Algebra 2

ELG HS.F.7: **Interpret expressions for functions in terms of the situation they model.**

Vertical Progression:

8th Grade	**8.F.A Define, evaluate, and compare functions.** o **8.F.3** Interpret the equation *y = mx + b* as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.
Algebra 1	**ELG.MA.HS.F.7 Interpret expressions for functions in terms of the situation they model.** o **F-LE.5** Interpret the parameters in a linear or exponential function in terms of a context.
Algebra 2	**ELG.MA.HS.F.7 Interpret expressions for functions in terms of the situation they model.** o **F-LE.5** Interpret the parameters in a linear or exponential function in terms of a context.

Students will demonstrate command of the ELG by:

- Interpreting the slope and y-intercept of a linear function.
- Interpreting the values of a, b, r, and t in an exponential function.

Vocabulary:

- exponential function
- linear function
- parameter linear function

Sample Instructional/Assessment Tasks:

1) **Standard(s): F-LE.5**
Source: https://www.illustrativemathematics.org/content-standards/HSF/LE/B/5/tasks/758

Item Prompt:

A preserved plant is estimated to contain 1 microgram (a millionth of a gram) of Carbon 14. The amount of Carbon 14 present in the preserved plant is modeled by the equation

$$f(t) = A\left(\frac{1}{2}\right)^{\frac{t}{5730}}$$

where t denotes time since the death of the plant, measured in years, and A is the amount of Carbon 14 present in the plant at death, measured in micrograms.

a. How much Carbon 14 was present in the living plant assuming it died 5000 years ago?

b. How much Carbon 14 was present in the living plant assuming it died 10000 years ago?

c. The half-life of Carbon 14 is the amount of time it takes for half of the Carbon 14 to decay. What half-life does the expression for the function f imply for Carbon 14?

Correct Answer:

a. a little more than 1.8 micrograms

b. between 3.3 and 3.4 micrograms

c. 5730 years

2) **Standard(s): F-LE.5**

Source: https://www.illustrativemathematics.org/content-standards/HSF/LE/B/5/tasks/353

The below table provides some U.S. Population data from 1982 to 1988:

U.S. Population 1982 – 1988

Year	Population (*In thousands*)	Change in Population (*In thousands*)
1982	231,664	----
1983	233,792	233,792 - 231,664 = 2,128
1984	235,825	2,033
1985	237,924	2,099
1986	240,133	2,209
1987	242,289	2,156
1988	244,499	2,210

Notice: The change in population from 1982 to 1983 is 2,128,000, which is recorded in thousands in the first row of the 3rd column. The other changes are computed similarly. All population numbers in the table are recorded in thousands.

Source: http://www.census.gov/popest/archives/1990s/popclockest.txt

a. If we were to model the relationship between the U.S. population and the year, would a linear function be appropriate? Explain why or why not.

b. Mike decides to use a linear function to model the relationship. He chooses 2,139, the average of the values in the 3rd column, for the slope. What meaning does this value have in the context of this model?

c. Use Mike's model to predict the U.S. population in 1992.

Item Prompt:

a. Yes

b. The population is growing by approximately 2,139,000 people per year.

c. Approximately 253,055,000 people