

The Doubling Trail

HOST GUIDE - includes solutions | US Letter | v1.0.0

2-6 players, with an adult host | Suggested ages 8-11 | Plan 20-30 minutes

Keep this guide with the adult host. Let the group try before offering hint 1, then hint 2. Read the explanation only when the group is ready to check its work.

Support your group

Use a calculator after box 6 if arithmetic becomes tiring. Cover the next row and predict it together. Emphasize that doubling a box value and adding to a running total are different steps.

Warm-up: four boxes

Hint 1: Double the newest box, not the whole running total.

Hint 2: Add all four box values for the final total.

Answer: Box values: 1, 2, 4, 8. Total: 15.

The next box doubles the previous box: 1 → 2 → 4 → 8. Add $1+2+4+8$ to get 15; the fourth box alone contains only 8.

Round 1: the sixth stop

Hint 1: Continue the list by two boxes.

Hint 2: The total is one less than twice the newest box value.

Answer: Box 6 has 32; the total is 63.

After box 4, the next values are 16 and 32. The six-box sum is $1+2+4+8+16+32=63$.

Round 2: test a claim

Hint 1: Count the starting box before doubling.

Hint 2: Box 7 is 64.

Answer: Box 8 has 128; the total is 255.

Box 1 starts at 1, so box 8 comes after seven doublings: 128. The next box, box 9, has 256. The sum through box 8 is 255.

Final: stay within 1000

Hint 1: Do not compare 1000 only with the newest box.

Hint 2: Compare the running totals 511 and 1023.

Answer: 9 complete boxes: total 511. A tenth box raises the total to 1023, which exceeds 1000.

Box 9 holds 256, so the total through 9 is $255+256=511$. Box 10 holds 512, taking the total to 1023. The unused 489 is less than the 512 needed for the next whole box.

How to close the session

Finish by proving the final stopping point with two totals: the last affordable total and the very next total. A close guess without both checks is not enough.

If a result differs, return to the stated rule and compare the written steps. An answer revealed by the host is help, not an independently solved puzzle.

Mechanism reference: Project Gutenberg 49137, THE PROGRESSION OF NUMBERS.. New session instructions and examples.

Age and time are planning estimates. No child playtest or physical print trial is claimed.