36. HANDS-ON SPONTANEOUS PROBLEM — Can You Top This?

A. When the team members enter the room, tell them this is a hands-on problem.

B. JUDGE READS TO TEAMS: (Do not read material in parentheses.)

(1) This is a two-part problem. In Part I, you will have 7 minutes to build a structure. You will be warned when 2 minutes, 1 minute, and 30 seconds remain. In Part II, you will have 2 minutes to test your structure. You will be warned when 30 seconds remain.

(2) Your team's problem is to build a structure that will rest on a coffee can and support a test container and weights above a measuring stick.

(3) You may not alter the cans or move them out of position.

(4) You will be given materials to build your structures. Nothing else may be used.

(5) You will be given the test container and measuring sticks in Part I.

(6) You may end Part I before 7 minutes if you are ready to test your structure.

(7) When Part II begins, you may test your structure. If the test container is not in place you must put it on the structure you want scored. It must rest entirely above the blue measuring stick (*demonstrate to the team*). No other structures will be scored.

(8) You may then add weights to the test container one at a time (*hold up a weight*).

(9) When testing, the structure may only touch the cans and the test container.

(10) Part II will end before 2 minutes if your structure breaks or if you run out of weights. Your structure will be considered broken if any part of it touches something other than the can and test container or if the container falls below the height of the blue measuring stick.

(11) You may ask the judges to stop Part II and be scored at any time.

(12) You will be scored as follows:

(a) If your structure supports the test container entirely above the blue measuring stick, you will receive 5 points for holding the test container and 1 point for each weight held.

OR

(b) If your structure supports the test container entirely above the red measuring stick, you will receive 15 points for holding the test container and 2 points for each weight held.

(c) You will receive 1 to 10 points for how well your team works together.

(*Say "I repeat," and repeat numbers 2-4 and 7-11. Then instruct the team to begin.*)

C. FOR JUDGES ONLY:

1. Make sure two metal cans, 3½-4" in diameter, are secured in place at opposite ends of a table before each team competes. The structure may touch one or both cans (see diagram).

2. Use a plastic one-pint container as the test container. Have 40 weights available for the teams to use. These may be nails (app. 8 penny), coins (quarter size), metal washers, marbles, or other uniform objects. Make sure the test container is able to hold 40 of these objects.

3. The blue measuring stick should be 7" long; the red measuring stick should be 11" long.

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4. Have the following materials ready before the team enters the room:

1-inch cube of clay	8 adhesive mailing labels (1" x 3½") ***OR*** 12 inches of masking tape
8 plastic straws	25 sturdy wooden toothpicks ***OR*** 35 weaker wooden toothpicks
1 paper plate	25 pieces of uncooked spaghetti
10 paper clips	1 8-oz. Styrofoam cup

5. Materials not used as part of the structure may be used in other ways. For example, a team may place clay on the table next to a can to help prevent it from moving.

6. Be sure to give the team 7 minutes for Part I and 2 minutes for Part II. The team may place the test container on the structure either in Part I or Part II. Teams may continue building during Part II but must stop before testing the structure. This gives them less time to test their structure.

7. If either can is moved out of place in Part I, reattach it to the table and tell the team not to move it again. Time will continue. If this happens in Part II, allow the team to continue until the structure is considered broken.

8. The test container must be entirely above the blue measuring stick to receive any score other than how well the team worked together. Be sure each team understands this as it is working. Award score for B. 12, a or for B. 12, b, but not for both. However, if the test container rests above the red measuring stick but falls below it as weights are added, still award 2 points for each weight held until the structure is considered broken.

9. If the team is obviously working under a misconception, clarify the problem. For example, if it thinks materials used in the structure may touch the table say, "Read number 9." However, if it thinks the materials may not be altered, you may not tell them they may be altered unless asked.