**Bar Model “Teacher Talk”**

**Addition:**
Max had 2 trucks in his toy chest. He added 3 more. How many total trucks did Max have in his toy chest?

Max's Trucks

\[
\begin{array}{cc}
\text{2} & \text{3} \\
\end{array}
\]

\[2 + 3 = 5\]

Max had 5 trucks in his toy chest.

**Step 1:** Let's **read the entire problem** and picture what is going on.

**Step 2:** Who **is involved in the problem?** (Max) Anyone else involved in the problem? (No, just Max) Let's write his name on the left side of our work.

Now that we know that Max is involved in the problem we can ask **“Max’s what?”** What are we talking about? His pets, buttons? Look at the question and tell me what it is we are talking about? (Trucks)

**Step 3:** Draw a unit bar to model the variable(s).
In this step we need to draw a unit bar directly to the right of the variable. Who can tell me what a variable is? How many do we have? This is what a unit bar looks like.
Now we have to set up the problem, we can begin to solve it through model drawing.

**Step 4:** We need to read the story and stop after every sentence to see what we’ve learned. Let's read the first sentence. **“Max had 2 trucks in his toy chest.”**

What information does it give us? Let’s label the unit bar “2.” Read the next sentence. Let’s add another unit bar and label it “3.” Read the last sentence. What do we need to find out? The “?” (for total) goes above, below, or at the end.

**Step 5:** Compute and solve the problem. How are we going to figure out the answer to this question? What numbers do we see in the problem? What should we do? Let’s show our work when doing the adding.

**Step 6:** Write a complete sentence to answer the question.
Anna and Raul caught fireflies one hot summer night. Anna caught 4 more fireflies than Raul. Raul caught 5 fireflies. How many fireflies did they catch together?

\[
\begin{array}{c|c|c|c}
\text{Anna's Fireflies} & 5 & 4 & 9 \\
\text{Raul's Fireflies} & 5 & 5 & 4 \\
\end{array}
\]

\[
5 + 4 + 5 = 14 \\
5 + 5 + 4 = 14 \\
9 + 5 = 14
\]

Anna and Raul caught 14 fireflies together.

Step 1: Read the problem.
Step 2: Identify the variables: who and what (Anna/Raul/Fireflies)
Step 3: Draw equal unit bars for each person.
Step 4: Read each sentence, one at a time.
   - Add on to Anna's bar (4)
   - Label Raul and Anna original bars (5)
   - Go back and label the total amount for both (9 Anna/5 Raul)
   - What are we looking for? (How many fireflies did they catch altogether) Put a bracket by both and put a “?” at the end.
Step 5: Solve the problem (e.g., 5 + 5 + 9 = 14 or 9 + 5 = 14)
Step 6: Write a complete sentence.
**Multiplicative Comparison (Total Amount Unknown)**

Amy has 5 baseball cards. Jeff had 3 times as many cards as Amy. How many baseball cards did they have altogether?

<table>
<thead>
<tr>
<th>Amy's Cards</th>
<th>5</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jeff's Cards</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

They have 20 baseball cards altogether.

- **Step 1:** Read the problem.
- **Step 2:** Identify the variables: who and what (Amy/Jeff/Baseball Cards)
- **Step 3:** Draw equal unit bars for each person.
- **Step 4:** Read each sentence, one at a time.
  - Label Amy’s bar (5)
  - Label Amy and Jeff’s original bars (5)
  - Add on to Jeff’s bar (2 more equal bars of 5)
  - Go back and label the total amount for both (5 Amy/15 Jeff)
  - What are we looking for? (How many baseball cards did they have altogether?) Put a bracket by both and put a “?” at the end.
- **Step 5:** Solve the problem.
- **Step 6:** Write a complete sentence.

\[5 + 15 = 20\]
\[4 \times 5 = 20\]
**Multiplicative Comparison** (Larger Amount Unknown) (Division)

Mike and Paul have 27 comic books altogether. If Mike has eight times as many comic books as Paul, how many comic books does Mike have?

Mike's Books

![Diagram showing 9 units equal to 27 comic books, 1 unit equals 3, and 8 units equal to 24 comic books.](27?

9 units = 27 \(27 \div 9 = 3\)

1 unit = 3

8 units = 24 \(8 \times 3 = 24\)

Mike has 24 comic books.

Step 1: Read the problem.
Step 2: Identify the variables: who and what (Mike/Paul/Comic Books)
Step 3: Draw equal unit bars for each person.
Step 4: Read each sentence, one at a time.
  - How many bars are added to Mike's bar? (Add 7 more equal bars to make a total of 8)
  - Where do we put the number 27? (Put a bracket at the end of both bars to show the total amount)
  - What are we looking for? (How many comic books does Mike have? Put a bracket above Mike's bar and a "?"")
Step 5: Solve the problem.
  - How can we solve this problem?
    - First we know the number 27 represents how many unit bars? (9)
    - We can divide 27 by 9 to get a quotient of 3. So we know that 1 unit bar equals 3.
    - We can now write 3 in each unit bar.
    - How many groups of 3 does Mike have? \(8 \times 3 = 24\)
Step 6: Write a complete sentence. (Mike has 24 comic books.)

Mix Freeze Pair Activity

• Mix around the room until they hear “Freeze.”

• Find a partner closest to them. (Anyone without a partner raises their hands high and looks for someone else whose hand is raised).

• Introduce yourself and decide who will be Partner #1 and Partner #2.

• Partner #1 will read their problem. They will show and explain the bar model they drew. Partner #2 will listen and agree or disagree and explain why.

• Partner #2 will then read their problem. They will show and explain the bar model they drew. Partner #1 will listen and agree or disagree and explain why.

• Mix again and repeat the above steps.
Bar Model Problem Solving

Bar Model Problem Solving Steps:
1. Read the problem.
2. Identify the variables – the "who" and the "what" (Who and what is the problem talking about?)
3. Draw a unit bar to model each variable.
4. Read each sentence, one at a time.
5. Solve the problem.
6. Write a complete sentence to answer the question.

Max had 2 trucks in his toy chest. He added 3 more. How many total trucks did Max have in his toy chest?

Anna and Raul caught fireflies one hot summer night. Anna caught 4 more fireflies than Raul. Raul caught 5 fireflies. How many fireflies did they catch together?
Amy has 5 baseball cards. Jeff had 3 times as many cards as Amy. How many baseball cards did they have altogether?

Mike and Paul have 27 comic books altogether. If Mike has eight times as many comic books as Paul, how many comic books does Mike have?
Bar Model Problem Solving

Margo lives 5 miles from the zoo. Karen lives 8 times farther from the zoo than Margo. How far does Karen live from the zoo?

Angie has 7 times as many marbles as Leigh. Angie has a total of 35 marbles. How many more marbles does Angie have than Leigh?
Alan has $5. Justin has 4 times as much money as Alan. How much money do they have altogether?

Sara has 3 times as many stamps in her collection as Emma. Sara has 24 stamps. How many stamps does Emma have?
Bar Model Problem Solving  (Answer key)

Margo lives 5 miles from the zoo. Karen lives 8 times farther from the zoo than Margo. How far does Karen live from the zoo?

Margo's Miles

Karen's Miles

1 unit = 5
8 units = 40

Karen lives 40 miles from the zoo.

Angie has 7 times as many marbles as Leigh. Angie has a total of 35 marbles. How many more marbles does Angie have than Leigh?

Angie has 30 more marbles than Leigh.
Alan has $5. Justin has 4 times as much money as Alan. How much money do they have altogether?

<table>
<thead>
<tr>
<th>Alan's Money</th>
<th>$5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Justin's Money</td>
<td>$5</td>
</tr>
</tbody>
</table>

$5 + $20 = $25
5 X $5 = $25

Alan and Justin have $25 altogether.

Sara has 3 times as many stamps in her collection as Emma. Sara has 24 stamps. How many stamps does Emma have?

<table>
<thead>
<tr>
<th>Sara's Stamps</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emma's Stamps</td>
<td>?</td>
</tr>
</tbody>
</table>

3 units = 24
1 unit = 8

Emma has 8 stamps in her collection.