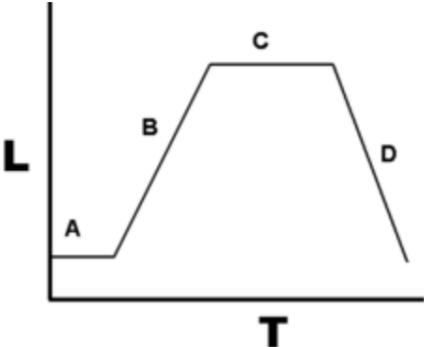
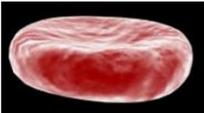
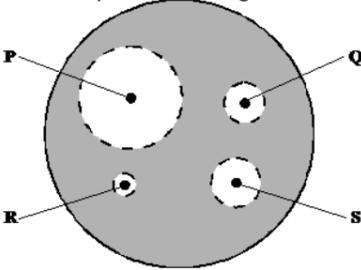


%	I can ...	Prove it!															
<p>70%+</p>	<p>3.6. Explain why there is a maximum incubation period when preparing a culture (triple)</p> <p>4.5. Evaluate the risks and benefits, including the social and ethical implications, of using stem cells in treatments</p> <p>4.6. Explain how plants can be cloned from stem cells and the benefits of doing this</p> <p>5.5. Compare advantages and disadvantages of sexual and asexual reproduction (triple only)</p> <p>6.2. Explain how genes code for a particular sequence of amino acids which in turn code for a particular protein (triple only)</p> <p>6.3. Explain what the human genome is and the importance of mapping it (triple only)</p>	<p>1) Looking at the graph to the right, describe the 4 stages of the bacterial growth curve (triple only).</p> <p>2) Thomas is trying to decide whether we should use stem cells or not. Write a letter to him explaining both sides of the argument and your final conclusion.</p> <p>3) Plants can be produced through both sexual and asexual reproduction. What is the advantage of using asexual reproduction (cloning) to do this? What are the disadvantages? (triple only).</p> <p>4) Draw a storyboard to explain how genes cause proteins to form (triple only).</p> <p>5) What is the human genome? Why have scientists spent such a lot of time and money mapping it (triple only)?</p> 															
<p>60%</p>	<p>2.3. Calculate magnification using a formula (magnification = size of image ÷ size of real object)</p> <p>2.4. Explain how electron microscopy has improved our understanding of subcellular structures</p> <p>3.4. Calculate the cross-sectional areas around colonies using (triple)</p> <p>3.5. Explain how to prepare an uncontaminated culture (triple only)</p> <p>3.7. (Required practical) Investigating the effects of antiseptics or antibiotics on bacterial growth (triple only)</p> <p>4.3. Describe what stem cells are, where they can be found and how they can be used</p> <p>4.4. Explain the process of 'therapeutic cloning'</p> <p>4.7. Describe how cloning can be used in "cuttings", "tissue cultures", "embryo transplants", "adult cell cloning" (triple only)</p> <p>5.2. Explain the process of meiosis which leads to the formation of gametes</p> <p>5.4. Model the behaviour of chromosomes during meiosis</p> <p>5.3. Explain the process of asexual reproduction</p>	<p>1) The image below is of a red blood cell. The actual size of a red blood cell is 6µm. Calculate its magnification.</p>  <p>2) Miss Clark is trying to convince Ms Mitchell to buy an electron microscope. Give two ways that the electron microscope has improved our understanding of cells.</p> <p>3) (a) Calculate the cross-sectional areas in the following examples. Show your working. (b) Which is the most effective antibiotic (triple only)?</p>  <p>4) Give 5 steps that you would take to prepare an uncontaminated bacterial culture. You should include how it will be disposed of after use (triple only).</p> <p>5) Use the diagram above to explain how you would prepare an agar plate to test the effect of antibiotics P, Q, R and S (triple only).</p> <p>6) Explain what stem cells are and what makes them special. Give two uses of them.</p> <p>7) Write an instruction card with the 6 steps to be able to clone one of your own body cells.</p> <p>8) For each of the 4 areas below, describe one use and how it would be carried out (triple only).</p> <table border="1" data-bbox="810 1967 1995 2193"> <thead> <tr> <th></th> <th>Cuttings</th> <th>Tissue Cultures</th> <th>Embryo Transplants</th> <th>Adult Cell Cloning</th> </tr> </thead> <tbody> <tr> <td>Describe what it is used for</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Describe how it is carried out</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>9) (a) Draw and label a series of diagrams to show the stages of meiosis. (b) Explain how meiosis differs from mitosis. (c) Explain why gametes have to be formed from meiosis rather than mitosis.</p> <p>10) Describe how two different organisms reproduce by asexual reproduction.</p>		Cuttings	Tissue Cultures	Embryo Transplants	Adult Cell Cloning	Describe what it is used for					Describe how it is carried out				
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Describe what it is used for																	
Describe how it is carried out																	

Key Terms

Prokaryote	Eukaryote	Nucleus	Cell Wall	Cell Membrane	Ribosome	Mitochondria	Flagellum	Vacuole
Chloroplast		Aerobic Respiration	Anaerobic Respiration	Photosynthesis	Reproduction	Division		
Differentiation	Specialisation	Adaptation	Function	Feature	Mitosis	Meiosis		
Sub-cellular	Organelle	Tissue	Organ	Organ system	Organism	Magnification	Resolution	
Centimetre	Millimetre	Nanometre	Micrometre	Colony	Uncontaminated	Antiseptics		
Antibiotics	Culture	Genes	Chromosomes	DNA	Nucleus	Stem cells	Therapeutic Cloning	
Ethics	Transplant	Embryo	Reproduction	Amino Acid	Protein	Human Genome		



50%

2.5. Define and apply the prefixes 'centi', 'milli', 'micro' and 'nano'

3.2.. Calculate the number of bacteria in a culture given the 'mean division time' (triple only)

Required Practical 2: Explain how to grow bacteria in nutrient broth and on agar gel plates (triple)

4.2. Explain the process of 'mitosis' and the 'cell cycle' (when, where, how and why)

5.1. Explain the process of sexual reproduction and link this to variation

1) Convert each of the measurements below – show your working (i.e. what you are multiplying or dividing by).

Easy	Medium	Tricky!
1.2m into mm	47,000nm into m	529cm into mm
250cm into m	349,000,000µm into m	256,000µm into nm
32m into µm	4,567,322mm into m	662,000,000nm into mm
0.3m into nm	520cm into m	400cm into µm

2) (a) You have determined that your original culture contains 12,000 bacterial cells. The mean division time is 15 minutes. Approximately how many bacterial cells will be present in your culture after 12 hours (triple only)?

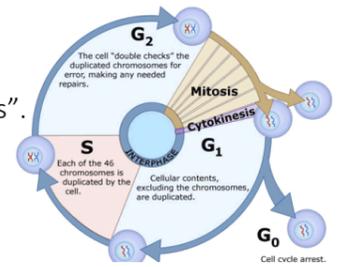
(b) You initial culture contains 150,000 bacterial cells. The mean division time is 3 minutes. Approximately how many bacterial cells will be present in your culture after 24 hours (triple only)?

3) Mr Finley is trying to grow some bacterial cultures on using both nutrient broth and agar gel. Write two step by step methods for him including the equipment he will require, any safety precautions and how he can safely dispose of the cultures after their use (triple only).

4) The diagram to the right shows the cell cycle.

(a) Calculate the proportion of the cell cycle spent in "mitosis".

(b) If the cell cycle lasts for 2 hours, estimate the time spent in "mitosis".



5) Some organisms reproduce sexually. Give one advantage of doing so in terms of survival of the population.

40%

2.1. Compare and contrast electron and light microscopes

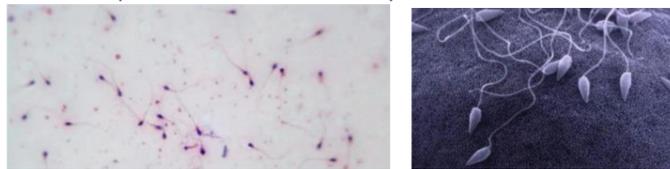
Required Practical 1: Use a light microscope to observe, draw and label a selection of plant and animal cells. A scale magnification must be included.

3.1. Explain how bacterial cells multiply (triple only)

5.1.1. Describe the difference between sexual and asexual reproduction giving an example of an organism that uses each method

6.1. Describe the structure of DNA (triple only)

1) Which of these images was taken with a light microscope, which was taken using an electron microscope? Give a reason for your decision.

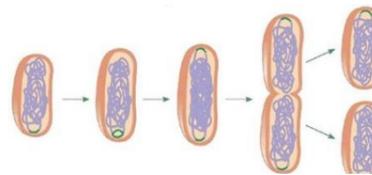


2) State two advantages and two disadvantages of using each type of microscope.

3) Mr Horlick is trying to teach Ms Cairns how to use a light microscope to look at an onion epithelial cell. Can you write him some step by step instructions to share with her? You must include:

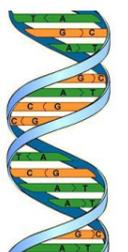
- the equipment you will need
- how to prepare the slide so that it has no air bubbles
- the purpose of using iodine solution
- how to magnify the image to x100 and get it into focus

4) Bacterial cells multiply rapidly and can make us incredibly ill. Use the diagrams below to help you to explain the process through which bacteria multiply (triple only).



5) Give the main difference between sexual and asexual reproduction. Name one organism that reproduces in each way.

6) Use the diagram to the left to help you to describe the structure of the DNA that is found within our cells (triple only).



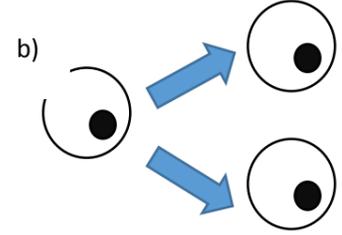
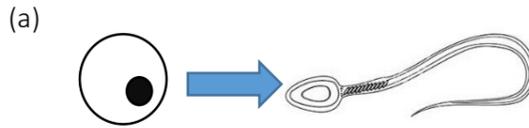
30%

1.3. Describe the difference between 'cell differentiation' and 'cell division'

1.4. Describe how cells are specialised and explain their roles (animal cells: sperm cells, nerve cells, muscle cells. Plant cells: root hair, xylem and phloem).

1.5. Define 'tissue', 'organ' and 'organ system' and explain how they work together to create a functioning 'organism'

1) One of these cells has differentiated, one has divided. Can you tell Mr Stewart which is which, explaining how he can tell!



2) For each of the cells below,

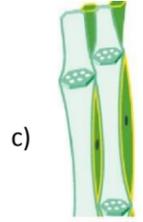
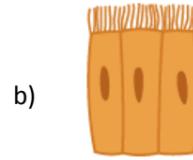
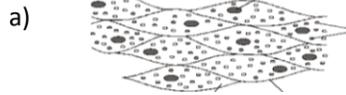
(i) Name the cell.

(ii) Decide whether it is a prokaryote or eukaryote, giving a reason for your decision.

(iii) Decide whether it is an animal or plant cell.

(iv) Give it's function.

(v) Give two adaptations that makes it suited to this function.



3) The circulatory system is made out of a collection of different **organs**, **tissues** and **specialised cells**. Can you explain the function of this organ system and then define each of these key terms, name at least one example of each of these in the circulatory system and write a paragraph explaining how they fit together to form this system.

20%

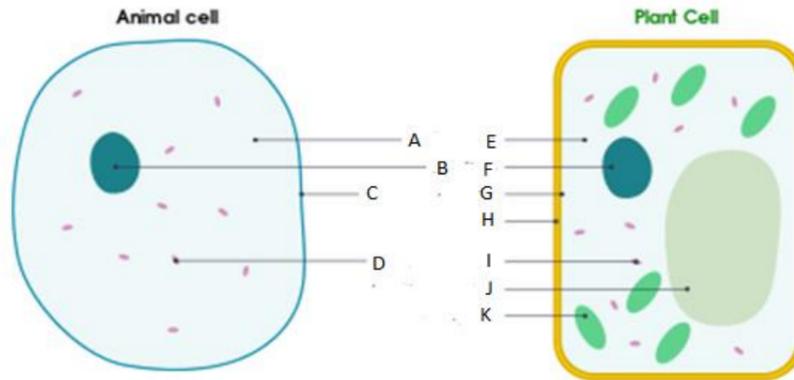
1.1. Describe the structure of plant, animal and bacteria cells, classifying as prokaryotic and eukaryotic cells.

1.2 Identify and explain the functions of sub-cellular structures

2.2. Define 'magnification' and 'resolution'

4.1. Define, locate and rank in terms of size, 'Genes', 'Chromosomes', 'DNA' and 'nucleus'

1) Can you label the animal and plant cell below? Use the key terms at the bottom of the page to help you.



- A=
- B=
- C=
- D=
- E=
- F=
- G=
- H=
- I=
- J=
- K=

2) Match the function of the subcellular structure to it's name:

Subcellular Structure
Nucleus
Vacuole
Chloroplast
Cell Wall

Function
Reservoir for water, stores sugars and salts
Absorbs light, the site of photosynthesis (making glucose)
Makes the cell turgid and strengthens the cell.
Contains the genetic material and controls the activity of the cell

3) Choose the correct definition for these key terms:

(a) **Magnification:**

- (i) Stretching an image (ii) Making an image more clear (iii) Making an image bigger

(b) **Resolution:**

- (i) Increasing the detail of an image (ii) Making an image bigger (iii) Rotating the image

4) Put these into order of size (from smallest to largest):

Genes

Chromosomes

DNA

Nucleus

Can you match the label to the correct diagram?

