Name: …… Date: ……..

Thinking with models _ Linear Functions

Investigation Task: Mobile screen usage Assessment Criterion: D and C

Key concept :	Related Concept :	Global context:
Relationships, Change , Form	Pattern, Model and Representation	Globalization & Sustianability

Inquiry Question

How can linear functions be used to model and make sense of mobile screen time and battery usage in real life?

Objective: Students will able to apply linear functions to an authentic real-life situation by modeling how mobile screen time affects battery percentage, and to justify the accuracy and reasonableness of their mathematical solutions..

Context: In this task, students investigate the relationship between screen-on time and battery life using given data. They identify relevant variables, select and apply a linear model, solve problems related to battery usage, and communicate their reasoning clearly. The task emphasizes applying mathematics in context and evaluating whether solutions make sense in real-life mobile screen usage.

Tasks:

Identify → Select → Apply → Justify → Justify

ATL Skills:

Thinking Skills: Critical thinking: Analyzing data and selecting appropriate mathematical strategies.

Transfer Skills: Applying linear functions learners in class to a real life business context.

Communication Skills: Explaining mathematical thinking clearly using appropriate language and representations.

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Context: A mobile phone is fully charged at **100%**. When the screen is continuously ON, the battery decreases at a constant rate. After **1 hour** of screen usage, the battery is **92%**, and after **3 hours**, it is **76%**.

1. **Identify** the independent and dependent variables related to mobile screen usage and battery percentage.

2. **Select** an appropriate linear model to represent the relationship between screen time and battery level.

3. **Apply** the selected model to form a linear equation.

4. **Solve** the equation to:

    a. Find the battery percentage after **5 hours** of screen usage.

    b. Determine how long the screen can remain ON before the battery reaches **20%**.

5. **Justify the degree of accuracy** of your solutions (rounding, units, and practicality).

6. **Justify whether your solution makes sense** in the real-life context of mobile screen usage.

Curriculum Framework

Key Concepts

1. **Relationships**
   The connection between screen time and battery percentage, where one changes as the other changes.
2. **Representation**
   Showing battery usage using mathematical forms such as a linear equation.
3. **Logic**
   Using clear mathematical reasoning to explain and justify battery-life solutions.

Related Concepts

1. **Linear Model**
   A mathematical model that shows battery percentage decreasing at a constant rate over time.
2. **Rate of Change**
   The amount the battery percentage decreases for each hour of screen usage.
3. **Accuracy**
   How precise and appropriate the calculated battery percentage and time values are.

Global Contexts

1. **Scientific and Technical Innovation**
   Exploring how mathematics is used to understand and improve mobile technology.
2. **Globalization and Sustainability**
   Understanding battery usage to support efficient and responsible use of technology.
3. **Personal and Cultural Expression**
   Examining how individual screen-use habits affect daily life.

Statements of Inquiry

1. **Scientific and Technical Innovation**
   Mathematical relationships help model and explain how mobile screen usage affects battery life.
2. **Globalization and Sustainability**
   Applying linear models supports informed and sustainable use of mobile devices.
3. **Personal and Cultural Expression**
   Logical reasoning allows individuals to understand and manage their screen-time behavior.

GRASPS – Mobile Screen Usage Investigation

G – Goal

To use a linear function to model and analyze how mobile screen time affects battery percentage and justify the accuracy and reasonableness of the solution.

R – Role

You are a **mobile usage analyst** investigating battery drain during screen usage.

A – Audience

Mobile phone users who want to understand and manage their screen time effectively.

S – Situation

A mobile phone battery drains at a constant rate when the screen is ON, and users need to predict battery life using mathematical models.

P – Product / Performance

A written mathematical investigation that includes a linear equation, solutions, and justifications linked to the real-life context.

S – Standards / Success Criteria

- Correct identification of variables
- Appropriate selection and application of a linear model
- Accurate solutions
- Clear justification of accuracy and real-life reasonableness