

## Year 6 Worksheet

# Helping Nathaniel at Komatsu

This worksheet is designed to help you understand and solve the problem Nathaniel faces at Komatsu. Follow the steps below to organise your thinking and work through the problem.

### 1. and 2. Understand the Problem

What is the task?

What do we already know?

What do we need to find out?

### 3. Organise the Information

Use this table to record what you know:

Step	Information	Notes/ Calculation
1	Number of long (3m) edges for 1 boom	4
	Number of short (1m) edges for 1 boom	8
	Welding needed for 1 boom	m
2	Number of booms per week	3
	Weeks per year	49
	Total weeks of work per year	weeks
3	Total welding needed per year	m

## 4. Explain Teacher Ben's Thinking

You can draw pictures, write number sentences, or explain in words.

<p><i>Welding for 1 boom</i>      <math>(4 \times 3m) + (8 \times 1m) =</math>  <math>12m + 8m =</math>  <math>20m</math></p> <p><i>Booms per year</i>      <math>3 \times 49 \text{ weeks} = 147 \text{ weeks}</math></p> <p><i>Welding per year</i>      <math>147 \times 20m =</math>  <math>294 \times 10m =</math>  <math>2940m</math></p>	
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## 5. Calculate Costs

Use this table to compare the costs of people vs robots:

Step	Information	Notes/Calculation
1 (People)	Amount of welding per year	500m
	Number of welders needed for 2940m	
	Cost of 1 welder per year	£35,000
	Total cost per year	£
2 (Robots)	Amount of welding per year	1500m
	Number of robots needed for 2940m	
	Cost to run 1 robot per year	£10,000
	Total cost per year	£

Do we need to think about any other costs?

## 6. Calculate Final Costs

Use this table to update the cost of the robots:

Step	Information	Notes/Calculation
1	Previous total cost per year (from table above)	£
2	Cost of programmer	£50,000
3	Number of robots needed for 2940m	
	Cost of each robot	£150,000
4	Updated total cost for Year 1	

### Make a Decision

Which option would you choose? Why?

What would you say to Nathaniel to explain your decision?

### Discussion

Is the cheapest solution always the best?

What would be the impact of your decisions on jobs?

How might the introduction of robots affect the community?

### Extension: Project Multi-Year Savings

Use this table to project the cost and savings over multiple years:

Year	People Cost	Robot Cost	Savings
1			
2			
3			
Total			