

Clay Mass Detectives

Track how a whole object's mass compares with its parts.

SC.4.P.8.3 "Explore the Law of Conservation of Mass by demonstrating that the mass of a whole object is always the same as the sum of the masses of its parts."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline the mass of the whole clay ball, and circle the three part masses that add to it. Number the sentence that explains what happens if a piece is lost.

Maya's Clay Investigation

- ① Mass tells how much matter is in an object. In science class, Maya placed a 45-gram ball of modeling clay on a balance. The balance showed 45 grams. She then cut the clay into three pieces. No clay fell away, and nothing was added. Maya wanted to find out whether the pieces still had the same total mass.
- ② First, Maya measured each piece separately. One piece had a mass of 12 grams, another had a mass of 18 grams, and the last piece had a mass of 15 grams. She added the masses: $12 + 18 + 15 = 45$ grams. The sum of the parts matched the mass of the whole clay ball before it was cut.
- ③ Cutting or breaking an object changes its size and shape, but it does not change how much matter is present when all the pieces are kept. This idea is called conservation of mass. Maya's investigation showed that the whole object had the same mass as the sum of its parts. If a piece had been lost, the measured parts would have totaled less than 45 grams.

2 ANSWER WITH EVIDENCE Use the passage

1 What was the mass of the whole clay ball before Maya cut it?

2 Write the addition sentence that shows the total mass of Maya's three clay pieces.

3 How did the mass of the clay pieces compare with the mass of the whole clay ball?

4 What would happen to the total measured mass if one clay piece were lost? Explain why.

3 YOUR TURN Your own words

First complete the numerical model: in Panel 1 draw a whole object labeled 36 grams; in Panel 2 draw three parts with positive masses that add to 36 grams, and compare them in one sentence. These labels are a model, not measured data. Then demonstrate with real modeling clay and a teacher-provided digital balance set to grams. On extra paper record the whole ball mass. Gently pull it into three pieces over a tray, keeping every bit; measure each piece separately, add their masses and compare that sum with the original. Put all pieces back together and measure again. Record all readings with units and explain why keeping all matter matters. Do not change readings to force equality or taste clay.

PART 1 • READ AND MARK

Underline the mass of the whole clay ball, and circle the three part masses that add to it. Number the sentence that explains what happens if a piece is lost. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What was the mass of the whole clay ball before Maya cut it?	45 grams
2	Write the addition sentence that shows the total mass of Maya's three clay pieces.	12 + 18 + 15 = 45 grams
3	How did the mass of the clay pieces compare with the mass of the whole clay ball?	The pieces totaled 45 grams, which was the same as the whole clay ball.
4	What would happen to the total measured mass if one clay piece were lost? Explain why.	The total would be less than 45 grams because not all of the clay, or matter, would be measured.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Panel 1: A whole apple labeled 36 grams. Panel 2: Three apple pieces labeled 9 grams, 11 grams, and 16 grams. Sentence: The three parts total 36 grams, so they have the same mass as the whole apple.

Accept any three positive part masses that add to 36 grams. The sentence should state that the total mass of the parts equals the mass of the whole object. For the actual demonstration, teacher supplies non-drying modeling clay, clean tray and balance; checks zero before each measurement, uses the same tared tray if needed and prevents loss or added material. Use clay portions large enough to register reliably. Require actual whole, three part and recombined readings in grams, part sum and comparison. Small rounding/readout differences can occur; examine balance precision and clay left on hands/tray, repeat safely and record honestly rather than label every difference lost matter. Conservation concerns retained matter, while measured values have limited precision. The 36-gram panels remain a separate numerical model. ACS Conservation of Mass explains measurement variation and precision; its activities differ from this clay demonstration: <https://www.acs.org/education/resources/k-8/inquiryinaction/fifth-grade/chapter-4/conservation-of-mass.html> .