Dinosaur Measurement

Project Based Learning

2nd Grade Print & Google Slides

Become a Paleontologist!

Paleontologists

Wouldn't it be an awesome job to study dinosaurs? One part of a paleontologist's job is to study dinosaur fossils. They can learn a lot of information about how dinosaurs lived and what they ate from fossils. Paleontologists also study where a species lived and how it changed over time. From this, we learn about the Earth's past.

What are fossils?

Fossils are the remains of a once-living organism. Fossils show part of or all an organism's body. Some fossils give us clues about the organism's patterns of behavior. Paleontologists study these fossils to learn about dinosaurs and the world long ago.

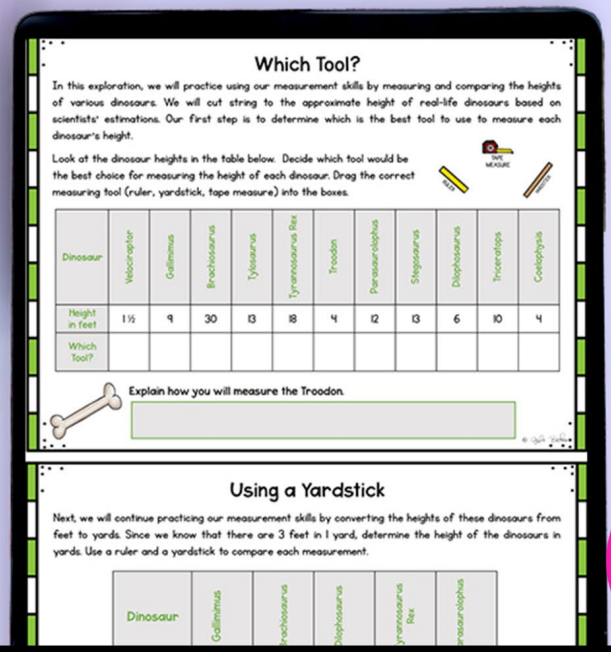
Fossils can teach us how dinosaurs looked. Paleontologists can estimate a dinosaur's size, age and weight. They do not always give us a complete picture. They cannot tell the color a dinosaur was by looking at fossils. It is also difficult to find evidence of their behavior or habits.

Interview with a Paleontologist

Dinosaur interview with Protoceratops

Take a Quiz

Play a Game



Integrates Reading, Math, and Science

Dino Comparisons

Answer the following questions using the table you completed for Dino Comparisons. Include Tylosaurus and the Troodon.

1. Write the names of all the dinosaurs that are shorter than you.
2. Write the names of all the dinosaurs that are taller than you.
3. How many feet taller are you than the Velociraptor?
4. How many feet taller is the Brachiosaurus than
5. Write your
   feet differe

Question

Answer

Dino Line Plot

Drag to plot

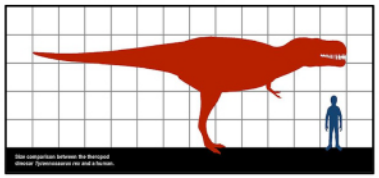
Create a line plot that shows the dinosaur heights using the data in the table. Mark each height by dragging an X above the correct number on the line. Label the X-axis.

Dinosaur	Height in feet
Velociraptor	1 ½
Troodon	4
Coelophysis	4
Dilophasaurus	6
Gallimimus	9
Triceratops	10
asaurolophus	12
tegosaurus	13
Tylosaurus	13
nnosaurus Rex	18
achiosaurus	30

3 24 25 26 27 28 29 30

Dino Word Problems

A theropod is a type of animal that has three toes and walks upright on two legs. There are many types of theropod dinosaurs. *Tyrannosaurus Rex* was one of the largest theropods to ever live. It could grow over 40 feet long and 13 feet tall at its hips.



But theropods weren't always giant. The earliest theropod was a dinosaur called *Eodromaeus*. Like T-Rex, it walked upright on two legs. However, unlike T-rex, it wa very small. It was about 4 feet long and 1 foot tall at its hips.

1. What is the difference in height between the Tyrannosaurus Rex and the Eodromaeus? Write and solve an equation that shows the math.

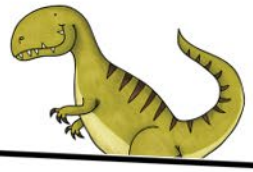
2. About how many Eo di s could you stack up to reach the same height as the T-Rex? Explain determined nswer with a model (use the shape tool) and words.

My Model

Let's Measure!

Materials

- String or Yarn.....lots of it!
- Scissors
- Tape
- Marker
- You
- LARGE workspace to lay the
- The measurement tools you s



Dino Comparisons

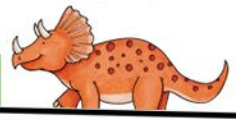
Now it is time to compare your height to the height of each dinosaur. Write the height of each dinosau
listed in the chart below. Then find the difference (in feet) between your height and the height of each
dinosaur.

Dinosaur	Height in feet	Difference

Stepping with the Dinos

In a long hallway or big room like the gymnasium, stretch your longest string out straight and tape both ends to the floor. Estimate the number of steps you can take walking along side the string using a heel to toe style.

My estimate for the Brachiosaurus is:



Now, walk the length of your string and
on the other foot for every step. How m

walked this many steps

Next, stretch out the string that measur
your experience with the length of the
the Triceratops.

My estimate for the Trice

Walk the length of your string and cour

I wal his many steps

Dino Estimation

Look at this diagram of dinosaur heights. If the man in the diagram is about six feet tall, estimate the height in feet of each dinosaur group. Be sure to ask yourself, "Is my estimation reasonable?"

- Eotriceratops =
- Triceratops =
- Pentaceratops =
- Chasmosaurus=

Integrates measurement standards.

Dino Bar Graph

Below is a table that displays data showing what some dinosaurs ate. Read the table to learn about each dinosaur's diet. Then use the data to answer the questions below.

Carnivore Eats Only Meat	Velociraptor	T-Rex	Dilphosaurus	Coelophysis	Tylosaurus
Herbivore Eats Only Plants	Tricerato			Parasaurolophus	
Omnivore Eats Both	Troodo				

1. How many of the dinosaurs e

2. Which type of dinosaur do y

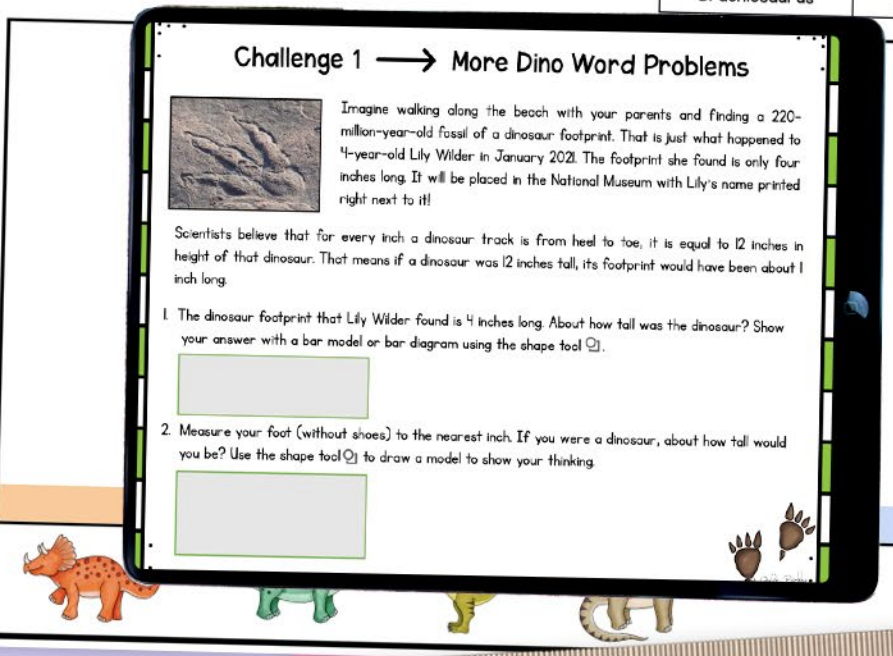
3. Omnivores ate both meat a
Gallimimus.

4. What would you rather be

Dino Bar Graph

Create a bar graph that shows approximate height of each dinosaur. Resize each bar by clicking on the colored bar and dragging upwards to resize. Include your height in the table and mark it on the bar graph where it falls.

Dinosaur	Height in feet
Triceratops	10
Stegosaurus	13
Tyrannosaurus Rex	18
Brachiosaurus	30



Challenge 1 ⟶ More Dino Word Problems

Imagine walking along the beach with your parents and finding a 220-million-year-old fossil of a dinosaur footprint. That is just what happened to 4-year-old Lily Wilder in January 2021. The footprint she found is only four inches long. It will be placed in the National Museum with Lily's name printed right next to it!

Scientists believe that for every inch a dinosaur track is from heel to toe, it is equal to 12 inches in height of that dinosaur. That means if a dinosaur was 12 inches tall, its footprint would have been about 1 inch long.

1. The dinosaur footprint that Lily Wilder found is 4 inches long. About how tall was the dinosaur? Show your answer with a bar model or bar diagram using the shape tool.

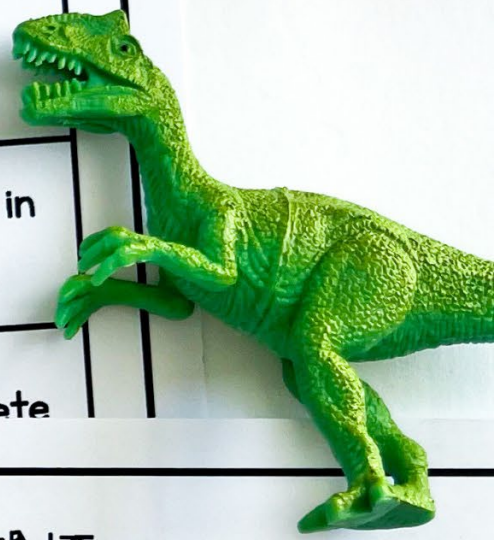
2. Measure your foot (without shoes) to the nearest inch. If you were a dinosaur, about how tall would you be? Use the shape tool to draw a model to show your thinking.

Challenges provide opportunity for differentiation.

Rubric

elf-Evaluation Rubric: Highlight or shade the parts of the rubric that express
ow you rate yourself on this Project Based Learning Activity.

⊕	✓	⊖
I felt very confident.	I felt good about most the the math.	I felt a lot of the math in was too hard for me.
I did not need math pr		
I used strat		
I am		



DINOSAUR MEASUREMENT

Self Reflection: Write a reflection of your experience with this project. How did you feel about the math problems and activities? What did you find easy? Did you find anything hard to do? Did you enjoy this activity? Why or why not?

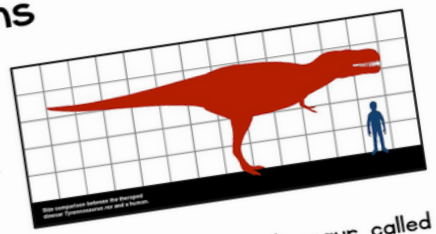
I liked this activity because I love dinosaurs and I like measuring things, which is v
activity easy.

Overall, I enjoyed this activity because it was fun.

Student rubric and reflection.

Google Slides

Dino Word Problems



A theropod is a type of animal that has three toes and walks upright on two legs. There are many types of theropod dinosaurs. *Tyrannosaurus Rex* was one of the largest theropods to ever live. It could grow over 40 feet long and 13 feet tall at its hips.

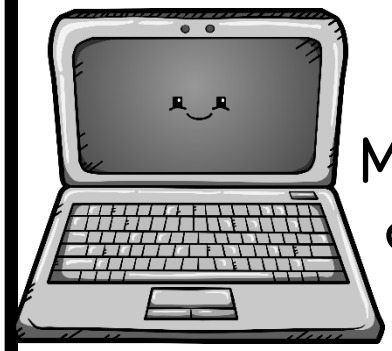
But theropods weren't always giant. The earliest theropod was a dinosaur called *Eodromaeus*. Like T-Rex, it walked upright on two legs. However, unlike T-rex, it was very small. It was about 4 feet long and 1 foot tall at its hips.

1. What is the difference in height between the Tyrannosaurus Rex and the Eodromaeus? Write and solve an equation that shows the math.

2. About how many Eodromaeus dinosaurs could you stack up to reach the same height as the T-Rex? Explain how you determined your answer with a model (use the shape tool) and words.

My Model

Table of Contents



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FOR THE TEACHER

Dinosaur Measurement is a project-based learning task that involves using Measurement math standards to solve problems related to dinosaurs. It is created for students in second grade. The following standards are addressed:

- 2.MD.A.1 Measure the length of an object by selecting and using appropriate tools.
- 2.MD.A.2 Measure the length of an object twice, using length units of different lengths for the two measurements; describing how the two measurements relate to the size of the unit chosen.
- 2.MD.A.3 Estimate lengths.
- 2.MD.A.4 Measure to determine how much longer one object is than another.
- 2.MD.B.5 Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units.
- 2.MD.B.6 Represent whole numbers as lengths from 0 on a number line diagram.
- 2.MD.D.9 Generate measurement data by measuring lengths of several objects. Show measurements on a line plot.
- 2.MD.D.10 Draw a picture graph and bar graph to represent data.
- Extra challenge activities can be assigned or can be optional.

Directions:

1. Assign students to work alone or in small groups.
2. Preview the activity with your students.
3. Allow students class time to complete the activity. This can span over several days.
4. Students have an opportunity to complete extra challenge activities.
5. Students will complete the self-evaluation reflection and evaluation rubric.
6. Allow students an opportunity to share their completed projects.

DINOSAUR MEASUREMENT

You have been hired as a paleontologist to study dinosaur measurement. It is your job to go into the field and use data other paleontologists have gathered to compare the heights of various species of dinosaurs.

Here are your tasks:

- Read through the entire packet before beginning.
- Read the informational slide about the work of paleontologists.
- Determine the best measurement tools to use for measuring dinosaur heights.
- Measure, cut and compare lengths of string or yarn based on the estimated height of each dinosaur.
- Estimate heights of unknown dinosaur types.
- Measure your height and compare to the heights of the dinosaurs.
- Read and answer dinosaur word problems.
- Create a line plot and a bar graph based on your data.
- (Optional) Complete the challenge pages.
- Complete the self-reflection and evaluation rubric.

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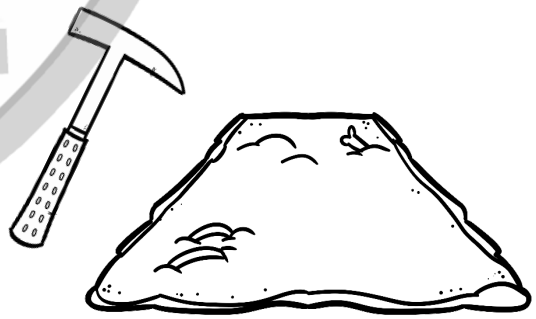
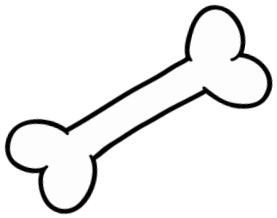


Which Tool?

In this exploration, we will practice using our measurement skills by measuring and comparing the heights of various dinosaurs. We will cut string to the approximate height of real-life dinosaurs based on scientists' estimations. Our first step is to determine which is the best tool to use to measure each dinosaur's height.

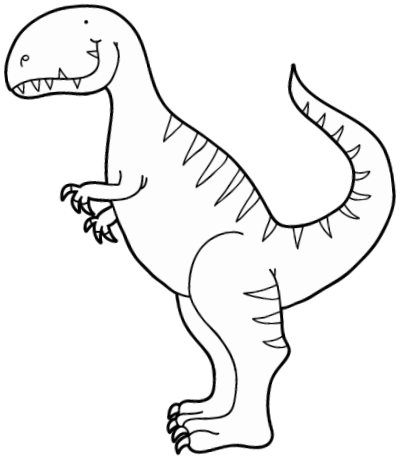
Look at the dinosaur heights in the table below. Decide which tool would be the best choice for measuring the height of each dinosaur. You can use these tools: ruler, yardstick, tape measure. Write **R, Y** or **T** in the box below the height.

Dinosaur	Velociraptor	Gallimimus	Brachiosaurus	Tylosaurus	Tyrannosaurus Rex	Troodon	Parasaurolophus	Stegosaurus	Dilophosaurus	Triceratops	Coelophysis
Height in feet	1 ½	9	30	13	18	4	12	13	6	10	4
Which Tool?											



Explain how you will measure the Troodon.

Let's Measure!



Materials

- String or Yarn.....lots of it!
- Scissors
- Tape
- Marker
- You
- **LARGE** workspace to lay the measurements out. (Big empty room or pavement outside.)
- The measurement tools you selected on the previous slide (ruler, yardstick, tape measure)

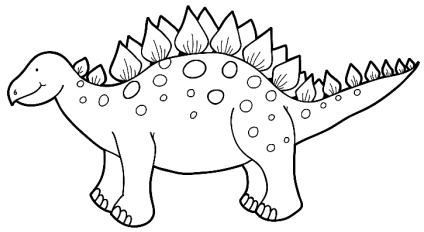
Let's see how large these dinosaurs were in real life!

1. Using the tool you selected, measure lengths of string the same length as each dinosaur.
2. Label each string with the name of the dinosaur with marker on a piece of tape.
3. Order the string sizes from shortest to longest. You may need to tape down each end of the string.
4. With a friend's help, measure your own height to the nearest inch.
5. Cut a string to your height. Add your string where it falls in the order of dinosaur heights.

My Height is: _____

Stepping with the Dinos

In a long hallway or big room like the gymnasium, stretch your longest string out straight and tape both ends to the floor. Estimate the number of steps you can take walking along side the string using a heel to toe style.



My estimate for the Brachiosaurus is: _____

Now, walk the length of your string and count your steps. Be sure that your heel bumps up to your toes on the other foot for every step. How many of your feet are equal to the length of the Brachiosaurus?

I walked this many steps: _____

Next, stretch out the string that measures the length of the Triceratops next to your first string. Using your experience with the length of the Brachiosaurus, estimate the number of steps you will take for the Triceratops.

My estimate for the Triceratops is: _____

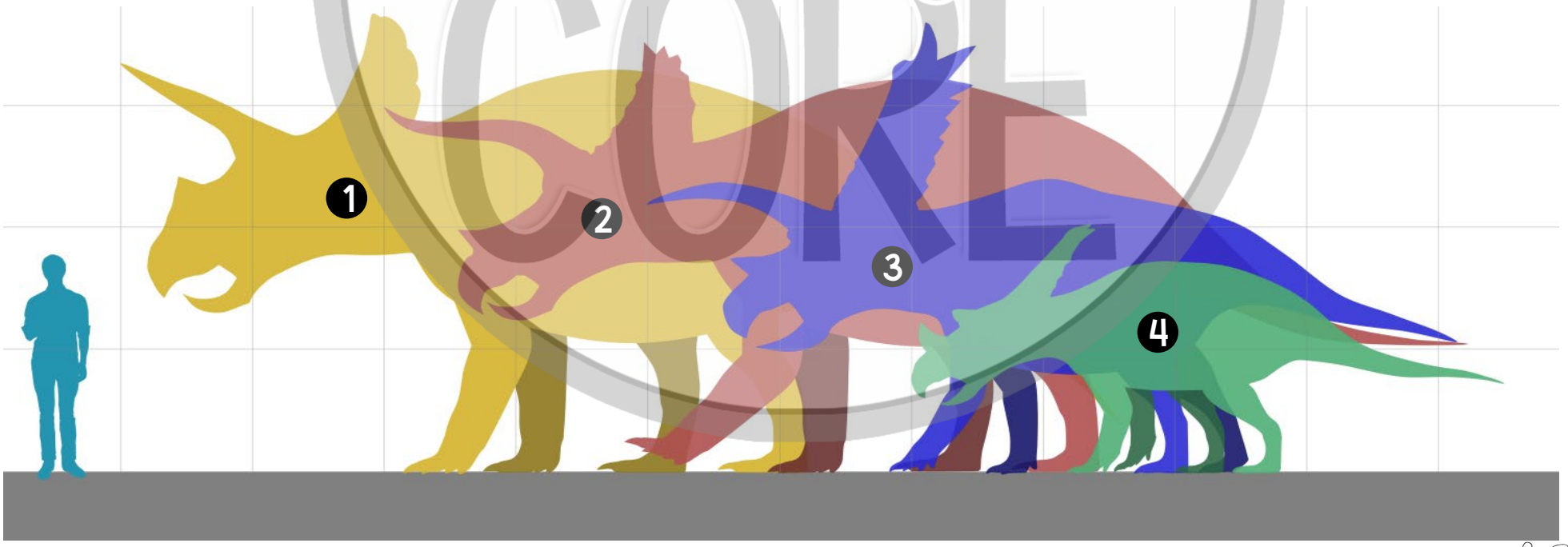
Walk the length of your string and count your steps. Be sure to use the heel to toe style of walking.

I walked this many steps: _____

Dino Estimation

Look at this diagram of dinosaur heights. If the man in the diagram is about six feet tall, estimate the height in feet of each dinosaur group. Be sure to ask yourself, "Is my estimation reasonable?"

1. Eotriceratops = _____
2. Triceratops = _____
3. Pentaceratops = _____
4. Chasmosaurus= _____



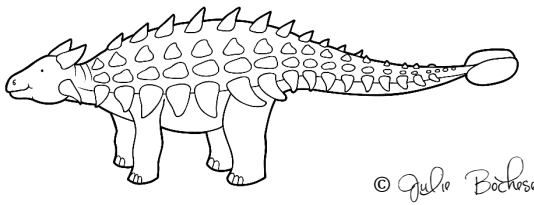
Dino Comparisons

Now it is time to compare your height to the height of each dinosaur. Write the height of each dinosaur listed in the chart below. Then find the difference (in feet) between your height and the height of each dinosaur.

Dinosaur	Height in feet	My Height	Difference
Velociraptor	1 ½		
Coelophysis	4		
Dilophasaurus	6		
Gallimimus	9		
Triceratops	10		
Parasaurolophus	12		
Stegosaurus	13		
Tyrannosaurus Rex	18		
Brachiosaurus	30		

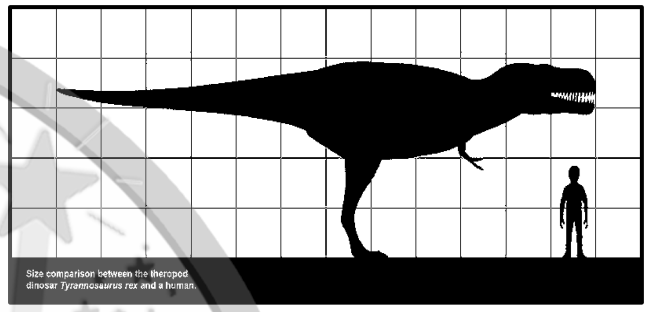
What is the difference in height between you and the Tylosaurus?

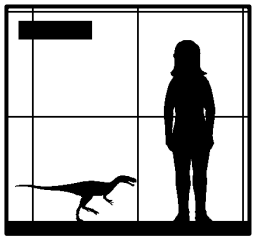
What is the difference in height between you and the Troodon?



Dino Word Problems

A theropod is a type of animal that has three toes and walks upright on two legs. There are many types of theropod dinosaurs. *Tyrannosaurus Rex* was one of the largest theropods to ever live. It could grow over 40 feet long and 13 feet tall at its hips.

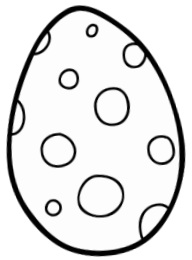




But theropods weren't always giant. The earliest theropod was a dinosaur called *Eodromaeus*. Like T-Rex, it walked upright on two legs. However, unlike T-rex, it was very small. It was about 4 feet long and 1 foot tall at its hips.

1. What is the difference in height between the Tyrannosaurus Rex and the Eodromaeus? Draw a model that shows the math.

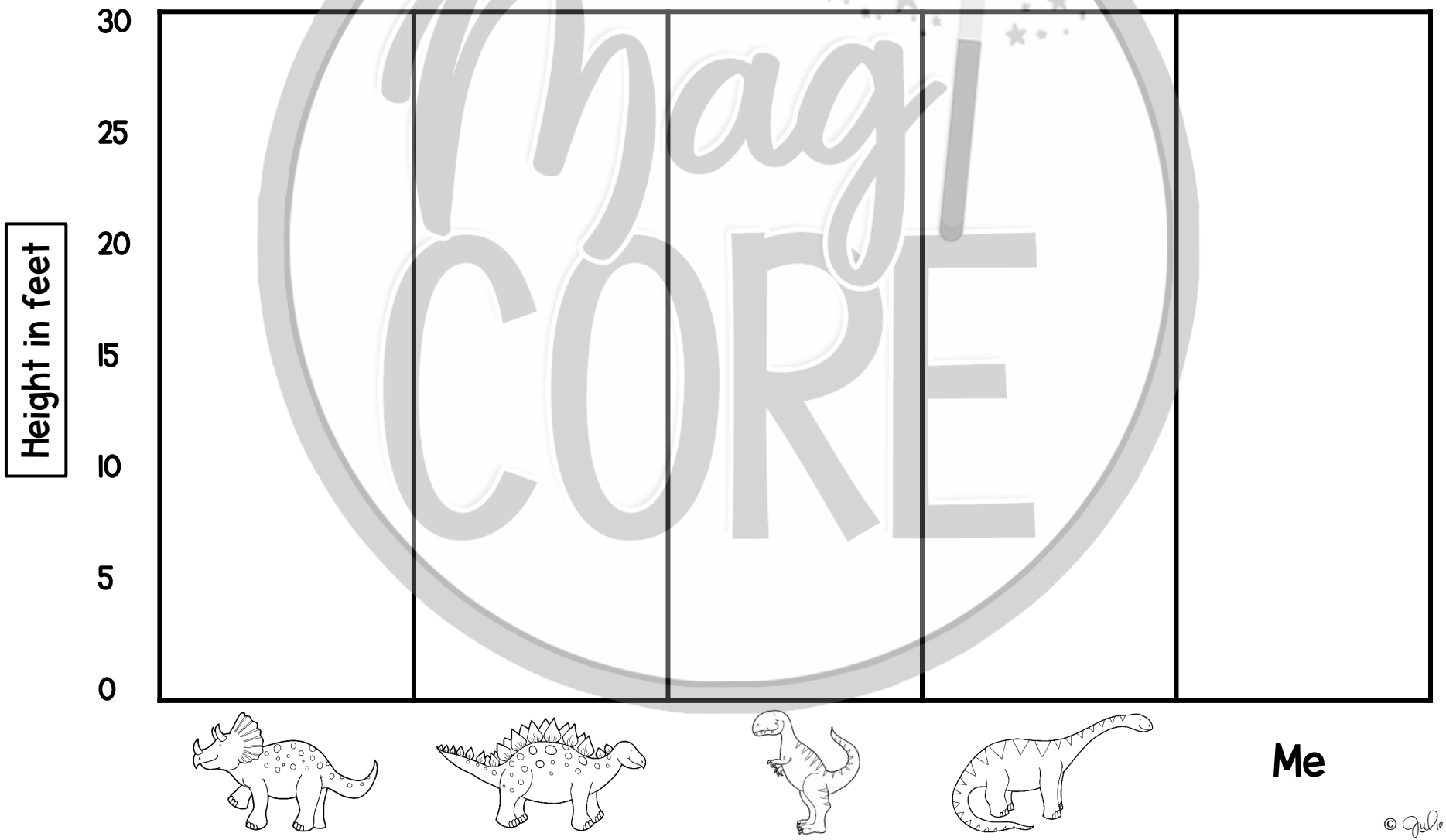
2. About how many Eodromaeus dinosaurs could you stack up to reach the same height as the T-Rex? Explain how you determined your answer with a model and words.



Dino Bar Graph

Create a bar graph by marking a line at the approximate height for each dinosaur. Include your height in the table and mark it on the bar graph where it falls. Color in each bar to the line you created.

Dinosaur	Height in feet
Triceratops	10
Stegosaurus	13
Tyrannosaurus Rex	18
Brachiosaurus	30



Challenge 1 ⟶ More Dino Word Problems

Imagine walking along the beach with your parents and finding a 220-million-year-old fossil of a dinosaur footprint. That is just what happened to 4-year-old Lily Wilder in January 2021. The footprint she found is only four inches long. It will be placed in the National Museum with Lily's name printed right next to it!

Scientists believe that for every inch a dinosaur track is from heel to toe, it is equal to 12 inches in height of that dinosaur. That means if a dinosaur was 12 inches tall, its footprint would have been about 1 inch long.

1. The dinosaur footprint that Lily Wilder found is 4 inches long. About how tall was the dinosaur? Show your answer with a bar model or bar diagram.

2. Measure your foot (without shoes) to the nearest inch. If you were a dinosaur, about how tall would you be? Draw a model to show your thinking.

DINOSAUR MEASUREMENT

Self Reflection: Write a reflection of your experience with this project. How did you feel about the math problems and activities? Explain what you found easy to do and any difficulties you had while working on this project. Did you enjoy this activity? Why or why not?

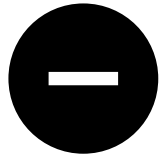
Rate this project

Circle the statement you most agree with.

I am ready for something harder | It was just right | I found this very challenging

Rubric

SELF-EVALUATION RUBRIC: **Highlight or shade the parts of the rubric that express how you rate yourself on this Project Based Learning Activity.**

		
I felt very confident about the math in this project.	I felt pretty good about my ability to complete the math in this project.	I felt a lot of the math in this project was too hard for me to do alone.
I understood all of the math and did not need help to complete the problems.	I understand most of the math but needed a little help to solve some of the problems.	I understood some of the math but needed help to complete most of the problems.
I easily used many strategies to solve the math problems efficiently.	I needed some help to determine the best strategies for solving the math problems.	I had trouble understanding the best way to solve many of the math problems.
I feel I am ready for a harder math project.	I feel I would like to spend more time practicing similar math problems.	I feel I need assistance to work on similar math problems

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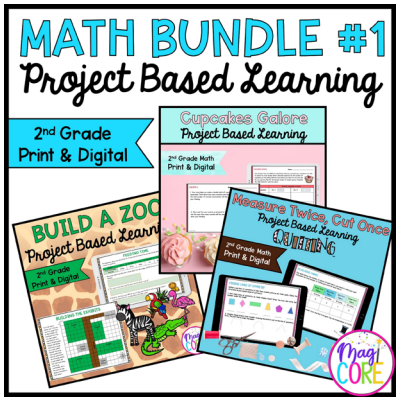

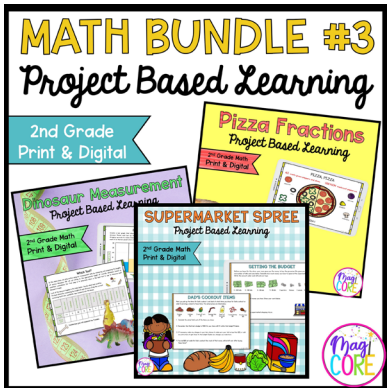

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