

# Meningococcal Lesson Plan

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**Title:** Learning about Bacterial Meningitis (inflammation of the brain tissues) and the meningococcal vaccine.

**Theme:** Review of the Nervous System & Meningitis – Symptoms, Transmission and Prevention Strategies.

**Time:** 60 minutes

**Materials:** Pens, markers, pencil crayons of various colours, recipe cards, photocopies, PowerPoint software.

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## Objectives:

- To teach students basic information about the brain, what it looks like and how it functions.
  - To teach students about meningitis: what it is and how it is spread.
  - To teach students about the risks associated with acquiring meningitis and methods to protect themselves from contracting and/or spreading the bacteria
  - To prepare grade 7 students for the meningococcal vaccine they will receive in school.
  - To help students to improve their listening and communication skills using oral and written forms as well as through group work.
  - To help students to develop their scientific inquiry skills as they associate abnormal nervous system problems with a specific disease.
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## Curriculum Expectations:

### Overall Expectations

By the end of Grade 7, students will:

C1. Demonstrate an understanding of factors that contribute to healthy development;

C2. Demonstrate the ability to apply health knowledge and living skills to make reasoned decisions and take appropriate actions relating to their personal health and well-being; as well as

C3. Demonstrate the ability to make connections that relate to health and well-being – how their choices and behaviours affect both themselves and others, and how factors in the world around them affect their own and others' health and well-being.

(Ministry of Education, The Ontario Curriculum Grades 1-8, Health and Physical Education, Interim Edition, 2010 revised)

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## Background Information

Meningococcal disease is a serious disease that is caused by different strains of bacteria called *Neisseria meningitidis* (Public Health Agency of Canada). These bacteria can cause meningitis (an infection of the lining of the brain and spinal cord) or meningococemia (an infection of the blood) (PHAC). Meningitis is the most common form of meningococcal infection, accounting for about 75% of cases. There are five types of the *Neisseria* bacteria that cause almost all infections: these are types A, B, C, Y and W-135 (Meningitis Research Foundation of Canada).

This bacterium is commonly found in the nose and throat secretions of healthy people (carriers) and is spread through direct contact with saliva or sharing of oral secretions, such as kissing or sharing a drink (PHAC).

Teens and young adults are considered to be at high risk of getting meningococcal disease, which can easily be spread when someone is infected with the bacteria (CIG, Evergreen). Individuals are at risk if they are living in the same home, sleeping in the same room or come in contact with direct secretions from the individual's nose or mouth (e.g., sharing drinking bottles, lipstick, utensils or cigarettes, or kissing on the mouth).

According to the Meningitis Research Foundation of Canada, 10-20% of adolescents and adults carry the meningococcus bacteria in the back of their noses and throats without any noticeable effects. These carrier infections may last as long as six months. Meningococcal disease is rare, causing about 100-400 cases per year in Canada. These cases usually occur between December and April.

In Ontario, from 2006 to 2011 there were 34 to 65 cases per year (2011 Reportable Disease Trend report from Public Health Ontario, as of January, 2014). In Peel, from 2006 to 2013, there were 1 to 9 cases per year (iPHIS, Region of Peel Health Department, as of May 16, 2014).

Meningococcal disease is serious and sometimes fatal. Approximately 10% of people who develop the disease will die. In addition, about 10% of those who recover will have long-term complications. These can

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include deafness, brain damage, problems with the nervous system and seizures, and may result in amputation of one or more limbs (PHAC).

The five strains of meningococcal bacteria A, B, C, Y and W-135 are vaccine preventable. The publicly funded vaccine offered in grade 7 protects against strains A, C, Y, and W-135. Only one vaccine dose (one shot) is needed. The vaccine against strain B (Men B) is not currently publicly funded; parents would need to consult their doctor and purchase this vaccine for administration. One way to reduce the risk of getting meningococcal disease or meningitis is by not sharing anything that might have someone's saliva on it.

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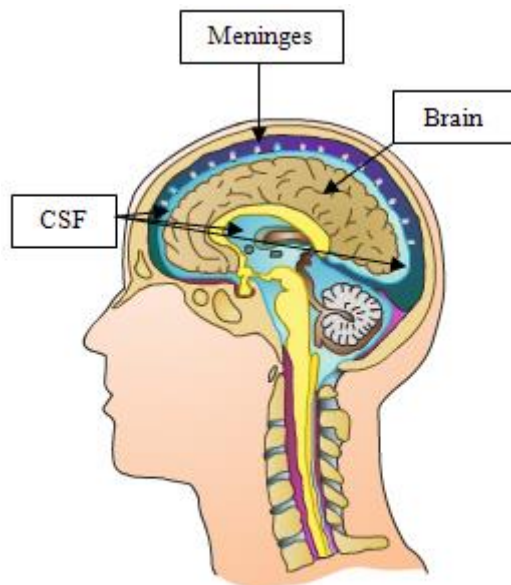
## **Activity One:**

### ***Identification of the Brain Meninges - 10 minutes***

The objective of this exercise is to provide a visual image of the brain and meninges and to review the function of the brain.

1. Hand out a copy of the picture of the brain to each student (see handout on page 6) and use your projector/document camera to place the brain picture onto your overhead screen (see student handout). Outline with the students the location of the meninges, the brain and the Cerebral Spinal Fluid (CSF). Ask the students to use a pencil crayon and color each of these locations on their handout with a different colour.

### **Illustration 1- The Brain and Meninges**



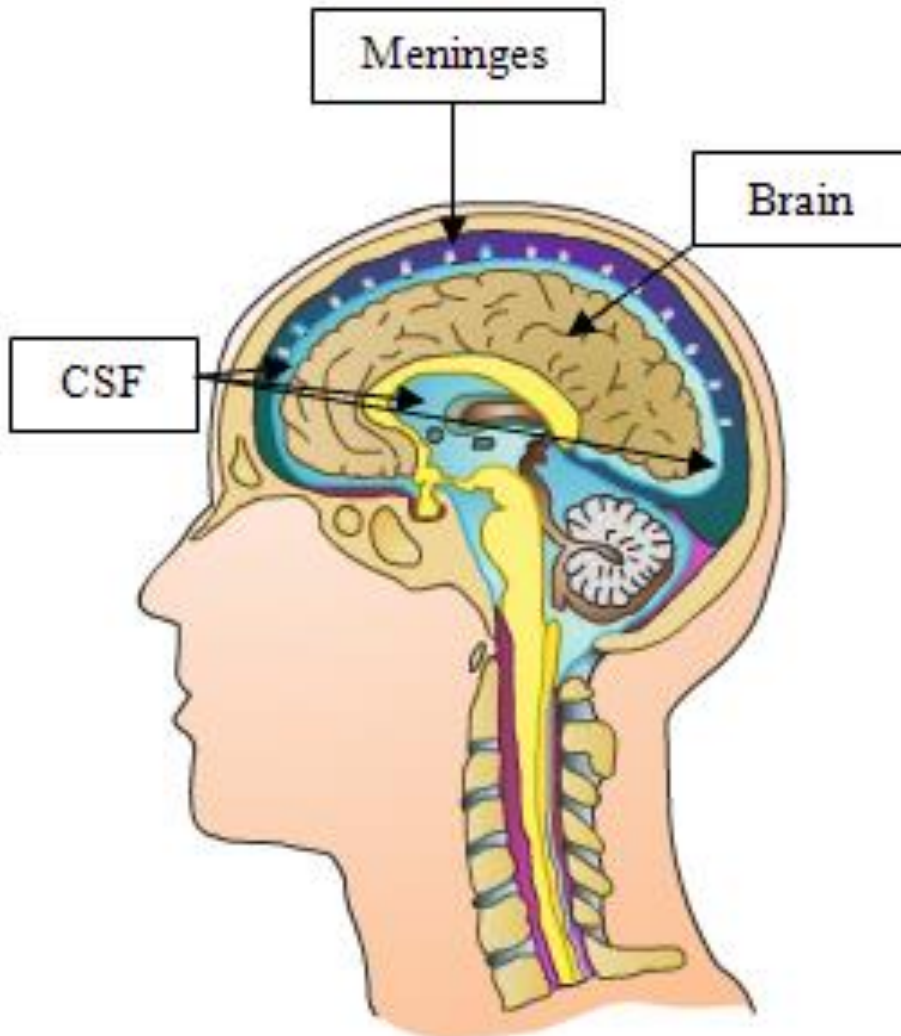
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[http://www.nlm.nih.gov/medlineplus/tutorials/meningitis/htm/\\_yes\\_50\\_no\\_0.htm](http://www.nlm.nih.gov/medlineplus/tutorials/meningitis/htm/_yes_50_no_0.htm)

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## Student Handout – The Brain and Meninges



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[http://www.nlm.nih.gov/medlineplus/tutorials/meningitis/htm/\\_yes\\_50\\_no\\_0.htm](http://www.nlm.nih.gov/medlineplus/tutorials/meningitis/htm/_yes_50_no_0.htm)

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2. Write the following question on a flipchart:
  - What is the purpose and the function of the brain?
3. Brainstorm a list of ideas, making sure to include the following:
  - The brain and the spinal cord are the command centres of the body. They allow us to:
    - Speak,
    - Hear,
    - Understand,
    - See,
    - Move, and
    - Feel.
4. Explain that there is a clear fluid, called cerebral-spinal fluid or CSF, that surrounds the brain and spinal cord. CSF is a clear fluid that looks like water. CSF acts as a shock absorber and protects the brain and spinal cord from injury.
5. The brain also contains membranes called meninges that protect the brain, spinal cord and CSF. Meninges are special coverings that help prevent CSF from leaking to the outside. Meningitis is an infection of the CSF, the fluid surrounding the brain, and the spinal cord.

[http://www.nlm.nih.gov/medlineplus/tutorials/meningitis/htm/\\_yes\\_50\\_no\\_0.htm](http://www.nlm.nih.gov/medlineplus/tutorials/meningitis/htm/_yes_50_no_0.htm)

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## ***Activity Two:***

### ***Meningitis Game – How Meningitis is Spread - 20 minutes***

(This exercise was adapted and reprinted with the permission of Toronto Public Health, August 2011)

#### **Objectives:**

- Using this interactive activity, students will become aware of how meningococcal meningitis can be spread from person to person.
- Students will identify why some people get infected, while others do not.

#### **Materials:**

Use one recipe card for each participant with the following codes written on them. Please see number 11 for the meaning of each code.

- On 2 cards write “D”. Give one card to a girl, one card to a boy.
- On all of the remaining cards, write “CWS”.
- On these cards also add one of the following letters: “C”, “S”, “K”, “SD”, “SC”, “SF”, or “MI”.
- On half of these “CWS” cards, add the letter “I”.

#### **Procedure:**

1. Tell the students that this exercise illustrates how meningococcal meningitis is spread.
2. Distribute a card to each student. Don't forget that one of the “D” cards goes to a girl, and the other card to a boy.
3. Ask the students to find a partner in the room. Together the paired students should answer the question “Why is meningitis a concern?” Have the paired students sign each other's card.



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4. Then have the students find a new partner. These new partners should answer the question, “How is meningitis spread?” These paired students sign each other’s card.
5. Then have the students find another new partner. These new partners should answer the question, “How is meningitis prevented?” These students sign each other’s card.
6. Ask the students to return to their seats.
7. Ask the students with the “D” on their card to stand. These two students have the meningitis infection.
8. Next, anyone with the names of the students with the meningitis infection on their card stand because they became infected.
9. Now everyone who has the student’s names on their cards that just stood up must stand because they are also infected. And so on .... until everyone in the class is standing.
10. Students with “CWS” stay standing because they came into contact with infected saliva.
11. Tell the students what the codes mean on the cards:

CWS	– contact with saliva
C	– infected through coughing
S	– infected through sneezing
K	– infected through kissing
SD	– infected through sharing a drink
SC	– infected through sharing a cigarette
SF	– infected through sharing food
MI	– infected through sharing a musical instrument
12. Students who have “I” on their card may sit down now, because although they came into contact with infected saliva, they were immunized against meningitis so they did not get the disease.

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13. Thank the students for participating. Ask them how it felt at the end of the activity knowing they were either at risk (left standing) or not at risk (sitting) of getting meningitis.
14. Debrief by discussing the three questions they asked each other.
  - Why is meningitis a concern?
  - How is meningitis spread?
  - How is meningitis prevented?

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## **Activity Three:**

### ***Meningitis Signs & Symptoms - 20 minutes***

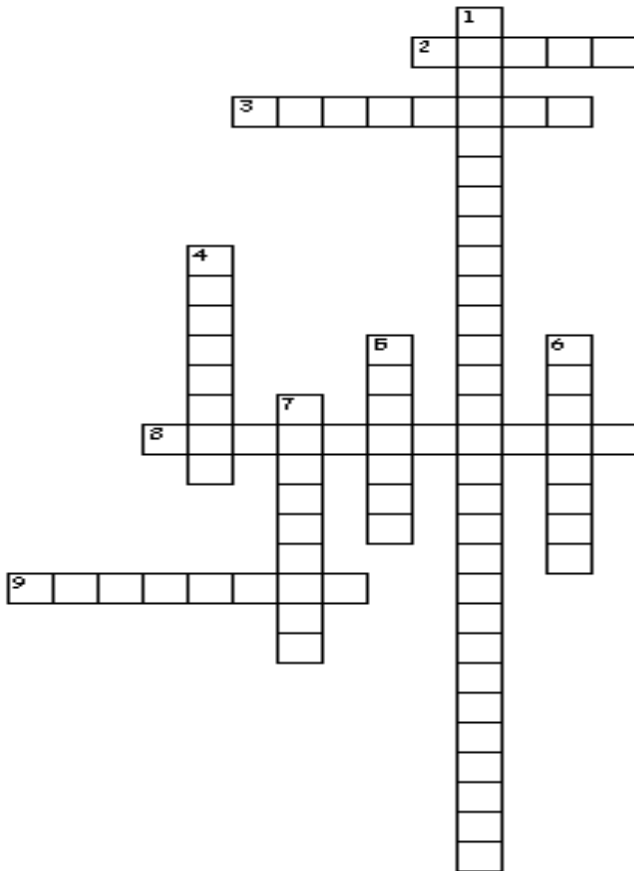
#### **Hand out the following crossword puzzle**

1. Make a copy of the following exercise (see following page), one for each student in the class. Provide the students with 20 minutes to complete the crossword puzzle. This can be done as a group exercise if the students are divided into small groups.
2. Review the answers with the students.
3. Explain to the students that meningitis can begin mildly – like a cold or flu with fever, headache, aches and pains in joints and muscles. The disease progresses very quickly and goes from mild to severe in a matter of hours. The first symptoms are usually fever, vomiting, headache and feeling unwell, just like many mild illnesses. As the illness progresses the person begins to feel neck stiffness and is sensitive to bright lights. The illness becomes very severe when the patient becomes sleepy, difficult to awaken, confused or delirious, experiences impaired consciousness, has seizures or develops a rash all over the body. <http://www.meningitis.ca/en/Bacterial>. Anyone with these symptoms should seek immediate medical attention.  
<http://www.immunize.cpha.ca/en/diseases-vaccines/meningococcal-diseases.aspx>

To help explain the symptoms visually you can refer to the following website: <http://meningitis.org/symptoms>

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## Meningitis crossword



### Across

- 2. High body temperature
- 3. Uncontrolled muscle spasms
- 8. Sensitivity to bright lights
- 9. Not knowing where you are or what you are doing

### Down

- 1. Very sleepy or difficult to awaken
- 4. Pain in the head or migraine
- 5. Small irregular purple or red spots all over the body
- 6. Retching
- 7. Sore neck muscles

### Answers:

Across: 2. Fever. 3. Seizures. 8. Photophobia. 9. Confused.

Down: 1. Decreased level of consciousness. 4. Headache. 5. Purpura. 6. Vomiting. 7. Stiff neck.

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## **Activity Four:**

### ***Personal Experiences – home reading plus 20 minutes.***

The objective of this exercise is to provide a personal connection to meningitis and a better understanding of how meningitis can affect the patient and the family. This exercise also helps to improve the reading skills of the students. Please review the stories posted on the websites below. Pick a story; ask students to read and think about the story as a homework assignment. In class the next day, review and encourage discussion about the story. You may want students to write a one page reflection about their thoughts on the story.

<http://www.meningitis.ca/en/Your-Story>

Meningitis Research Foundation of Canada

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## References

Meningitis Research Foundation of Canada. Meningitis Overview. In *Meningitis Research Foundation of Canada*. Retrieved September 9, 2014, from <http://www.meningitis.ca/en/MeningitisOverview>

Ministry of Education. (2010) revised. The Ontario Curriculum Grades 1-8, Health and Physical Education, Interim Edition. Ontario: Queen's Printer. Retrieved September 9, 2014, from <http://www.edu.gov.on.ca>

Public Health Agency of Canada. *Canadian Immunization Guide (CIG)*. Ottawa: National Advisory Committee on Immunization. Evergreen Edition: <http://www.phac-aspc.gc.ca/publicat/cig-gci/>

Public Health Agency of Canada. Invasive Meningococcal Disease. Retrieved September 9, 2014 from: <http://www.phac-aspc.gc.ca/im/vpd-mev/meningococcal-eng.php>

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## Further reading

<http://www.meningitis.ca/en/Your-Story>  
Meningitis Research Foundation of Canada – personal stories about Meningitis

<http://meningitis.org/>  
Meningitis Research Foundation (Ireland)- includes personal stories about people who caught meningitis.