Understandings:

1. State that cells can only be formed by division of pre-existing cells.
- This is one of the three points in cell theory and is stated in 1.1.

2. Discuss the idea that the very first cells must have arisen from non-living material.
- This is still not determined and it is a challenge for biologists to exactly know how something as complex as the cell could have developed from non-living materials. There are many theories about this of course, but it is still under discussion.

3. Explain the endosymbiotic theory.
- This is basically about how eukaryotes have been formed from prokaryotes. How scientists explain this is by endosymbiotic theory. Endo means inside and symbiotic means living together, thus it is when an organism lives inside another organism.

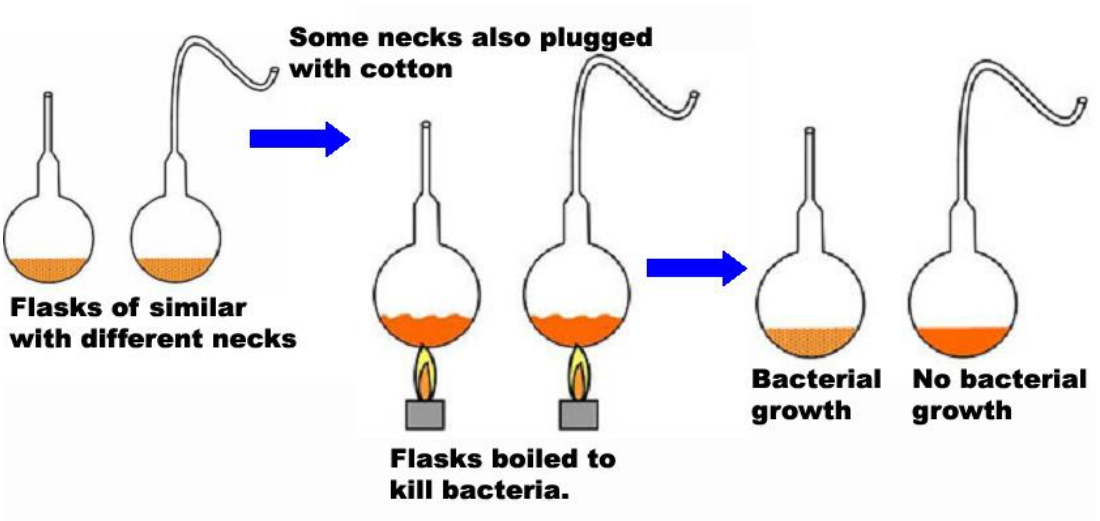
It seems that a prokaryote could have swallowed an aerobically respiring smaller prokaryote or even a chloroplast. Both benefitted and natural selection chose these new prokaryotes that were later about to evolve into eukaryotes.

Strong evidences for this is that mitochondria and chloroplasts have their own DNA, they can independently code that DNA into mRNA, they have 70s ribosomes that current prokaryotes have and they cannot be coded by the eukaryote. As we know mitochondria are something that is passed on directly from your mother, thus it is not something that is created by the zygote. I don't know how it works for chloroplasts but I reckon it is something similar.

Applications:

1. Explain the evidence from Pasteur's experiments that spontaneous generation of cells and organisms does not now occur on Earth.
- Before late 19th century, people believed that organisms appeared "spontaneously" when contact with air.

Pasteur (a French chemist and biologist) proved this wrong by his experiment with swan-necked bottles.



Essentially, he showed that despite contact with air, no new organisms were “created” in the swan-necked bottles because bacteria/fungus/spores/ could not reach through the bottled necks. Another demonstration was by cotton wool. Cotton wool let air pass, but not bacteria.

TOK:

1. Biology is the study of life, yet life is an emergent property. Under what circumstances is a systems approach productive in biology and under what circumstances is a reductionist approach more appropriate? How do scientists decide between competing approaches?