ANSWER KEY.

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Asexual Reproduction

Biology | ANSWER KEY

Show your work in the blank space. Use units and complete sentences where asked.

1. A bacterium divides every 30 minutes. Assume every cell keeps dividing and none die.

(a) How many cells are there after 2 hours, starting with 1 cell?

(b) How long does it take for 1 cell to become 256 cells?

(a) 2 h = 120 min. 120 min / 30 min = **4 divisions**. 2^4 = **16 cells**.

(b) 256 = 2^8, so **8 divisions**. 8 x 30 min = 240 min = **4 hours**.

2. Name the type of asexual reproduction in each case.

(a) A yeast cell grows a small bud that later separates from it.

(b) A bacterium copies its DNA and splits into two cells.

(c) A piece of a sponge breaks off and grows into a new sponge.

(d) A female lizard raised alone, with no males, lays eggs that hatch into young lizards.

(a) budding (b) binary fission (c) fragmentation (d) parthenogenesis (an unfertilized egg develops into a new individual)

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3. A hydra with the genotype Bb reproduces by budding, and no mutations occur. What is the genotype of each offspring? Explain why, using what happens to DNA before the cell divides.

Bb for every offspring. The parent's DNA is copied before the cell divides, so each bud receives a complete, identical copy of the parent's DNA. **The offspring are clones of the parent.**

4. Sample data (made up for practice): a farmer plants 100 potato plants grown from pieces of one potato (clones) and 100 plants grown from seeds. A disease kills 91 of the clones and 23 of the seed plants.

(a) What percent of each group died?

(b) Write a claim, evidence, reasoning statement about which group is more likely to survive a new disease, and why.

(a) Clones: 91 / 100 = **91%**. Seed plants: 23 / 100 = **23%**.

(b) Claim: seed-grown plants are more likely to survive. **Evidence:** 23% of seed plants died compared with 91% of clones. **Reasoning:** clones have identical genes, so if they lack a resistance allele the disease kills most of them. Sexual reproduction makes varied offspring, so some seed plants have alleles that help them survive.

A correct answer includes: the two percentages, identical genes in clones, and variation from sexual reproduction.

5. State one advantage of asexual reproduction and one advantage of sexual reproduction.

Asexual: fast, and no mate is needed. **Sexual:** offspring have new gene combinations, so some may survive when the environment changes.

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