

Understanding Part-Part-Whole

Before solving missing number equations students need to:

- Understand addition and subtraction.
- Understand how to represent addition and subtraction using part-part-whole.
- Use these understandings to write addition and subtraction equations where the unknown is in the typical place to the right of the equals symbol.

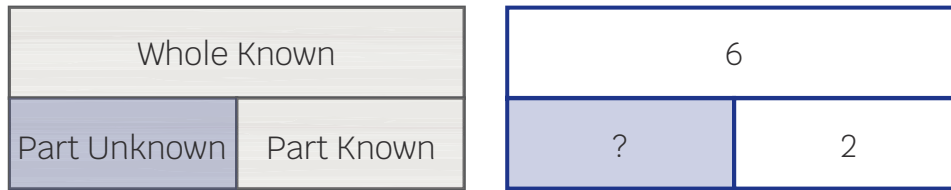
Addition

$$\boxed{\text{Part Known}} + \boxed{\text{Part Known}} = \boxed{\text{Whole Unknown}} \qquad 4 + 2 = \boxed{?}$$

Subtraction

$$\boxed{\text{Whole Known}} - \boxed{\text{Part Known}} = \boxed{\text{Part Unknown}} \qquad 6 - 4 = \boxed{?}$$

Addition: Part Unknown



To solve missing number addition equations where the part is unknown students can either:

(i) Use addition.

$$\boxed{?} + 2 = 6$$

Think, "What joins with 2 to make 6?"

Part Unknown

 +

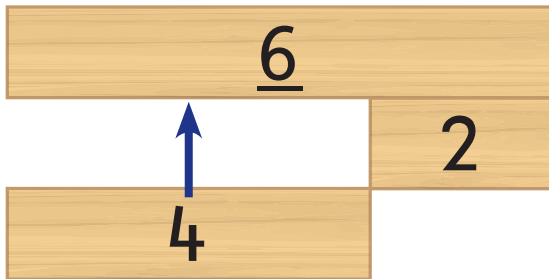
Part Known

 =

Whole Known

Think, "**What joins with** this part to make the whole?"

Bond blocks can be used to support the calculation and check solutions.



(ii) Rearrange the equation, using part-part-whole to make a subtraction equation where the unknown is in the answer position.

$$\boxed{?} + 2 = 6 \quad \longrightarrow \quad 6 - 2 = \boxed{?}$$

Whole Known

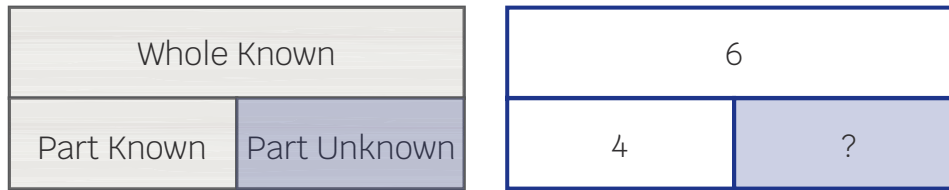
 -

Part Known

 =

Part Unknown

The same process applies if the missing number is in the other part.



To solve missing number addition equations where the part is unknown students can either:

(i) Use addition.

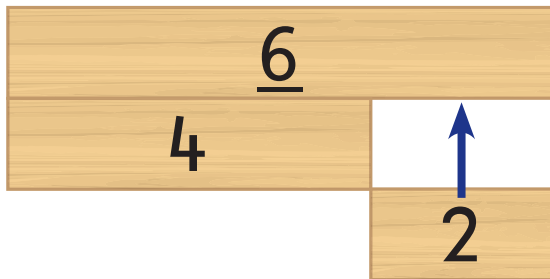
$$4 + \boxed{?} = 6$$

Think, "**What joins with** 4 to make 6?"



Think, "**What joins with** this part to make the whole?"

Bond blocks can be used to support the calculation and check solutions.

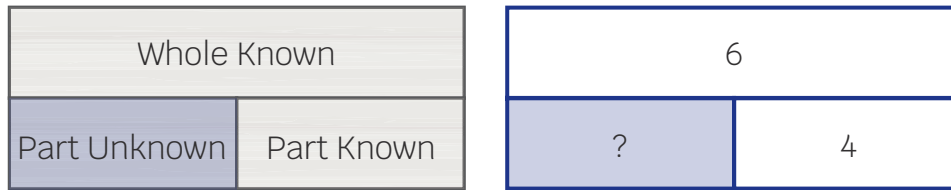


(ii) Rearranging the equation, using part-part-whole to make a subtraction equation where the unknown is in the answer position.

$$4 + \boxed{?} = 6 \quad \longrightarrow \quad 6 - 4 = \boxed{?}$$



Subtraction: Part Unknown



To solve missing number subtraction equations where the part is unknown students can either:

(i) Use addition.

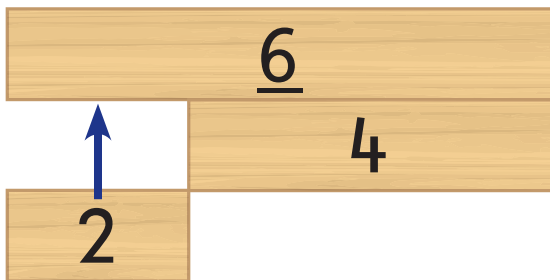
$$6 - \boxed{?} = 4$$

Think, "What joins with 4 to make 6?"



Think, "**What joins with** this part to make the whole?"

Bond blocks can be used to support the calculation and check solutions.

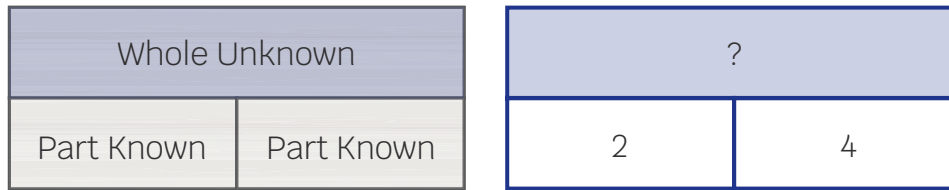


(ii) Rearrange the equation, using part-part-whole to make a subtraction equation where the unknown is in the answer position.

$$6 - \boxed{?} = 4 \quad \longrightarrow \quad 6 - 4 = \boxed{?}$$



Subtraction: Whole Unknown

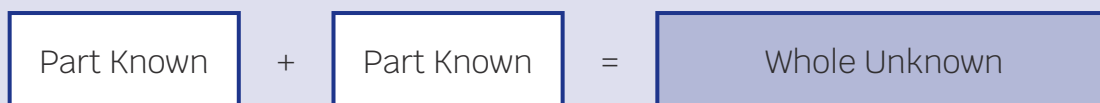


To solve missing number subtraction equations where the whole is unknown students can either:

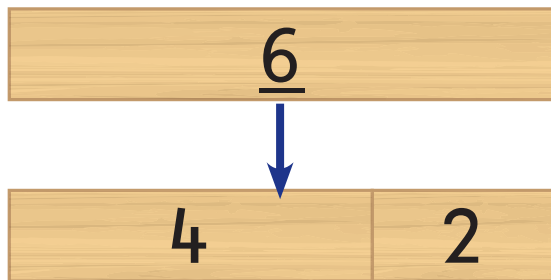
(i) Use addition.

$$\boxed{?} - 2 = 4$$

Think, "Join the parts using addition to make the whole."

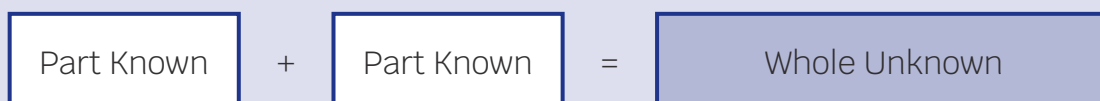


Bond Blocks can be used to support the calculation and check solutions.



(ii) Rearrange the equation, using part-part-whole, to make an addition equation where the unknown is in the answer position.

$$\boxed{?} - 2 = 4 \quad \longrightarrow \quad 4 + 2 = \boxed{?}$$



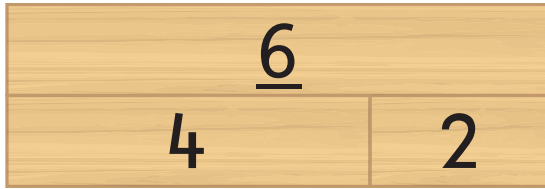
A Progression to Solve Missing Number Equations

Each of the strategies outlined to solve missing number equation have been based on this progression.

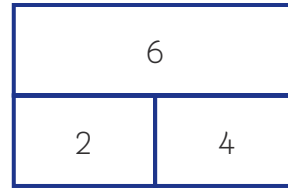
Concrete

Representational

Abstract



Bond Blocks manipulated to represent numbers, addition and subtraction.



Diagrammatic representation using part-part-whole.

$$\boxed{?} - 4 = 2$$

so $4 + 2 = \boxed{?}$

Calculation using numbers and symbols.

Bond Blocks support students to move toward calculating with numbers and symbols.

If students are experiencing difficulty backtrack one step. If they demonstrate understanding, help them to move forward one step using the concrete-representational-abstract progression.