ASSESSMENT C
Permission Granted

LET'S GET PHYSICAL

The results of a questionnaire filled out by a student body of one thousand students determined that their most frequent methods of exercise were running, lifting, and skating. The results showed that

260 students ran.
360 students lifted.
240 students skated.
100 students ran and lifted.
80 students ran and skated.
120 students lifted and skated.
60 students ran, lifted, and skated.

1. Construct a Venn Diagram and record the number of students in each region.
2. a. How many students only lift to exercise?
   b. How many students run or lift to exercise?
   c. How many students run and lift, but do not skate to exercise?
   d. How many students do not run, lift or skate?
3. If you were in charge of scheduling exercise availability and could only schedule 2 activities for any time slot, which two of the three most popular exercises would you schedule most frequently? Explain and justify your answer.

Description: Students analyze the results of a student body questionnaire and make scheduling decisions based on the results.

[Source: A Collection of Performance Tasks and Rubrics: High School Mathematics, Eye on Education, Larchmont, NY]

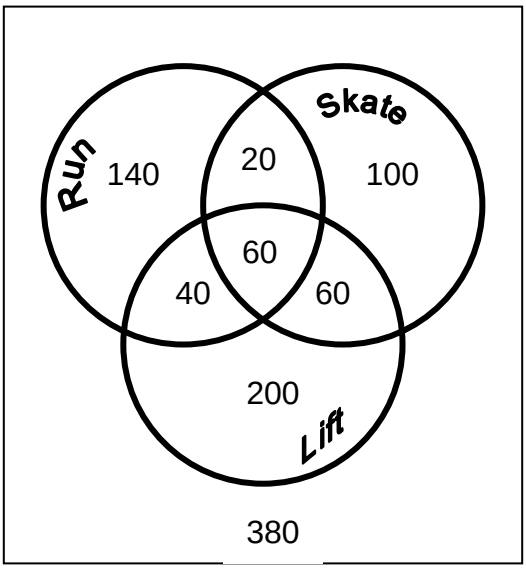
MATHEMATICAL CONCEPTS

To solve this task, students must organize and analyze the intersections and unions of the data via a Venn Diagram. They must then solve an authentic problem based on that analysis.

SOLUTION

1. Venn Diagram:

Student Body



2. a. 200 = 360 – (60 + 60 + 40)
   b. 520 = 260 + 260
   c. 40 = 100 – 60
   d. 380 = 1000 – (140 + 40 + 60 + 20 + 200 + 60 + 100)

[Source: A Collection of Performance Tasks and Rubrics: High School Mathematics, Eye on Education, Larchmont, NY]

3. More than one answer is acceptable but the reasoning must be sound in order for an answer to be accepted. For example, a student may say that running and skating should be scheduled most often for the same time slot since this would minimize conflicts – 120 both lift and skate, 100 students both run and lift, but only 80 students run and skate. Or, a student might respond that lifting and running should be scheduled in the same time slot since this would attract 420 (=200 + 60 + 140 + 20) people without conflict, whereas lifting and skating would attract 360 (=200 + 40 + 100 + 20) people without conflict, and running and skating would attract only 340 (= 140 + 40 + 100 + 60) people without conflict.

RUBRIC

Level 4: This response offers clear and convincing evidence of a deep knowledge of the mathematics related to this task.

Characteristics:
All parts correct with the possibility of a minor flaw. Part 3 must show correct reasoning. (It is possible to score a 4 is an error was made in the Venn Diagram but the answers and reasoning given in parts 2 and 3 are correct based on that error.)

Level 3: This response offers evidence of substantial knowledge of the mathematics related to this task.

Characteristics:
Multiple minor flaws in parts 1 and 2 but reasoning correct in part 3.

Level 2: This response offers limited or inconsistent evidence of knowledge of the mathematics related to this task.

Characteristics:
Parts 1&2 correct, but part 3 weak, incorrect, or missing.

Or

Major flaws in part 1 and/or 2, but reasoning correct in part 3.

Level 1: This response offers little or no evidence of knowledge of the mathematics related to this task.

Characteristics:
Major flaws in Parts 1 and 2 and part 3 weak or missing.

[Source: A Collection of Performance Tasks and Rubrics: High School Mathematics, Eye on Education, Larchmont, NY]