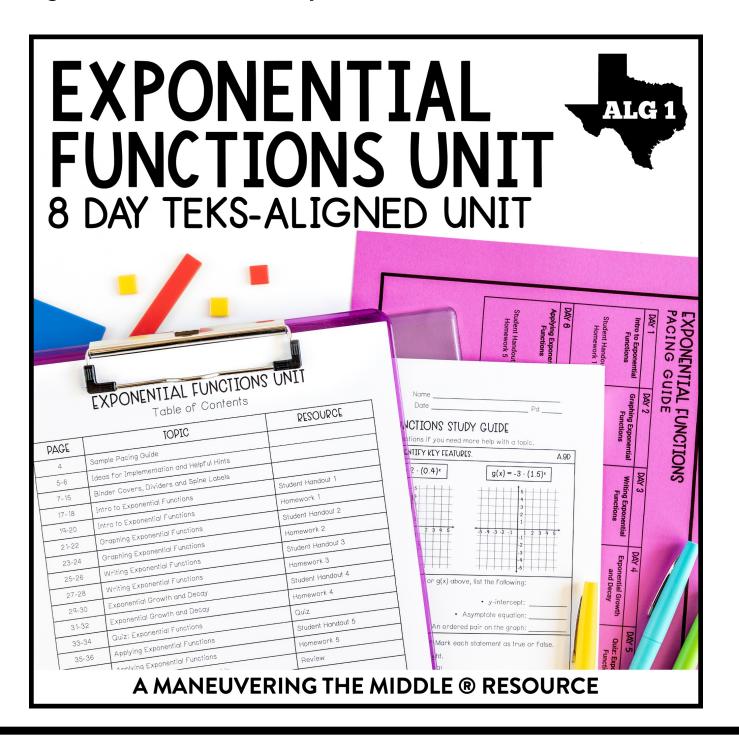
learning focus:

- graph exponential functions and identify key features including domain and range
- interpret the meaning of the values a and b in functions of the form y = abx
- write exponential functions to describe growth and decay



EXPONENTIAL FUNCTIONS -



an 8 day TEKS-aligned unit TEKS: A.9A, A.9B, A.9C, A.9D, A.9E

ready-to-go, scaffolded student materials

EXPONENTIAL FUNCTIONS UNIT

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student friendly + real-world application

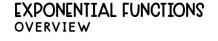
Unit: Exponential Functions Student Handout 3	Name Date	Pd	multip	
We can write exponential functions o	XPONENTIAL FUNCTIONS f the form to represent grap the real-world example below to explore to		repres	sentations
by identifying the values of a and b. Use values. I. Homerun Hats is a start-up company is exponential growth in hat production sin heir business. Use the equation and table number of hats produced after t nursomplete a-c. I. How many hats did they produce when they have a possible to the initial number of the company of the table, find the following ration $\frac{h(1)}{h(0)} = \frac{h(2)}{h(1)} = \frac{h(2)}{h(1)} = \frac{h}{h(2)}$ I. Where do you see the ratio found in	that has seen cee lee mb A similar method can be applied to below to determine the values of a 4. The graph shows the exponentia a. What is the value of a? Expla os b. List two coordinate points the of b by setting up a ratio. Wh of those points?	years # of hats writing exponential functions from a graph, and b from the graph.	45 40 38 30 25 20 15	
d. Where do you see the ratio round in For exponential functions of the form y The y-value of the function will grow by	=	Unit: Exponential Functions Homework 3		Pd
EXPONENTIAL FUNCTIONS y = a · 1 2-3, find the values of a and b and the	For 5-6 determine the values of $\begin{bmatrix} 5 \\ 45 \\ 36 \\ 30 \\ 30 \\ 25 \\ 25 \\ 20 \\ 30 \\ 30 \\ 30 \\ 30 \\ 30 \\ 30 \\ 25 \\ 25 \\ 20 \\ 30 \\ 30 \\ 25 \\ 20 \\ 30 \\ 30 \\ 30 \\ 25 \\ 20 \\ 30 \\ 30 \\ 30 \\ 30 \\ 30 \\ 30 \\ 45 \\ 78 \\ 40 \\ 40 \\ 40 \\ 40 \\ 40 \\ 40 \\ 40 \\ 4$	In 2012, marine biologists be a portion of the Pacific Ocean x be the number of years since PUFFERFISH 550 85 450 95 100 100 100 100 100 100 10	Each population can be reprized to a control of the number $\frac{\mathbf{x}}{2012}$ and let \mathbf{y} be the number $\frac{\mathbf{x}}{2012}$ and $\frac{\mathbf{y}}{2012}$ and $\frac{\mathbf{y}}{2012}$ and $\frac{\mathbf{y}}{2012}$ and $\frac{\mathbf{y}}{2012}$ and $\frac{\mathbf{y}}{2012}$ can the value $\frac{\mathbf{y}}{2012}$ and $\frac{\mathbf{y}}{20$	of three different animal populations in resented by an exponential function. Let of animals recorded that year. SEA TURILES SEA TURI
igher-le nalysis	vel	5. Which of the following equation for the sea furtle properties as $y = 300 \cdot (\frac{5}{3})^x$ b. $y = 0.6x + 300$ c. $y = 180(0.6)^x$ d. $y = 300 \cdot (\frac{3}{5})^x$		an equation to represent the graph of erfish population each year since 2012.

A MANEUVERING THE MIDDLE® RESOURCE

EXPONENTIAL FUNCTIONS

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streamline your planning process with unit overviews





STANDARD

PEADINESS A.9C write exponential functions in the form $f(x) = ab^x$ (where b is a rational number) to describe problems arising from mathematical and real-world situations, including growth and decay

A.9D graph exponential functions that model growth and decay and identify key features, including y-intercept and asymptote, in mathematical and real-world problems

SUPPORTING

A.9A determine the domain and range of exponential functions of the form $f(x) = ab^x$ and represent the domain and range using inequalities

A.9B interpret the meaning of the values of a and b in exponential functions of the form $f(x) = ab^x$ in real-world problems

A.9E write, using technology, exponential functions that provide a reasonable fit to data and make predictions for real-world problems



key vocabulary

vertical alignment

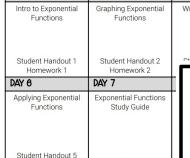
PIG IDEAS

- Many real-world and math have certain unique charac
- Situations involving expon
- Technology can be used to predictions

ESSENTIAL QUESTIONS

- What characteristics are un
- What features of an expon
- What do the values in an ex
- How can exponential funct

EXPONENTIAL FUNCTIONS PACING GUIDE



DAY 3

DAY 1 DAY 2 DAY 4 DAY 5 Writing Exponential **Exponential Growth** Quiz: Exponential **Functions** and Decay **Functions EXPONENTIAL FUNCTIONS OVERVIEW**

sample pacing calendar



TOPIC	TEACHING TIPS		
Intro to Exponential Functions	Exponential functions in the form of y = ab* can be written with a multiplication dot (y = 5 · 10*) or with parentheses (y = 5(10)*) It is helpful to show students the different ways of writing to avoid confusion and/or thinking only one format is correct. As students fill in tables for exponential functions, it may be necessary and/or helpful to review rules of negative exponents. Search desmos.com for an activity called "Polygraph: Exponentials."		
Graphing Exponential Functions	When students are viewing the graph of an exponential function, it will often appear that the function's curve touches the horizontal asymptote. It is helpful to have a conversation about the limitations of our graphs within certain windows/parameters, and that a table of values can be helpful to see that the graph does not actually touch the horizontal asymptote but comes increasingly closer to the asymptote. Zooming in on an exponential function using the graphing calculator on desmos.com can be helpful during a class discussion. Search desmos.com for an activity called "Two Truths and a Lie: Exponentials."		
Growth and Decay	Allow students to build on prior knowledge by asking where they have heard of something growing "exponentially," and what they think this means. Similarly, consider asking students to brainstorm situations where exponential growth is a positive thing and when it can be a negative thing. As students discover that when b > 1 the value of f(x) grows, and when b < 1 the value of f(x) decays, it may help them to connect this relationship to scale factor (a factor > 1 enlarges a figure while a factor < 1 reduces a figure.)		

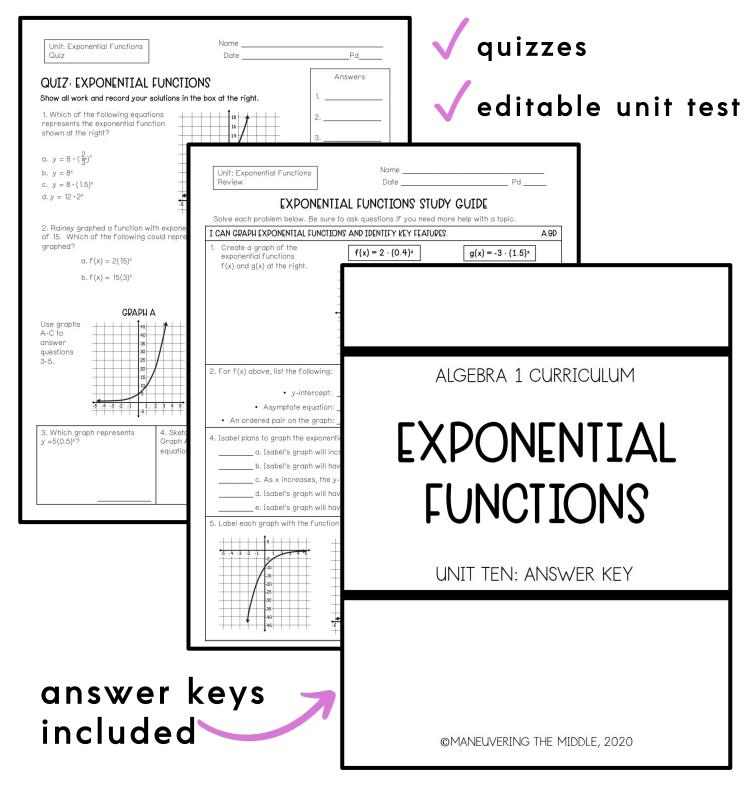
teaching ideas

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unit study guide + assessments



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