

TEACHER KEY

**TB Unit 2: Etiology**

**Activity 1: How TB can affect the human body**

**Description:**

Students are asked to match up types of tuberculosis infection with the body parts that infection primarily affects, and to identify some of the signs and symptoms expressed by a patient with different types of tuberculosis. By the end of the activity they will understand that tuberculosis can affect multiple parts of the body.

**Time:** 35 min (20 min work time, 15 min review)

**Objectives:**

- To know and identify the location of major body organs.
- To know and identify the signs and symptoms of TB infection.

**Curriculum Links:**

Understanding Life Systems	3. Understanding basic concepts	3.1 identify major systems in the human body and describe their roles and interrelationships
		3.4 identify common diseases and the organs and/or body systems that they affect

**Materials:**

Online exhibition [Fighting for Breath: Stopping the TB epidemic](http://museumofhealthcare.ca/explore/exhibits/breath/) :

<http://museumofhealthcare.ca/explore/exhibits/breath/>

Handout (PDF)

**Procedure:**

- 1) As resources allow, ask students to browse or read-through the exhibition page Etiology – Introduction to TB. If students will not have access to the web-resource, the instructor should conduct a lesson summarizing the key points about tuberculosis infection in advance of completing the activity sheet.
- 2) Ask students to complete the worksheet.
- 3) Review the worksheet as a class.

**Background Info:**

Although *Mycobacterium tuberculosis* or *bovis* are typically inhaled or ingested, once in the body the bacteria are able to migrate to different areas if they are left untreated. Their location affects the signs and symptoms of the disease.

- Pulmonary

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Representing approximately 75% of all tuberculosis cases, pulmonary TB is the most common form of the disease. Although the body forms a [tubercle](#) around the invading bacteria, they can continue to replicate inside, causing the [tubercle](#) to grow. As it gets larger, it may invade different parts of the lung, affecting the ability to breathe, or entering blood supply lines. Eventually the [tubercle](#) may grow so large that it bursts, spreading the bacteria that were inside.

- **Miliary**  
Miliary tuberculosis refers to a tuberculosis infection that has spread to multiple locations in the body through the blood stream or lymph system. It is characterized by the presence of multiple, small seed-like collections of bacilli, rather than larger granulomas.
- **Osteo-articular:**  
When TB affects the joints or the spine, it causes a softening of the bones. As the bones soften, they can compress. In the spine this may cause a hunchback, while in the joints this can present with arthritis-like symptoms.  
e.g. Pott's disease
- **Lymph nodes:**  
When the lymph nodes are infected, in the neck or elsewhere in the body, they swell. Other symptoms may include fever and sweating.  
e.g. [Scrofula](#)
- **Adrenal glands:**  
When tuberculosis attacks the adrenal glands they become inefficient at producing hormones, such as cortisol, causing adrenal insufficiency. Symptoms include weakness, muscle fatigue, weight loss, nausea and vomiting. When Dr. Thomas Addison first diagnosed adrenal insufficiency, in 1849, tuberculosis was the cause of 70-90% of the cases. Today TB accounts for 20% of the cases of adrenal insufficiency in developed countries.  
e.g. Addison's Disease
- **Central Nervous System:**  
When the meninges, the membranes that surround the central nervous system (i.e. spinal cord, brain), are infected they become inflamed, which can affect brain and motor function. Fever and headache are the most common signs and symptoms. This tubercular infection is usually fatal and affects children more frequently than adults.  
e.g. Tuberculous meningitis
- **Cardiac:**  
If the tuberculous bacteria spread to the heart, they most commonly affect the pericardium, the sac that contains the heart and part of the major blood vessels. The presence and growth of the [tubercles](#) can cause [fibrosis](#), and a hardening of the pericardium, which can restrict the action of the heart.  
e.g. Tuberculous pericarditis

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- **Gastrointestinal:**  
Whether caused by the ingestion of tainted food products, or by swallowing infected sputum from the lungs, TB in the digestive tract produces ulcer-like **lesions**. Signs and symptoms include abdominal pain, diarrhea, and blood in the stool.
  
- **Genito-urinary**  
Tuberculosis of the genitor-urinary system can manifest in a variety of symptoms depending on the location of the infection and its severity. Infection can produce **fibrosis**, which in turn can cause **ureter stricture** and other blockages. It can also cause infertility, genital ulcers, and kidney malfunction.
  
- **Cutaneous:**  
When tuberculosis affects the skin it presents as **lesions** and growths that can persist for years and often leave scarring.  
e.g. Lupus vulgaris

## Unit 2: Etiology – Introduction to TB

### ANSWER SHEET: How TB Can Affect the Human Body

Although tuberculosis most commonly affects the lungs, TB bacteria can spread to almost any part of the human body. Depending on where the TB infection is located in the body, the signs and symptoms of the disease may vary.

Fill in the blanks on this diagram to identify:

1. the organ or body part indicated
2. the medical name given to that type of TB infection
3. some signs and symptoms of the infection

1. Lungs
2. Pulmonary
3. Cough, fever, paleness

1. Brain & Spinal Cord
2. Tubercular Meningitis
3. Fever, Pain

1. Stomach & Intestines
2. Gastrointestinal
3. Pain, diarrhea

1. Heart
2. Cardiac
3. Tissue hardening

1. Bones
2. Osteoarticular
3. Hunchback, joint weakness

1. Skin
2. Cutaneous/ Lupus Vulgaris
3. Lesions

Choose from the following terms (some may be used more than once and some may not be used at all).

Kidneys	Cardiac	Pain
Skin	Pulmonary	Fever
Stomach & Intestines	Adrenal	Fibrosis
Heart	Osteoarticular	Diarrhea
Lungs	Tub. Meningitis	Lesions
	Miliary	Cough
		Hunchback