Year 11 Science: Microbes and their environment: gut, food and soil

Name: _____ Date: _____

Try these without your notes first, then check the answer key.

Practice

1. Name the four phases of a growth curve in order, and give one reason for the stationary phase.

2. Room 9 measured the pH of a kombucha brew: day 0, pH 5.0; day 4, pH 3.8; day 8, pH 3.2; day 12, pH 2.9. Describe the change and explain it with a life process.

3. Bread dough was left for an hour at 5 °C, 30 °C and 70 °C, and rose 2 mm, 25 mm and 0 mm. Explain how changing the temperature changed the rate of respiration in the yeast.

4. For kauri dieback, sort these factors into abiotic or biotic, in order: soil moisture, the kauri tree, feral pigs, temperature.

5. A student writes: 'Phytophthora makes kauri leaves turn yellow, so it changes the forest.' Explain why this does not reach Excellence.

Fix the mistake

6. Correct this statement: "The bacteria respired faster at 43 °C because it was warmer."

7. Correct this statement: "In the stationary phase the yeast has stopped reproducing."

8. Correct this statement: "For Excellence I explained how E. coli gives people diarrhoea."

9. Correct this statement: "My graph shows the yeast grew best at 35 °C, so I don't need numbers in my writing."

Answer key (for parents and tutors)

1. Name the four phases of a growth curve in order, and give one reason for the stationary phase.
   Lag, log (exponential), stationary, death. In the stationary phase food is running low and wastes are building up, so cells are made only as fast as they die.
2. Room 9 measured the pH of a kombucha brew: day 0, pH 5.0; day 4, pH 3.8; day 8, pH 3.2; day 12, pH 2.9. Describe the change and explain it with a life process.
   The pH fell by 2.1 over 12 days (5.0 to 2.9), quickly at first and then more slowly. Yeast respires the sugar into ethanol, and acetic acid bacteria use the ethanol and excrete acetic acid, which lowers the pH of the brew.
3. Bread dough was left for an hour at 5 °C, 30 °C and 70 °C, and rose 2 mm, 25 mm and 0 mm. Explain how changing the temperature changed the rate of respiration in the yeast.
   From 5 °C to 30 °C the dough rose more (2 mm to 25 mm) because the yeast's enzymes worked faster as particles moved faster and collided more often, so respiration made more carbon dioxide. At 70 °C it rose 0 mm because the heat denatured the enzymes, so respiration stopped.
4. For kauri dieback, sort these factors into abiotic or biotic, in order: soil moisture, the kauri tree, feral pigs, temperature.
   Abiotic, biotic, biotic, abiotic.
5. A student writes: 'Phytophthora makes kauri leaves turn yellow, so it changes the forest.' Explain why this does not reach Excellence.
   It describes a symptom of the disease, the microbe acting as a whole, not how one of its life processes changes a factor. Better: its threads feeding in the roots (nutrition) destroy root tissue, so less water reaches the canopy, which thins and lets more light and heat reach the forest floor.
6. Correct this statement: "The bacteria respired faster at 43 °C because it was warmer."
   Give the reason in the cells: near 43 °C their enzymes work close to their best, so lactic acid builds faster, as the pH falling to 4.5 shows.
7. Correct this statement: "In the stationary phase the yeast has stopped reproducing."
   Cells are still dividing, but about as many die as are made, because food is running low and wastes are building up.
8. Correct this statement: "For Excellence I explained how E. coli gives people diarrhoea."
   Symptoms are about the microbe as a whole; Excellence needs how a life process, such as the acid or gas it excretes, changes a factor of the environment.
9. Correct this statement: "My graph shows the yeast grew best at 35 °C, so I don't need numbers in my writing."
   Quote the observations in your sentences, with units, because the grade depends on linking the evidence, not just pointing to it.