

Using a box or a letter for the unknown

CURRICULUM ALIGNMENT

ALG.EXP.3 represent and express problems with known and unknown values in different ways to include the use of appropriate letter-symbols or words.

INTERACTIVES Balance Scales · challenge, display, explore

WHAT THIS LESSON TEACHES

The one missing number in a number sentence can be shown as an empty box or as a single letter. Both mean the same thing: a number we have not found yet that makes both sides balance.

→ In $\square + 3 = 9$ and $a + 3 = 9$ the box and the letter both hide 6.

→ In $b + 4 = 10$ the letter b stands for 6 so both sides balance.

MODEL THIS ON THE BOARD

FINDING A ON THE BALANCE BEAM

- 1 Look at the number sentence $a + 4 = 9$
- 2 The letter a is the unknown we must find to level the beam
- 3 Slide weights until both sides match: try $5 + 4$
- 4 Check: $5 + 4 = 9$ so the beam hangs level
- 5 a stands for 5 and we could rewrite it as $\square + 4 = 9$

ANSWER KEY

a) 7

b) 6

c) 6

Q1: 9

Q2: 11

Q3: 8

Q4: 6

Q5: 11

Q6: 10

a) **Always** : Both are just ways to mark the one missing number that balances the sentence.

b) **Never** : In the first, n is 8; in the second, n is 5. A letter stands for whatever number makes its sentence true.

c) **Always** : The box and letter do the same job so the rest of the sentence stays unchanged.

d) **Never** : Both work: $\square + 4 = 9$ and $n + 4 = 9$ ask the same question.