

# GRILLE DESCRIPTIVE DE SCENARIO PEDAGOGIQUE

Rubriques	Commentaires éventuels
<b>Auteur du scénario</b>	Line DARIBO
<b>Titre</b>	Epidémie de choléra en Haïti
<b>Type d'établissement</b>	Lycée polyvalent et technologique
<b>Classe/niveau</b>	1 <sup>ère</sup> STL
<b>Discipline(s) impliquée(s)</b>	Anglais technique –biotechnologie- CBSV
<b>Cadre pédagogique</b>	Préparation à l'épreuve d'ETLV de terminale
<b>Modalités</b>	Nombre de séances : 6 Durée de la séance : 1h Nombre d'élèves concernés : 21 Matériel : ordinateur, smartphone
<b>Objectifs disciplinaires et/ou transversaux</b>	Introduire en anglais le vocabulaire technique lié aux biotechnologies et à la CBSV.
<b>Objectifs documentaires</b>	Lire et utiliser des informations contenues dans un texte en anglais
<b>Pré requis</b>	Acquis en séance de cours et TP de biotechnologie et de CBSV
<b>Documents fournis à l'élève</b>	Fiche 1-2-3
<b>Outils Tice utilisés</b>	Outil bureautique – vidéoprojecteur
<b>Ressources numériques utilisées</b>	En ligne : vidéo
<b>Productions attendues</b>	Exposé oral, échanges entre élèves, production écrite (sous forme de tableau).
<b>Modalités d'évaluation de l'élève</b>	Evaluation formative et sommative, autoévaluation.
<b>Bilan</b>	Des séances interactives et des élèves plus impliqués.

## Séquence2 : Epidémie de Cholera en HAÏTI

<b>Activités technologiques</b>	<ul style="list-style-type: none"> <li>• Légender la structure d'une bactérie</li> <li>• Légender un microscope et identifier le rôle des différentes parties du microscope</li> <li>• Mettre en évidence les différentes étapes de la technique de Gram et de l'état frais</li> <li>• Utiliser les techniques de coloration et d'observation microscopique afin de s'orienter vers <i>Vibrio cholerae</i>.</li> </ul>
<b>Compétences visées</b>	<ul style="list-style-type: none"> <li>• Exploiter des ressources documentaires afin de comprendre une maladie bactérienne</li> <li>• Réinvestir les connaissances de BTK sur la morphologie et l'ultrastructure des microorganismes;</li> <li>• Réaliser la technique de l'état frais et de Gram en utilisant des documents en anglais</li> </ul>
<b>Contexte mobilisateur</b>	<p><b>Thème</b> : santé / Microbiologie</p> <p><b>Situation déclenchante pour une mise en activité des élèves</b> : Au cours du dernier tremblement de terre en Haïti, une épidémie de choléra s'est développée.</p>

### Questionnaire et recherche de ressources documentaires pour la mise en action des élèves

<b>Séance 1</b>	<p>Présentation du contexte de l'étude : le tremblement de terre en HAÏTI et les problèmes sanitaires associés : Support : communiqué du CDC</p> <p>- AT 1 : Repérer et rechercher les mots anglais non maîtrisés sur le smartphone et les répertorier dans un carnet de vocabulaire</p> <p><u>Objectif</u> : comprendre le contexte de l'étude</p> <p>TRAVAIL MAISON : Vidéo sur le cholera « Who is the Cholera » ?</p>
<b>Séance 2</b>	<p><b>Quels sont les symptômes du cholera ? Comment se propage la maladie ? Comment lutter contre la maladie ?</b></p> <p>AT 2 : Mise en commun des cartes d'informations sur ce qu'est le cholera réalisée à la maison? / Visualisation à nouveau de la vidéo / Travail en binôme : chaque groupe doit répondre et formuler en anglais leurs réponses aux questionnaires.</p> <p><u>Objectif</u> : Utiliser les connaissances des élèves afin de répondre à un questionnaire en relation avec la vidéo.</p>
<b>Séance 3</b>	<p><b>Qui est l'agent responsable du cholera ? C'est une bactérie <i>Vibrio cholerae</i> :</b></p> <p><b>Comment observent t'on les bactéries ?</b> : Présentation du microscope et rôle des différents éléments du microscope</p> <p>AT 3 : Travail sur la morphologie et l'ultrastructure de la cellule bactérienne / Légender une cellule bactérienne</p> <p>AT 4 : Légender le microscope</p> <p><u>Objectif</u> : identifier les différentes structures constitutives d'une bactérie : flagelle, paroi....</p>
<b>Séance 4</b>	<p><b>Comment les mettre en évidence ?</b> Technique de coloration : principe et protocole de Gram et état frais + <b>Evaluation 1 : légèder un microscope</b></p>
<b>Séance 5</b>	<p><b>Evaluation 2 : Gram et état frais</b></p>
<b>Séance 6</b>	<p><b>AT 6</b> : Utiliser les techniques de coloration afin d'étudier grâce au microscope différents germes proposés. <b>Lequel de ces germes pourraient être <i>Vibrio Cholerae</i> ? Autoévaluation</b></p>

## Activité technologique 1



Centers for Disease Control and Prevention  
CDC 24/7: Saving Lives, Protecting People™



**Source:** <https://www.cdc.gov/cholera/haiti/index.html>

On October 20, 2010, an outbreak of cholera was confirmed in Haiti for the first time in more than a century, ten months after the catastrophic earthquake that killed over 200,000 people and displaced over 1 million.

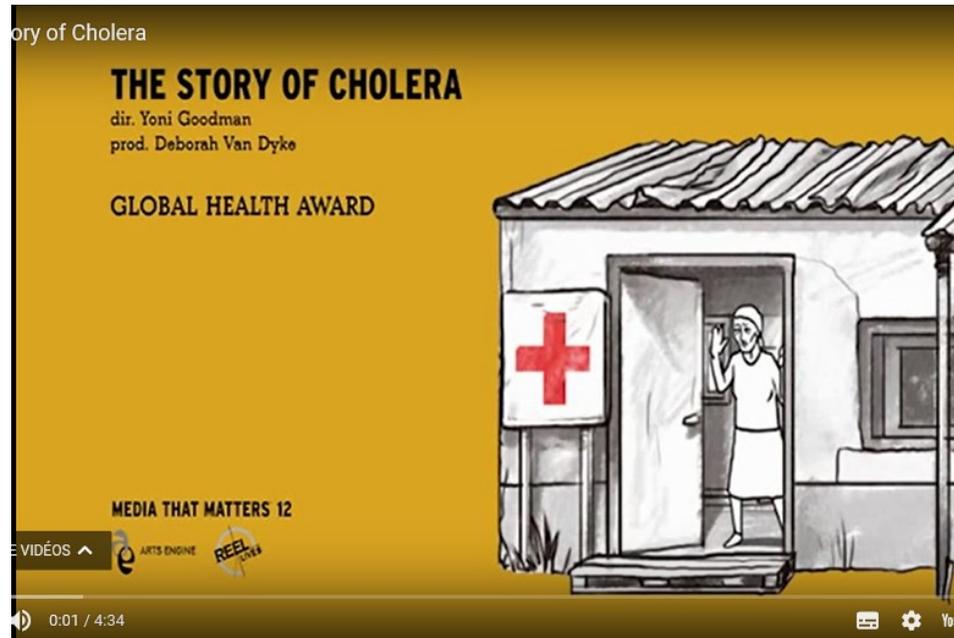
Cholera is an extremely virulent disease that can cause severe acute watery diarrhea. It takes between 12 hours and 5 days for a person to show symptoms after ingesting contaminated food or water. Cholera affects both children and adults and can kill within hours if untreated.

This cholera outbreak is the worst in recent history with over 665,000 cases and 8,183 deaths. Since the beginning of the outbreak, CDC has worked closely with the Haitian Ministry of Public Health and Population (MSPP) to combat the cholera epidemic and reduce the impact of the disease.

Rapid response from CDC, MSPP, and partners prevented thousands of deaths from cholera. However, new cholera cases continue to emerge throughout Haiti. Experience from past cholera outbreaks around the world suggests that Haiti may have ongoing cholera transmission for years to come. Improving Haiti's water and sanitation infrastructure is critical to achieving large health gains and reducing the opportunity for cholera to spread.

1. *List the unknown words. Use your smartphone to find the french translation.*

2. **Instruction:** view this video: <https://youtu.be/0heC36sbiLI> and propose an informative card in French on the thème of Cholera.



## Activité technologique 2

### QUESTIONNAIRES

1. How is cholera first transmitted? <i>Tiny germs of cholera spread through the river</i>	2. What happens to the contaminated water from the river? <i>It is consumed by the villagers.</i>
3. How is cholera spread? <i>Flies / unwashed hands</i>	4. Where can cholera germs be found? <i>Food / water / fingers</i>
5. How long does it take to become sick? <i>It's very fast.</i>	6. What are the symptoms of cholera? <i>Diarrhea</i>
7. What was the special drink made of? <i>The water was filtered then boiled for one minute. ½ teaspoon of salt and 6 teaspoons of sugar were added to 1 liter of boiled water.</i>	8. What did it taste like? <i>Tears</i>
9. Does everyone get sick after being contaminated by cholera? <i>No, but they can spread the disease.</i>	10. What safety measures should be taken? <i>Add chlorine to the water and wait 30 minutes. Clean hands. Latrines have to be installed far from the river (at least 30 meters)</i>

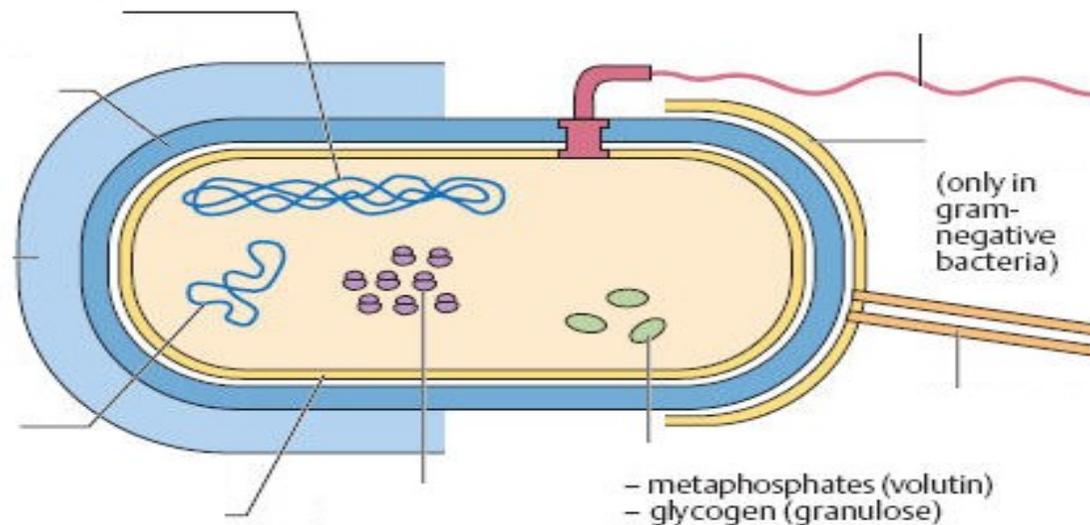
## AT 3 - Who is vibrio cholerae ?

Vibrio is a genus of Gram-negative bacteria, possessing a curved-rod shape (comma shape). Typically found in salt water, Vibrio species are facultative anaerobes that test positive for oxidase and do not form spores. All members of the genus are motile and have polar flagella with sheaths. Vibrio species typically possess two chromosomes.



Source : <http://3.bp.blogspot.com/bacteria+cholera.jpg>

1. Used your smartphone to found the french translation of the underline words.
2. Complete the structure of this bactéria with these words : nucleis, Flagella, capsule, cytoplasmic membrane, cell wall murein, plasmid, dépôt sbstances, attachment pili, outer membrane, ribosomes.



All bacteria have the same basic structure (not to scale).

Source : <http://image.slidesharecdn.com/2015-03-25agb12022-150327234623-conversion-gate01/95/bacteria-2015-0325-agb-12022-2-638.jpg>

**3. How can I observe Vibrio Cholerae ?**  
 choose the item to observe bacteria

Justified your response :



**AT4 Let's discover the microscope !**

**SCHEMA A LEGER D'UN MICROCOPE**

<b>A</b>		<b>G</b>	
<b>B</b>		<b>H</b>	
<b>C</b>		<b>I</b>	
<b>D</b>		<b>J</b>	
<b>E</b>		<b>K</b>	
<b>F</b>		<b>L</b>	
	<b>SCORE</b>		

Source : *Let's speak biotechnology- castella – collection dirigé par Caroline Bonnefoy*

*To observe and describe bacteria, you must use a microscope, because they are too small to be seen with naked eyes. The two main techniques to observe bacteria under a microscope are the gram staining and the wet mount.*

- What's the two techniques to observe this bacteria and translate in french ?
- Which technique do you need to see if vibrio is a Gram-negative or gram positive bacteria.
- Which technique do you need to see if vibrio is a motile or not motile bacteria ?
- Give main differences between both techniques.
- Make a list of equipment you need to make the gram staining.

Materials	Product

- Put in order the different steps of this technique, from the collection of the sample to the observation under the microscope.

	Different steps
<b>A</b>	Observe the microscope, using the 100 x objective lens with a drop of immersion oil.
<b>B</b>	Cover the bacteria with safrinin for 30 seconds. Rinse with d'H <sub>2</sub> O and blot the slide dry with absorbant paper.
<b>C</b>	Rinse the stain with 95% ethanol. This step must be done <b>very carefully</b> . Hold the slide at a 45° angle over the staining rack and rinse with ethanol one drop at a time. Watch the ethanol as it runs off the slide looking for blue color. Stop dropping ethanol as soon as no more color is releases and rinse the slide immediately with water.
<b>D</b>	Cover the smear with crystal violet and incubate for 30 seconds. Rinse the dye off with distilled water (d'H <sub>2</sub> O) from the squeeze bottle.
<b>E</b>	Pass the slide slowly through a bunsen burner flame.
<b>F</b>	Allow the bacterial slurry (called the smear) to air dry.
<b>G</b>	Cover the smear with grams iodine (lugol). After 40 seconds, rinse the slide with d'H <sub>2</sub> O.
<b>H</b>	Sterilize your loop and touch a single colony and transfer the bacteria to the water droplet on the slide and mix well.
<b>I</b>	Transfer one small drop of water to the center the slide
<b>J</b>	Clean a glass slide and place a small mark slightly off center using a grease pencil

## Evaluation 1

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<b>NOM :</b>	<b>PRENOM :</b>	<b>DATE :</b>
Note		sur 20

**Sentence** : Complete the following image

<b>A</b>	
<b>B</b>	
<b>C</b>	
<b>D</b>	
<b>E</b>	
<b>F</b>	
<b>G</b>	
<b>H</b>	
<b>I</b>	
<b>J</b>	
<b>K</b>	
<b>L</b>	
	<b>SCORE</b>

**SCHEMA A LEGENDER D'UN MICROCOPE**

Source : *Let's speak biotechnology- castella – collection dirigé par Caroline Bonnefoy*

## Evaluation 2

<b>TEST : GRAM STAINING OR WET MOUNT</b>				
<b>NOM :</b>				
<i>Note sur 20</i>				
	<b>Affirmations</b>	<b>True</b>	<b>False</b>	<b>Justifications</b>
1	The gram staining is a method to distinguish between two major classes of bacteria	*		
2	The gram staining is observed under the microscope, using the 40× objective lens.		*	the 100× objective lens
3	Bacteria with a single membrane surrounded by a thick (or big) cell wall of peptidoglycan are said to be gram Gram positive.	*		
4	The gram staining is a method to observe living cell under a microscope		*	Dead bacteria
5	A wet mount preparation is a method to see the bacteria mobility.	*		
6	A flagella gives the bacteria the ability to move	*		
7	All bacteria have a flagella		*	Motile and non-motile Bacteria
8	Cristal violet is used after lugol 's iodine		*	before
9	Lugol 's iodine is a mordant whichis used in order to fix a crystal violet.	*		
10	95% alcohol is used in order to clean the slide before coloring.		*	Decolorize
11	Safranin orfuchsin are used in order to color the bacteria in purple.		*	No, pink
12	A drop of immersion oil is necessary for the gram staining technique	*		
13	Water is used in order to eliminate the alcohol and excess of fuchsin.	*		
14	The first step of the wet mount consists in collecting water from the container.		*	The sample
15	The second step of the wet mount consists in adding the sample to the slide.			
16	The third step of the wet mount consists in placing a cover slideunder the sample.		*	On the sample
17	The slide is placed on the stage of the microscope	*		
<b>TOTAL</b>			<b>17</b>	

## Autoévaluation : *The Gram staining AND the wet mount*

**Activity 1 :** Choose the material do you need to prepare and observe a bacterian sample

A gloves	A beaker	An Absorbant tissue
A goggles	A Bunsen burner	A Pasteur pipet
A Lab coat	A slide	A hot plate
A microscop	A dye	A volumetric flask

Remarque:



**Activity 2 :** Put in the order the differents steps of the gram staining and wet mount technical.

### GRAM STAINING

Wash with water
Wash with water
Carefully decolorize with 95% Ethanol. Do not exceed 10 seconds
Flood with the counterstain (safranin or fuchsin) for 30 seconds
Observe under the microscope, using the *100 objective lens (with a drop of immersion oil).
Blot with absorbant paper
Flood the slide carrying the dry mount sample with the first dye : crystal violet for 30 seconds. (Wash with running tap water).
Flood with mordant: lugol iodine for 40 seconds. (Wash with water).



Remarque :

### WET MOUNT

Add sample to slide
Collect sample from container
Cover slip lower and slowly
Place cover slip on sample



Remarque :

## AT 6 : Let's make a wet mount and a gram staining

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- Describe the bacteria you observed (morphologies, arrangement and flagella type (wet mount)) and complete the following table.

	<i>Bacterium A</i>	<i>Bacterium B</i>
<b>Morphology</b>		
<b>Approximate size</b>		
<b>Arrangement</b>		
<b>Gram</b>		
<b>Motility</b>		
<b>Name of the genus</b>		
	<i>Bacterium C</i>	
<b>Morphology</b>		
<b>Approximate size</b>		
<b>Arrangement</b>		
<b>Gram</b>		
<b>Motility</b>		
<b>Name of the genus</b>		
	<i>Bacterium D</i>	<i>Bacterium E</i>
<b>Morphology</b>		
<b>Approximate size</b>		
<b>Arrangement</b>		
<b>Gram</b>		
<b>Motility</b>		
<b>Name of the genus</b>		

- Which genus is Vibrio ? and why ?

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Document support : Source : *Let's speak biotechnology- castella – collection dirigé par Caroline Bonnefoy*  
**Bacterial morphologies / Bacterial arrangement / Bacterial flagella type.**