Number: Operations – Multiplication 2

5. Pocket Money

This task provides an opportunity to use multiplication (particularly ×2, ×4 and ×8) to solve a practical problem, linking with the topic of money.

Focus Skills:
- *Applying and problem-solving:* Analyse problems and plan an approach to solve them.
- *Integrating and connecting*: Recognise mathematics in the environment.
- *Reasoning:* Reason systematically in a mathematics context.

Teaching Points:
- Discuss why Sam might choose one option over the other e.g. the one that will earn him the most money.
- Encourage students to find the total Sam would earn if he chose each option so they can compare.
- Some students may benefit from the use of tables books or multiplication squares.
- As further extension, explore the factors that affect the value of the options e.g. for 4 weeks' work or less, Option 1 will earn Sam the most money. But for 5 weeks' work or more, Option 3 will earn him the most. Option 1 will always total more than Option 2 unless Sam works less days per week while the rates remain the same.

Anticipated Student Responses:
There are many ways that students may approach this problem. Below are just some examples using repeated addition or multiplication.

Part A	Part B
Option 1: Days Sam works: 3 + 3 + 3 + 3 = 12 *or* 3 × 4 = 12 Money Sam would earn: €8 + €8 + €8 + €8 + €8 + €8 + €8 + €8 + €8 + €8 + €8 + €8 = €96 *or* €8 × 12 = **€96** *or* €8 + €8 + €8 = €24 *or* €8 × 3 = €24 per week (at this point students might say that this means Option 1 is best as €24 p/w is better than €23 p/w) €24 + €24 + €24 + €24 = €96 or €24 × 4 = **€96** **Option 2:** Weeks Sam works: 4 Money Sam would earn: €23 + €23 + €23 + €23 = €92 or €23 × 4 = **€92** Option 1 will mean that Sam earns €4 more.	**Option 3:** Week 1: €2 + €2 + €2 = €6 *or* €2 × 3 = €6 Week 2: €4 + €4 + €4 = €12 *or* €4 × 3 = €12 Week 3: €8 + €8 + €8 = €24 *or* €8 × 3 = €24 Week 4: €16 + €16 + €16 = €16 *or* €16 × 3 = €48 *or* Week 1: €2 + €2 + €2 = €6 *or* €2 × 3 = €6 Week 2: Double €6 = €12 Week 3: Double €12 = €24 Week 4: Double €24 = €48 Total: €6 + €12 + €24 + €48 = **€90** Option 1 will still mean that Sam earns the most.
Extension	
Option 1 will now total **€120** (€8 × 15 *or* €24 × 5) Option 2 will now total **€115** (€23 × 5) Option 3 will now total **€186** (€6 + €12 + €24 + €48 + €96) Option 3 will now earn Sam the most money.	