INSTRUCTIONS

The following worksheets are mostly grouped according to the major systems of the body, just as the BODY WORLDS exhibition is. Complete these questions as you tour through the exhibition.

Questions can be answered by reading the text, observing the specimens and others will require that you draw conclusions from your tour of the exhibition and personal experience.

Be sure to read the questions carefully so that you can eliminate answers that are incorrect. If you can’t find the correct answer, mark it for discussion with your class at a later time.
1. The smallest bones in the body are located in the _____________.
   a  nose  b  ear  c  fingers  d  toes

2. The bones play several roles in the body.
   Which of the following is not a function of bones?
   a  protecting inner organs  b  deposit of minerals
   c  body support  d  filtering harmful materials from the body

3. The human hand has an equal number of bones and muscles.
   a  true  b  false

4. How much does an adult’s skeleton weigh?
   a  about 2 kg (5 pounds)  b  7 to 9 kg (15-20 pounds)
   c  half of the weight of the body  d  about 45 kg (100 pounds)

5. The main blood cell production sites are in ________________ bones
   such as the breast bone, ribs, shoulder blades and pelvis.
   a  large  b  small  c  flat  d  long

6. Cartilage is one of the tissues of the body that is not supplied with blood.
   a  true  b  false

7. The spine normally has how many vertebrae?
   a  13  b  23  c  33  d  34
SKELETAL SYSTEM

8. Which joint bares the most weight in the body?
   a  □ shoulder  b  □ hip  c  □ knee  d  □ ankle

9. Ball-and-socket joints include the following:
   a  □ neck and spine  b  □ toe and finger
   c  □ ankle and knee  d  □ hip and shoulder

10. Arthritis is most common in those who are:
    a  □ over the age of 50  b  □ overweight
    c  □ overly active  d  □ a & b (over age of 50 and overweight)

11. What are the three bones that make up the shoulder joint?
    a  □ the collarbone, the shoulder blade and the upper arm bone
    b  □ the clavicle, the scapula and the humerus
    c  □ both a. & b. since they refer to the same bones
MUSCULAR SYSTEM

1. When a muscle contracts it _________________.
   a  shortens  b  relaxes  c  lengthens  d  softens

2. There are more than 620 _____________ muscles in the body.
   a  involuntary  b  voluntary  c  total  d  arm and leg

3. Muscles convert energy into movement.
   a  true  b  false

4. Muscle performance gradually declines beginning around the age of
   a  15  b  30  c  45  d  60

5. What do tendons do?
   a  connect bones to each other
   b  reduce friction and lubricate joints
   c  connect muscles to bones

6. Which of the following is true about muscles?
   a  they can be increased by 15-20%
   b  they are pre-determined in size when we are born
   c  they are all attached to bones
   d  they can double from their natural size through exercise
MUSCULAR SYSTEM

7. Which is true about voluntary and involuntary muscles?
   a  Voluntary muscles cannot be controlled, while involuntary muscles can.
   b  Involuntary muscles and voluntary muscles can be controlled.
   c  Voluntary muscles can be controlled, while involuntary muscles cannot be.
   d  Involuntary muscles do not exist in adults, all adult muscles are voluntary.

8. Muscles are not used in which of the following activities
   a  breathing  b  moving  c  seeing  d  thinking

9. Males have more muscle mass than females
   a  true  b  false

10. Take a moment to describe which plastinates you felt best displayed the muscular system.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

________________________________________________________________________
________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
NERVOUS SYSTEM

1. The brain and spinal cord make up the _________________________________.
   a  □ central nervous system  b  □ nervous system
   c  □ peripheral nervous system  d  □ upper body

2. The brain makes up ______________ of our total body weight, but requires __________ of our bloody supply.
   a  □ 20% and 2%, respectively  b  □ 2% and 20%, respectively
   c  □ 3% and 30%, respectively  d  □ 30% and 3%, respectively

3. In terms of evolutionary brain development, the ________________ is one of the oldest parts.
   a  □ cerebellum  b  □ spinal column
   c  □ brainstem  d  □ corpus callosum

4. Which part of the brain controls our movement?
   a  □ cerebrum  b  □ thalamus  c  □ cerebellum  d  □ corpus callosum

5. During a severe brain hemorrhage blood pours into the cerebral matter.
   a  □ true  b  □ false

6. Regular exercise stimulates the brain.
   a  □ true  b  □ false

7. The ____________________________ is the largest part of the brain.
   a  □ brainstem  b  □ cerebrum
   c  □ cerebellum  d  □ corpus callosum
NERVOUS SYSTEM

8. Nerve cells can travel at speeds of up to ______________ .
   a. 8 km/h (5 mph)  b. 80 km/h (50 mph)  c. 400 km/h (250 mph)  d. 800 km/h (500 mph)

   a. from in the brain  b. from in the spinal column  c. from either the brain or spinal column

10. List three activities that stimulate new brain areas and strengthen existing neural networks.
    a. ____________________________ 
    b. ____________________________ 
    c. ____________________________ 

RESPIRATORY SYSTEM

1. Tar and soot particles from cigarette smoke form deposits in the __________ tissue.
   a  skin      b  pulmonary  c  muscle      d  cardiovascular

2. Every minute, about _______ pints of air pass into the lungs.
   a  2-3    b  5         c  10-12     d  20

3. Breathing is an exchange process of oxygen and carbon dioxide.
   a  true    b  false  

4. The thyroid is a gland in the neck that produces ________________________.
   a  saliva   b  oxygen  c  hormones    d  all of the above

5. Nicotine raises the levels of a neurotransmitter called dopamine
   a  true    b  false  

6. Each lung contains _________________________ alveoli
   a  300 to 450  b  300-450 thousand  
   c  300-450 million d  300-450 billion

7. The bronchial passages of the lungs lead to clusters of tiny air sacs called ______________.
   a  alveoli  b  tracheas   c  capillaries  d  bronchial trees

8. What causes deepening of the voice in puberty, particularly in males?
   a  the larynx growing larger and thicker  
   b  the larynx shrinking and getting thinner
   c  chronic lung disease as a child  
   d  smoking and pollution
9. Studies show that _________ of all deaths caused by heart disease are related to smoking.
   a  10%  b  15%  c  20%  d  50%

10. Lung cancer is ____________________________ common in smokers than non-smokers.
    a  10 times less common
    b  equaly
    c  10 times more common
    d  20 times more common

11. The chemicals in cigarette smoke increase mutation rates and inhibit cells from repairing DNA.
    a  true  b  false

12. Nicotine raises the levels of a neurotransmitter called dopamine
    a  true  b  false  c  50%

13. The effects of smoking are:
    a  skin wrinkles
    b  accelerating our aging process
    c  weakening our immune system
    d  increasing the risk for diseases, such as cancer, heart attack, stroke, and eye diseases
    e  all of the above

14. Which of these facts is NOT true?
    a  The surface area of the lungs is the same size as a tennis court?
    b  A sneeze travels at a speed of about 145 km/h (90 mph).
    c  Your left lung is larger than your right lung.
The size of the heart is roughly that of our fist and weighs approximately ________________.

- a 60 g (2 oz.)
- b 150 g (5 oz.)
- c 300 g (11 oz.)
- d 600 g (21 oz.)

The network of arteries, veins, and capillaries is extraordinarily dense. In an adult, this network is more than ________________ long.

- a 15 metres (600 inches)
- b 200 metres (600 feet)
- c 9.656 kilometres (6,000 miles)
- d 96.500 kilometres (60,000 miles)

Cardiovascular diseases are the number one cause of death globally. According to the World Health Organization (WHO) more than ____________ people die of heart disease every year.

- a 500,000
- b 9 million
- c 17 million
- d 23 million

Which of these is not true?

- a Your heart beats around 70 times a minute.
- b The heart is the biggest organ in your body.
- c Your heart pumps a cup full of blood every time it beats.

In an adult normal blood pressure at rest is considered to be ________________.

- a under 120/80 mmHg
- b over 120/80 mmHg

Our heart is the only muscle that does not grow with exercise.

- a true
- b false

Causes of an enlarged heart may include which of the following:

- a exercise
- b high blood pressure
- c defects in the heart wall
- d all of the above
8. The heart sits tucked between _______________________.
   a  □ the stomach and chest muscles   b  □ the lungs
   c  □ the spleen and liver           d  □ the ribs

9. Sometimes heart attacks go undiagnosed, because the signs are not as obvious as what people may be used to seeing depicted in the movies or on TV.
   a  □ true   b  □ false

10. “Smoker’s leg” is a common term for severe peripheral arterial occlusive disease.
    a  □ true   b  □ false

11. Name three cardiovascular diseases shown in the exhibition.
    a  ____________________________
    b  ____________________________
    c  ____________________________

12. The two chambers at the bottom of your heart are called ventricles.
    a  □ true   b  □ false

13. Which of the following is true:
    a  □ The pulmonary vein carries oxygen-rich blood to the heart.
    b  □ Veins lead to the body from the heart.
    c  □ Veins always carry oxygen-rich blood.
    d  □ None of the above.
DIGESTIVE SYSTEM & EXCRETORY SYSTEM

1. The stomach is a hollow, muscular organ, capable of holding __________________ of food and liquids.
   a  □ 0.5 to 1 litres (2-4 cups)   b  □ 2 to 3 litres (4-6 pints)
   c  □ up to 10 litres (3 gallons)

2. Most digestion occurs in ________________________________.
   a  □ the mouth   b  □ the stomach   c  □ the small intestine
   d  □ the large intestine   e  □ equally in all areas listed before

3. To enlarge the area available for nutrient absorption, the small intestine has ring-shaped folds and a dense network of finger-shaped villi that ________________________.
   a  □ are each 1 mm (0.04 inches) in length   b  □ act like bristles of a microscopic brush
   c  □ are tiny finger-shaped projections   d  □ all of the above

4. Water and vitamins are absorbed in the large intestine.
   a  □ true   b  □ false

5. The pancreas secretes two hormones they are:
   a  □ testosterone and estrogen
   b  □ insulin and glucagon
   c  □ oxytocin and cortisol

6. The liver is the largest organ in the body.
   a  □ true   b  □ false

7. The ________________________ is the largest and heaviest organ of the body.
   a  □ liver   b  □ heart   c  □ skin   d  □ stomach
8. Liver cells produce 0.75 to 1.25 litres (1.6-2.6 pints) of ____________ each day.
   a) bile   b) blood   c) urine   d) waste

9. Excess alcohol intake causes ____________ to accumulate in liver cells.
   a) blood   b) bile   c) fat   d) protein

10. Melanomas are a benign form of skin cancer.
    a) true   b) false

11. Factors that can tip the balance in favor of weight gain include:
    a) our genetic makeup
    b) overeating
    c) lack of physical activity
    d) all of the above

12. Overweight and obesity are linked to more death worldwide than underweight.
    a) true   b) false

13. The body’s total blood volume flows through the kidneys around ____________ per hour.
    a) once   b) five times   c) ten times   d) fifteen times

14. The male urethra is about 20 cm (8 inches) long.
    In women, the urethra is about ____________ cm long.
    a) 4 cm (1.5 inches)   b) 8 cm (3 inches)
    c) 10 cm (4 inches)   d) also 20 cm (8 inches)
1. The testes contain thousands of finely coiled tubes, called seminiferous tubules, in which about how many sperm cells mature every day?
   a) 1 million  
   b) 100 million  
   c) 300 million  
   d) 1 billion

2. The prostate gland is roughly the size of a _________________.
   a) pea  
   b) chestnut  
   c) golf ball  
   d) tennis ball

3. What is the most common form of cancer in women?
   a) lung  
   b) ovarian  
   c) breast  
   d) skin

4. A woman’s egg cells develop throughout her life.
   a) true  
   b) false

5. After only four weeks, an embryo already has developed the following:
   a) a heart and eyes  
   b) four buds (beginnings of arms and legs)  
   c) all of the above  
   d) none of the above

6. After the eighth week of pregnancy, the developing child is called a _________________.
   a) embryo  
   b) fetus  
   c) baby  
   d) infant
REPRODUCTIVE SYSTEM & FETAL DEVELOPMENT

7. In the fourth month of pregnancy the following organs develop ________________.
   a. kidneys  
   b. liver and pancreas  
   c. large and small intestines  
   d. all of the above

8. The placenta exists only during pregnancy.
   a. true  
   b. false

9. Twins that share the same genetic code are known as identical or ________________.
   a. fraternal  
   b. dizygotic  
   c. monozygotic  
   d. brother and sister

10. In the exhibition what is described as the “life line” from the mother to the developing fetus?
   a. uterus  
   b. blood supply  
   c. umbilical cord  
   d. placenta
BODY WORLDS & DAILY LIFE

1. Briefly describe your favorite part of the exhibition.

2. After seeing the exhibition will you be more or less likely to live a healthy lifestyle and why?
SKELETAL SYSTEM

1) b. ear
2) d. filtering harmful materials from the body
3) b. false (there are 27 bones controlled by 37 muscles)
4) b. 7 to 9 kg (15-20 pounds)
5) c. flat
6) a. true
7) c. 33
8) c. knee
9) d. hip and shoulder
10) d. a & b (over age of 50 and overweight)
11) c. both a & b since they refer to the same bones

MUSCULAR SYSTEM

1) a. shortens
2) b. voluntary
3) a. true
4) b. 30
5) c. connect muscles to bones
6) a. they can be increased by 15-20%
7) c. Voluntary muscles can be controlled, while involuntary muscles cannot be.
8) d. thinking
9) a. true
10) answers will vary among students
NERVOUS SYSTEM

1)  a. central nervous system
2)  b. 2% and 20%, respectively
3)  c. brainstem
4)  a. cerebrum
5)  a. true
6)  a. true
7)  b. cerebrum
8)  c. 400 km/h (250 mph)
9)  c. from either the brain or spinal column
10) answers may vary but can include: exercise, playing a musical instrument, studying a language

RESPIRATORY SYSTEM

1)  b. pulmonary
2)  c. 10-12
3)  a. true
4)  c. hormones
5)  a. true
6)  c. 300-450 million
7)  a. alveoli
8)  a. the larynx growing larger and thicker
9)  c. 20%
10) d. 20 times more common
RESPIRATORY SYSTEM

11) a. true
12) a. true
13) g. all of the above
14) c. Your left lung is larger than your right lung.

CARDIOVASCULAR SYSTEM

1) c. 300 g (11 ounces)
2) d. 96.500 kilometres (60.000 miles) long
3) c. 17 million
4) b. false – The skin is the biggest organ.
5) a. under 120/80 mmHg
6) b. false
7) d. all of the above
8) b. the lungs
9) a. true
10) a. true
11) Answers may include:
Aneurysm (of the Abdominal Aorta), Arteriosclerosis.
Infarct in the Apex of the Heart, Heart Hypertrophy,
Hemorrhage due to a Heart Attack,
arterial occlusive disease/”smoker’s leg”,
Enlarged Heart (Cardiac Hypertrophy)
Enlarged Spleen due to Leukemia
12) a. true
13) a. The pulmonary vein carries oxygen-rich blood to the heart.
DIGESTIVE SYSTEM & EXCRETORY SYSTEM

1) b. 2 to 3 litres (4-6 pints)
2) c. the small intestine
3) d. all of the above
4) a. true
5) b. insulin and glucagon
6) b. false
7) c. skin
8) a. bile
9) c. fat
10) b. false
11) d. all of the above
12) a. true
13) d. fifteen times
14) a. about 4 cm (1,5 inches)

REPRODUCTIVE SYSTEM & FETAL DEVELOPMENT

1) c. 300 million
2) b. chestnut
3) c. breast
4) b. false – All of a female’s egg cells are present at birth.
5) c. all of the above
6) b. fetus
REPRODUCTIVE SYSTEM & FETAL DEVELOPMENT

7) d. all of the above
8) a. true
9) c. monozygotic
10) c. umbilical cord

BODY WORLDS & DAILY LIFE

1) answers will differ
2) answers will differ