Name: …….  Date: ……..

Thinking with models _ Linear Functions

Investigation Task: Ice Cream  Assessment Criterion: B and C

Criterion B: Investigating patterns

| Level | Identify the Pattern | Find the Rule (y = mx + c) | Verify the Rule | Justify the Rule | Sample Student Response |
|---|---|---|---|---|---|
| **1–2** | Recognises that values change but does not clearly describe how. | Writes an incorrect or unclear rule. m and c are missing or incorrect. | Little or no verification shown. | Gives a vague statement with no clear reasoning. | "The cost goes up when more ice creams are made. I think the rule is y = x + 50." |
| **3–4** | Identifies a simple pattern but explanation lacks detail. | Writes a partially correct rule with minor errors. | Checks one value with limited working. | Gives a basic explanation with weak context links. | "The cost increases by 30 for every 10 ice creams. The rule is y = 3x + 50. I checked it for 20 ice creams." |
| **5–6** | Correctly identifies a constant rate of change and explains it clearly. | Writes a correct linear rule consistent with the data. | Verifies the rule using more than one value with clear calculations. | Explains what m and c mean in the ice cream context. | "The pattern shows the cost increases by $3 per ice cream. The rule is y = 3x + 50. When x = 20 and 40, the equation gives the same values as the table." |
| **7–8** | Clearly identifies and explains the pattern using precise mathematical language. | Constructs an accurate general rule fully consistent with all findings. | Thoroughly verifies the rule using multiple substitutions and logical working. | Fully justifies the rule using mathematical reasoning and real-life interpretation. | "There is a constant rate of change of 3, representing the cost per ice cream, and a fixed cost of 50. The model y = 3x + 50 fits all data values. Substituting multiple x-values confirms the rule, and a linear model is justified because both costs remain constant." |

## Criterion C: Communicating

| Achievement Level | Rubric Descriptor (According to Task) | Sample Student Response |
|---|---|---|
| **1–2** | Uses very limited mathematical language. Representations (table, equation, explanation) are missing or incorrect. Reasoning is unclear and work is poorly organized. | “The cost goes up when ice creams increase. I used a formula but I am not sure if it is correct.” |
| **3–4** | Uses some appropriate mathematical language and one form of representation. Attempts to explain thinking but reasoning is basic and not well connected. Organization is inconsistent. | “The cost increases by 30 for every 10 ice creams. I used the equation y = 3x + 50 and checked it for one value.” |
| **5–6** | Uses correct mathematical language and appropriate representations (table and equation). Moves between representations with clear links. Reasoning is mostly clear and logically organized. | “From the table, the cost increases by $3 per ice cream. I wrote the rule y = 3x + 50 and verified it using two values from the table.” |
| **7–8** | Uses precise mathematical language and multiple appropriate representations. Clearly moves between representations and communicates a complete, coherent, and concise line of reasoning with logical structure. | “The relationship is linear with a constant rate of change of 3 and a fixed cost of 50. Using the table and the equation y = 3x + 50, I verified several values and clearly explained the pattern, rule, and justification.” |