# Practice Questions

* Read pages 414 – 418 Biology WA ATAR Units 3 & 4 and answer Questions 1 – 4 of Question Set 12.3a

1. Compare **two** major structural differences between a bacterium and a virus. (2 marks)

One: Two:

2. Not all bacteria are parthenogenic (cause disease). You cannot tell a pathenogenic bacteria from a harmless bacteria by looking at its shape. One way to differentiate one bacterium from another is to examine the differences in the structure and composition of their cell walls. The differences in how the cell walls of the different bacteria respond to stains & dyes, particularly Gram Stain, help scientists determine a pathenogenic bacillus (rod shaped bacteria) from a harmless one.

Go to the website listed on SEQTA and state what Gram stain is and how it differentiates between bacteria.

3. Explain why bacteria can be easily cultured in a petri dish for research purposes while viruses cannot. (4 marks)

4. Explain how disease-causing bacteria evolve resistance to antibiotics. (4 marks)

5. Explain the transmission of pathogens via

(i) Direct contact (2 marks)

(ii) Indirect contact (2 marks)

# Bacteria Colony Lab Activity

You will use sterile techniques to determine the bacteria growing on a fomite (desk) and the effectiveness of different hygiene techniques in killing bacteria.

**Variables**

|  |  |
| --- | --- |
| Independent Variable |  |
| Dependent Variable |  |
| Control Variables |  |
| Control |  |

What is the purpose of the control?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Write a hypothesis for your experiment

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Complete the method in the space below (you need to complete steps 2, 6:

1. Divide desk into 4 quadrants
2. Sample on quadrant by rubbing a sterile swab tip across its surface
3. Open lid of the agar plate and, starting at the top, gently drag the swab in a zig zag motion down and across the agar, taking care not to gouge the surface
4. Replace the lid quickly, seal the plate with sticky tape and label it with your groups name and the treatment
5. Repeat steps 3 – 5
6. Place plates in an incubator at 25°C for 24 – 48 hours
7. Ensure the bench is wiped down and wash hands thoroughly
8. When checking plates, do not open. Score plates based on coverage
9. Dispose of plates as instructed, ensure the bench is wiped down and wash hands thoroughly

**Results**

|  |  |  |
| --- | --- | --- |
| Treatment | Percentage of coverage of Agar Plate | Description of colonies |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

Discussion

1. Describe your results

­­­­­­­­­­

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Identify any possible limitations in the data by considering the sample size & measurement errors

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Write a conclusion for your experiment

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Compare **two** major structural differences between a bacterium and a virus. (2 marks)

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Any **two** of: | |
| * bacteria contain DNA within a nucleoid region while viruses have unbound RNA or DNA * bacteria contain ribosomes while viruses have no organelles * bacteria have a cell wall while viruses have a protein coat/capsule | 1 - 2 |
| **TOTAL** | **2** |

2. Explain why bacteria can be easily cultured in a petri dish for research purposes while viruses cannot. (4 marks)

|  |  |
| --- | --- |
| **Description** | **Marks** |
| bacteria are living organisms that reproduce through binary fission | 1 |
| bacteria replicate readily outside a host cell (in suitable conditions) | 1 |
| viruses are not living organisms and cannot reproduce by themselves/without a host cell | 1 |
| viruses can only reproduce once they have infected a host cell (and hijacked its DNA/RNA) | 1 |
| **TOTAL** | **4** |

4. Explain how disease-causing bacteria evolve resistance to antibiotics. (4 marks)

|  |  |
| --- | --- |
| **Description** | **Marks** |
| variation in phenotypes via mutation | 1 |
| exposure to antibiotics provides a selection pressure | 1 |
| antibiotic resistant phenotypes will survive treatment and reproduce | 1 |
| allelic frequency for antibiotic resistance will increase in gene pool | 1 |
| **TOTAL** | **4** |

5. Explain the transmission of a pathogen via

(i) Direct contact (2 marks)

|  |  |
| --- | --- |
| **Description** | **Marks** |
| physical contact with infected human/organism | 1 |
| transfer is via body fluids | 1 |
| **TOTAL** | **2** |

(ii) Indirect contact (2 marks)

|  |  |
| --- | --- |
| **Description** | **Marks** |
| via a reservoir or contaminated object, not through physical contact with an infected human/organism | 1 |
| transfer can be via airborne particles, contaminated water or food and vectors | 1 |
| **TOTAL** | **2** |