Teacher Answer Key

Case Study

1. The fragment did not change, but the technology did. Next-generation sequencing reads very short, damaged pieces of DNA that older methods could not measure, so a sample that failed three times finally produced a full profile.
2. Families grieve on different timelines, and a phone call can reopen a loss that someone has spent years accepting. Recording the choice in advance means the office treats the family's wishes as part of the scientific process rather than an afterthought.

Multiple Choice

1. B
2. C
3. A

Matching

1-E, 2-D, 3-A, 4-C, 5-B

Fill-in-the-Blank

1) short tandem, 2) mitochondrial, 3) repository

Short Answer (Sample Responses)

Q1: The remains were crushed, burned, and exposed to bacteria, so many fragments produce no readable profile with the technology available at the time. The office stores those samples and retests them as methods improve, which means the work has no natural end point.
Q2: A failed test usually means the method was not sensitive enough, not that the fragment is empty. Because sequencing technology keeps improving, a stored sample may yield a full profile years later, as happened repeatedly after 2017.
Q3: A direct reference comes from the missing person, so a match points at one individual. Kinship analysis compares a fragment to relatives who share only part of their DNA, so analysts must calculate probabilities and gather more samples before they can be confident.