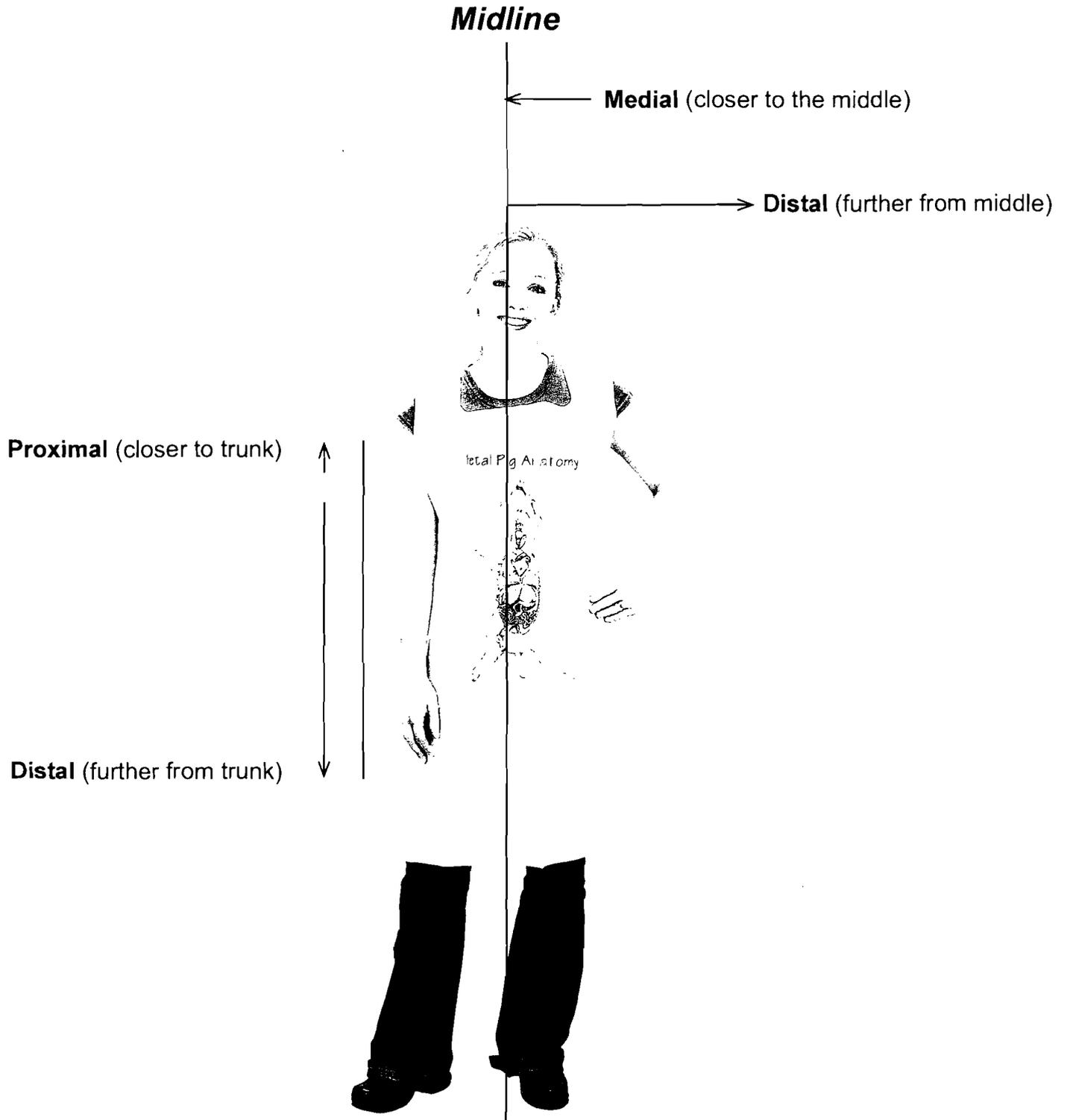
As we travel through the body in this exercise, we will use terms to describe where one structure is relative to other parts of the body. With four-legged animals like the pig, we can use an imaginary set of compass points indicating front and back, top and bottom.



Humans have similar anatomical directions, but ours are modified to fit the change from four-footed (quadruped) to two-footed (biped).



There are also four terms to describe the position of a structure relative to other structures. Two terms describe positions relative to an imaginary line drawn through the middle of the body, and two terms describe positions on the limbs (arms and legs) relative to the trunk.



**Box 1: Subject**

Case Number: \_\_\_\_\_

Name: \_\_\_\_\_

**Box 2: External Examination Form**

**Office of Autopsy**

Head Coroner: \_\_\_\_\_

Jurisdiction: \_\_\_\_\_

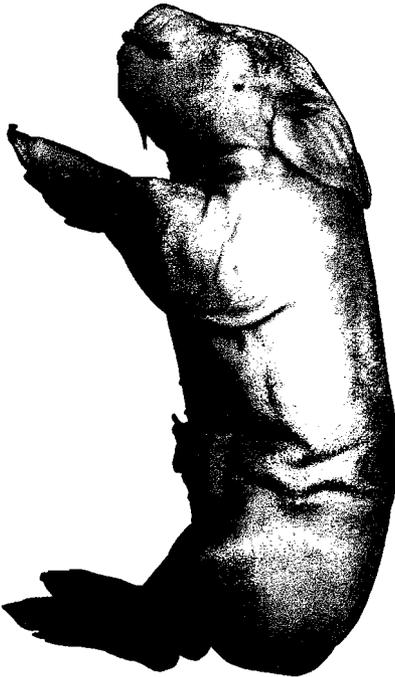
(school name)

**Box 3: Participants**

Date: \_\_\_\_\_

Examiners: \_\_\_\_\_

(student names)



**Box 4: Overall Appearance**

Coloring \_\_\_\_\_

Distinguishing Marks \_\_\_\_\_

Length (nose to rump) \_\_\_\_\_" (\_\_\_\_\_ mm)

Approximate Age \_\_\_\_\_

Weight \_\_\_\_\_ lbs. (\_\_\_\_\_ g)

Body Development \_\_\_\_\_

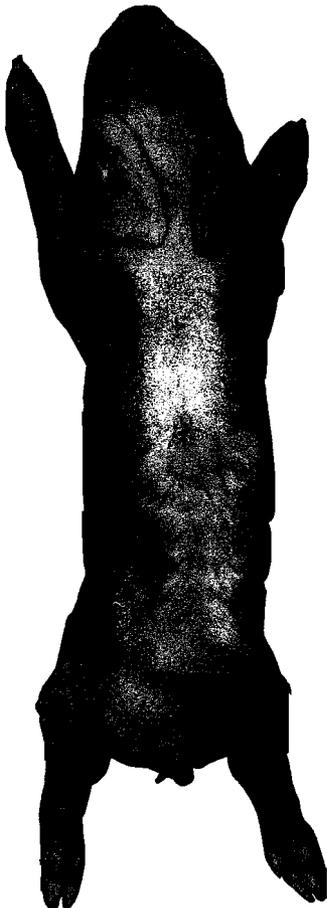
Nutrition \_\_\_\_\_

State of Preservation \_\_\_\_\_

Body Temperature \_\_\_\_\_

Mortis, Rigor \_\_\_\_\_

Mortis, Livor \_\_\_\_\_



**Box 5: External Signs of Trauma**

Contusions (C)

Abrasions (A)

Lacerations (L)

Punctures (P)

Incisions (I)

Amputation (---)

Fractures (xx)

Gunshot Wound (G)

Knife Wound (K)

Foreign Object (F)



**Directions:** Use one form per body (fetal pig). Complete the first three boxes. Examine the external surfaces of the deceased thoroughly. Record any signs of abnormal appearance on the appropriate drawings, using the code listed in Box 4. Write in additional notes as necessary. Complete Box 5.

**Box 1: Identity**

Write in the case number and the name of the deceased on the appropriate lines. These pieces of information will be found on the toe tag.

**Box 2: Jurisdiction**

Write in the name of the teacher or instructor as the coroner. Write in the name of the school, the city, and the state as the jurisdiction.

**Box 3: Examiners**

Write in the date of examination. Write in the names of the students as examiners.

**Box 4: Overall Appearance**

Use the definitions below to help you identify and describe additional characteristics.

**Coloring:** Describe the overall color (white, black, red). Draw in any patterns.

**Distinguishing Marks:** skin blemishes (freckles, moles), scars, tattoos, piercings, etc.

**Length (substitutes for height):** measure from nose to rump; units in inches or in centimeters.

**Approximate Age:** Estimate the age of the body based on length vs. age table (next page).

**Weight:** measure on a balance; units in pounds or grams.

**Body Development:** This pig has average development.

**Nutrition:** This pig has adequate nutrition.

**State of Preservation:** This pig is well preserved.

**Body Temperature:** This pig is either cool (room temperature) or cold (refrigerated).

**Mortis, Rigor:** This pig shows no sign of muscle stiffening, so rigor is gone.

**Mortis, Livor:** This pig shows no sign of blood settling, so livor is absent.

**Box 5: External Signs of Trauma**

Use the definitions below to guide you in identifying any surface marks. Use the code symbols in Box 5 to record their locations.

**Contusion (C)** = a bruise; a superficial injury, due to impact, without breaking the skin

**Abrasion (A)** = a scrape, a mechanical wearing away of skin

**Laceration (L)** = a rip; a wound with torn, ragged, or mangled edges; skin was broken but not because of sharp edge

**Puncture (P)** = a hole; a pierced, penetrated, or punctured wound; skin was broken, with narrow but possibly deep wound, made by narrow but long object (e.g., nail, needle, syringe)

**Incision (I)** = a cut, a wide but relatively shallow wound made by a sharp object (use this if cutting object is unknown — see also knife wound)

**Amputation (---)** = a limb or part of the body that was removed

**Fracture (xx)** = break or crack in bone or cartilage

**Gunshot Wound (G)** = entrance (with or without exit) hole associated with ammunition from a firearm; appearance may vary with the type of ammunition, the distance between the weapon and the target, etc.

**Knife Wound (K)** = surface (or deeper) wound produced by a knife or other cutting edge (use this if it is clear the cut was made by a knife — see also incision)

**Foreign Object (F)** = entrance (with or without exit) hole not associated with ammunition from a firearm. Appearance may be irregular.

## BACKGROUND

Use the definitions below to help you identify and describe additional characteristics.

**Coloring:** Describe the overall color of the body (white, black, red) and draw in the pattern.

**Distinguishing Marks:** Record any skin blemishes (freckles, moles), scars, tattoos, piercings, etc.

**Length (substitutes for height):** Measure from nose to rump; units in inches or centimeters.

**Approximate Age:** Estimate the age of the body based on the table below.

*With humans, age would be estimated based on several factors, including height, wear and tear, teeth, etc.*

### Length vs. Age Chart

Size	Time
1½" (40 mm)	56 days
3⅛" (80 mm)	68 days
4" (100 mm)	75 days
5⅞" (150 mm)	86 days
8⅝" (220 mm)	100 days
11⅞" (300 mm)	115 days

full gestation

**Weight:** Measure on a balance; units in pounds or grams.

**Body Development:** This pig has average development.

*With humans, development describes not the age, but the muscularity of the body, and can be rated as being skinny, average, muscular, or overweight.*

**Nutrition:** This pig has adequate nutrition.

*With humans, adequate nutrition indicates the person is neither malnourished, nor undernourished. An individual who is cachetic suffers from general ill health and malnutrition. A person who is obese is significantly overweight. In addition, bodies may be described as having cyanosis (bluish color, a sign of inadequate oxygen), jaundice (yellow color, sign of bile remaining in the body, often associated with problems of the liver), ascites (accumulation of fluid in the abdomen, or edema (accumulation of fluid in tissues, often in segments of the body like the arms and legs).*

**State of Preservation:** This pig is well preserved.

*With humans, the body may be found at the time of death or long afterwards. A body in good preservation was collected by authorities at the time of death or soon afterwards. A body in the early stages of decay will match the temperature of its surroundings, go into and out of rigor mortis (locking of muscles), have shrinking skin, and may have insects laying eggs on or in it. A body that is putrid is undergoing decay, may be bloated, may have fluids leaking out, will be turning colors (purple, green, etc.), and will smell. Once all the soft tissues have disappeared, the body is skeletonized, and it may or may not have remnants of hair, clothing, jewelry, etc.*

**Body Temperature:** This pig is either cool (room temperature) or cold (refrigerated).

*With humans, a live body maintains an internal temperature of 98.6° F (37° C). Following death, the body will gain or lose temperature based primarily on the environment. The temperature will usually begin to drop for a day or two, although it may then increase as bacteria begin multiplying. Eventually, the body equilibrates — it matches the temperature of the environment. Thus, body temperature could be warm (recently dead), cool (room temperature), cold (outdoors, at night, or refrigerated), or frozen (outdoors in winter or in a freezer). Temperature of a newly discovered body is usually measured with a special probe that is inserted through the abdominal wall into the liver.*

**Mortis, Rigor:** This pig shows no sign of muscle stiffening, so rigor is gone.

*With humans, rigor mortis describes the change in which muscles stiffen (lack of ATP) then relax (deterioration of muscle fibers). This generally correlates with the time since death for newly dead bodies, but it is influenced by so many factors that it does not provide an accurate estimate of time. If rigor is absent, the body may be recently dead. If moderate, death probably occurred within a few hours. If marked, death may have occurred several hours to a day in advance. After several hours to a couple of days, rigor passes and is absent or gone.*

**Mortis, Livor:** This pig shows no sign of blood settling, so livor is absent.

*Blood is kept moving by the heart; when the heart stops, the blood is no longer pumped. Initially, there will be no accumulation of blood, so livor mortis is absent. However, blood cells will follow gravity and begin settling in the lowest accessible areas. This pooling of blood cells is called livor mortis and can be pink or purple. If the body is shifted, the cells will shift also, and livor mortis is non-fixed. As time passes, though, the blood vessels weaken, and blood cells move out of the vessels and into tissues. Once in the tissues, the cells no longer have easy-to-follow pathways and tend to stay in the tissues, and livor mortis is fixed. The location of the color — on the back (dorsal) or front (ventral) of the body is important — that part of the body was lowest following death. A body found with livor mortis that is not at the lowest level has probably been moved.*

# INTERIOR EXAMINATION FORM

## I. Organ Weights

Organ	Weight (g)
Heart	
Lungs	
Liver	
Kidneys	
Stomach	
Brain	

## II. Observations

Organ	Notes on Appearance
<i>Chest Cavity</i>	
<i>Abdominal Cavity</i>	
<i>Head</i>	
<i>Musculoskeletal System</i>	

## III. Comments

**Internal Examination**  
(use to record injuries)



**EVIDENCE**

## EVIDENCE

Case Number: \_\_\_\_\_ Item Number: \_\_\_\_\_

Location: \_\_\_\_\_

Collected by: \_\_\_\_\_

\_\_\_\_\_/\_\_\_\_\_  
DATE TIME

Description:

**EVIDENCE**

## EVIDENCE

Case Number: \_\_\_\_\_ Item Number: \_\_\_\_\_

Location: \_\_\_\_\_

Collected by: \_\_\_\_\_

\_\_\_\_\_/\_\_\_\_\_  
DATE TIME

Description:

**EVIDENCE**

## EVIDENCE

Case Number: \_\_\_\_\_ Item Number: \_\_\_\_\_

Location: \_\_\_\_\_

Collected by: \_\_\_\_\_

\_\_\_\_\_/\_\_\_\_\_  
DATE TIME

Description:

**EVIDENCE**

Package opened by: \_\_\_\_\_

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Time: \_\_\_\_\_ AM / PM

Reason: \_\_\_\_\_  
\_\_\_\_\_

**EVIDENCE**

Package opened by: \_\_\_\_\_

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Time: \_\_\_\_\_ AM / PM

Reason: \_\_\_\_\_  
\_\_\_\_\_

**EVIDENCE**

Package opened by: \_\_\_\_\_

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Time: \_\_\_\_\_ AM / PM

Reason: \_\_\_\_\_  
\_\_\_\_\_

**EVIDENCE**

Package opened by: \_\_\_\_\_

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Time: \_\_\_\_\_ AM / PM

Reason: \_\_\_\_\_  
\_\_\_\_\_

**EVIDENCE**

Package opened by: \_\_\_\_\_

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Time: \_\_\_\_\_ AM / PM

Reason: \_\_\_\_\_  
\_\_\_\_\_

**EVIDENCE**

Package opened by: \_\_\_\_\_

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Time: \_\_\_\_\_ AM / PM

Reason: \_\_\_\_\_  
\_\_\_\_\_

**EVIDENCE**

Package opened by: \_\_\_\_\_

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Time: \_\_\_\_\_ AM / PM

Reason: \_\_\_\_\_  
\_\_\_\_\_

**EVIDENCE**

Package opened by: \_\_\_\_\_

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Time: \_\_\_\_\_ AM / PM

Reason: \_\_\_\_\_  
\_\_\_\_\_

**EVIDENCE**

Package opened by: \_\_\_\_\_

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Time: \_\_\_\_\_ AM / PM

Reason: \_\_\_\_\_  
\_\_\_\_\_

**EVIDENCE**

Package opened by: \_\_\_\_\_

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Time: \_\_\_\_\_ AM / PM

Reason: \_\_\_\_\_  
\_\_\_\_\_