Draw a Lever: Fulcrum, Arms, and Load in Clear Diagram Form

Original tasks 1, 2, 3 / complete keys

Task 1

A lever beam is 10 cm long. The fulcrum is 3 cm from the left end. Effort acts at the left end and load acts at the right end. State the effort arm and load arm lengths.

Answer: Effort arm = 3 cm; load arm = 7 cm.

Reason: Measure from the fulcrum to each force point. The left end is 3 cm from the fulcrum, and the right end is 10 minus 3 equals 7 cm from the fulcrum.

Check: Add the two arms: 3 plus 7 equals 10 cm, matching the beam length.

Task 2

A lever has an effort arm of 6 cm and a load arm of 2 cm. If the effort is 3 units, what load balances it? Use the arm-length ratio.

Answer: 9 units.

Reason: The effort arm is three times the load arm (6 divided by 2 equals 3). A longer effort arm means a smaller effort balances a larger load, so the load equals effort times the arm ratio: 3 times 3 equals 9 units.

Check: Multiply effort by effort arm and divide by load arm: 3 times 6 divided by 2 equals 9.

Task 3

Describe how to draw a lever where the effort point is 5 cm from the fulcrum and the load point is 5 cm on the other side. What is the beam length if both points are at the beam ends?

Answer: Draw a 10 cm beam with the fulcrum at the center. Mark effort at the left end and load at the right end. Beam length is 10 cm.

Reason: Equal arms mean the fulcrum is midway. The total beam length is the sum of the two arms: 5 plus 5 equals 10 cm.

Check: Measure each arm from the fulcrum and confirm both are 5 cm; add to get 10 cm.

Draw a Lever: Fulcrum, Arms, and Load in Clear Diagram Form

Original tasks 4 / complete keys

Task 4

A diagram shows a fulcrum at 2 cm from the left end of an 8 cm beam. The effort arrow is at the left end and the load arrow is at the right end. The labels say effort arm 2 cm and load arm 6 cm. Is the diagram consistent? Explain.

Answer: Yes, it is consistent. Effort arm 2 cm plus load arm 6 cm equals 8 cm, the beam length.

Reason: The fulcrum is 2 cm from the left end, so the left arm is 2 cm. The right arm is 8 minus 2 equals 6 cm. The labels match these measurements.

Check: Add the labeled arms and compare with the beam length: 2 plus 6 equals 8 cm.

Draw a Lever: Fulcrum, Arms, and Load in Clear Diagram Form

Source rubric / reflection

- [ ] Fulcrum is drawn at the pivot point and touches the beam.
- [ ] Beam is a clear straight line or narrow rectangle.
- [ ] Effort point and load point are marked on opposite sides of the fulcrum.
- [ ] Arm lengths are measured from the fulcrum, not from the beam ends.
- [ ] Both arms are labeled with lengths and one consistent unit.
- [ ] Effort and load arrows are labeled and distinguishable.
- [ ] Labels are legible; printed, cursive, or mixed styles are acceptable if readable.
- [ ] Arm lengths add up consistently with the beam length when force points are at the ends.

Reflection: What did you check, what did you change, and what will you try next?