

# DINO-LIGHT

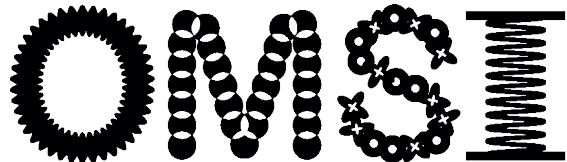
A GLOW-IN-THE-DARK ADVENTURE

## DISCOVERY GUIDE

Presented in Partnership by



Oregon Children's Theatre



Oregon Museum of Science and Industry

### ABOUT THE SHOW:

A famous scientist with magic powers brings a friendly dinosaur to life! When the dinosaur wanders away from home, he discovers a wonderful world full of creatures that light up the darkness and help him find the true meaning of love. As seen on *America's Got Talent*, this glow-in-the-dark adventure is visually stunning and has been praised for its cutting-edge blend of puppetry, technology, and dance by audiences all over the world!

### ABOUT LIGHTWIRE THEATER:

Lightwire Theater is a unique entertainment experience that utilizes light, technology, and music to tell captivating tales.

Find out more at [www.lightwiretheater.com](http://www.lightwiretheater.com)

# VOCABULARY

**Paleontology:** the study of the history of life on Earth based on fossil evidence to see how organisms and our planet changed over time.

**Tyrannosaur:** a very large bipedal carnivorous dinosaur of the late Cretaceous period, with powerful jaws and small clawlike front legs.

**Geologist:** A scientist who studies the structure and history of Earth

**Shadow:** the dark shape made when something blocks light.

**Light:** a form of energy that moves in straight lines. It also reflects off things, and that reflected light enters our eyes, allowing us to see.

**Laser:** an instrument that can produce a powerful beam of light. Laser is an acronym (word that stands for other words) for Light Amplification by the Stimulated Emission of Radiation.

**Reflection:** when light bounces off a surface without passing through it like a light shining on a mirror or the moon reflecting the light of the sun.

**Refraction:** when light changes direction or bends when it passes from one transparent material into another.

**Transparent:** Light can completely pass through an object so you can see clearly through it.

**Translucent:** Some light can get through the object, so you may see some shapes and shadows, but not very clearly

**Opaque:** No light passes through the object so you cannot see through it.



# BUILD A DINO!

**Adaptations:** Different species of all animals have survived because they slowly adapted to their environment through adaptation, the adjustment of organisms to their environment in order to improve their chances at survival in that environment.

Dinosaurs evolved and adapted to live in specific environments all over the world. In this activity, you will have a chance to design a dinosaur for a given environment to give it the best possible chance of surviving. What physical characteristics will you give your dinosaur?

## Activity:

- Choose which environment you are going to build a dinosaur for.
- Think about what this environment is like...
- What kinds of plants might it have?
- What other kinds of animals live there?
- Choose 2 of the adaptations that you think most suit the environment.
- Draw your dinosaur with its adaptations!

## Environment #1: Swampy forests (Riparian forests)

A riparian forest consists of lush trees and vegetation growing alongside rivers and marshes. This habitat provided plenty of food for its inhabitants but was also prone to flooding.



## Environment #2: Open plains

The vast, windswept plains of the Cretaceous period were very similar to those of today, with one major difference. 100 million years ago, grass had not evolved yet! So these ecosystems were instead covered with ferns and other low-laying plants.



# FEATURES/ADAPTATIONS

## Frill and/or Horns

Horns on dinosaurs could serve many purposes - defending against predators, combat with the same species for dominance, mating displays and more. Larger horns could also, on the other hand, make it difficult to navigate small areas in certain environments.



## Living in herds

For animals with fewer defensive capabilities, living in herds provided some extra protection. Creatures could alert others in the herd to nearby predators and the group could respond or move collectively.

## Long neck

Longer necks can be very useful for creatures that eat food that is up high in tall trees. However, if a creature is going to have a long neck, it also needs to have a large enough body that can support and balance out that long neck, and a small head so the neck muscles can hold it up well.



## Duck Bill

Large, flattened out mouths shaped much like a duck's bill would have been great for plant eaters as they often also contained lots of interlocking teeth at the back of the jaw for crushing and grinding plant matter.



## Bipedal

A creature that is bipedal walks primarily on two hind legs. However, creatures that use those back legs to walk often have much smaller arms. Those arms, since not being used for walking, would have been available grappling with prey or food. Many bipedal dinosaurs could also run quickly, similar to today's ostrich.



## Quadrupedal

Creatures that are quadrupedal walked on four legs with their weight more distributed between all four. Walking on four legs often meant that those creatures were larger but also slower moving.



## Strong jaw

A strong jaw can mean that creatures can chomp though large or tough foods more easily. However, these creatures often had larger heads to accommodate all those strong jaw muscles!



# SAVE THE DAY FOR A T-REX!

**Adapting to our environment:** It takes a long time for a species to adapt to an environment. Like, a really really long time! So sometimes we may need to have a little help to adapt and even adapt our environment to help meet our needs. Here's your chance to help a struggling T-Rex do an everyday task that might be easy for us humans.

It's tough to be a T-Rex! In this activity, you are going to design something that will help a T-Rex have a better day.

## Materials:

- Paper
- Colored pencils, markers, crayons, etc.
- Way to randomize items & situations (6-sided dice, papers drawn out of a bowl)

## Activity:

- Randomly select an object to create for your T-Rex as well as a situation.
- Write out your scenario on your paper.
- Think about how a T-Rex might use the object you selected. Think about what the activity you selected might look for a T-Rex. Use the list of considerations below to help you brainstorm.
- Design your object! Get creative!

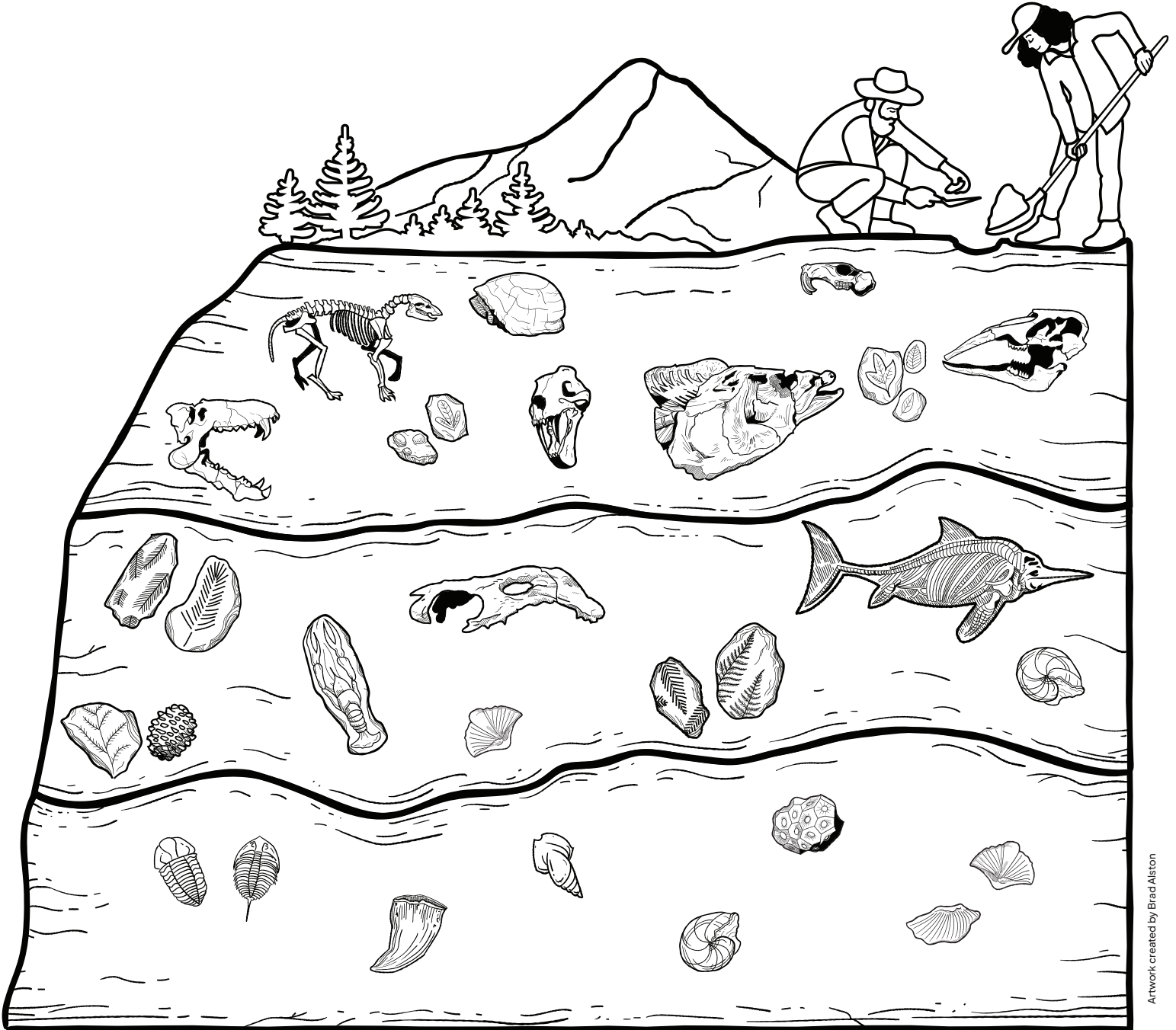
	<b>Object</b>		<b>Situation</b>
<b>Design a ...</b>	Clubhouse	<b>Where a T-Rex can ...</b>	Make art
	Form of transportation		Play with friends
	Playground		Do experiments
	Place to sit		Eat food
	Something to wear		Play games
	Place to sleep		Have a dance party

## Considerations:

- T-Rex have very large heads - make sure your design makes room for that big head!
- T-Rex have small arms and only 2 fingers - think about how the T-Rex is going to do the activity you chose. Will they be able to reach everything they need?
- T-Rex are very heavy! They could weigh over 10,000 pounds. That's as much as the biggest elephants! Make sure your design is strong enough to hold this giant dinosaur!



# GEOLOGICAL TIME SCALE - ANSWER KEY



# SHADOW PUPPET THEATRE

What's as big as a dinosaur but weighs nothing? It's shadow!

But seriously folks, everything and anything can cast a shadow and we can have a lot of fun with shadows. [Check out this video](#) we made with our friends at OMSI.

In this video, Dr. Rae and OCT's Young Professionals member Greta play with light and shadows to make their own dino-shadow puppets! You can make your own here using [these templates](#).



# TRACING SHADOWS

Shadows may follow us, but we can track where they go! Want to have more fun with shadows? [Try these experiments from the folks at Curiodyssey](#).





# LIGHT AND COLOR

In this easy activity you can create new colors by combining colors without mixing them together. Explore combining light and colors to create the illusion of new colors!

## Materials:

- Clear plastic water cup
- Large clear container (glass bowl or wide vase works great)
- Pitcher
- Water
- Food coloring (red, yellow, blue)

## Instructions:

- Pour water into a clear plastic cup until almost full.
- Add 1-3 drops of food coloring to the water in the cup and stir to combine.
- Fill a pitcher of water and add 7-10 drops of yellow food coloring and stir to combine.
- Make some observations about both containers of colored water.
  - Can you think of how we might change the color of the water without adding anything to either container or mixing them together?
- Get the large, clear container (empty) and place the cup of blue water in the center of the container.
- Pour the yellow water from the pitcher into the bowl. Be careful not to pour any of the yellow water into the cup of blue water.
- Look through the side of the bowl and make some observations.
  - How many different colors do you see?
  - Is this different from what you started with? How so?
- Try the experiment again with different combinations of primary colors
  - What do you notice? What different color combinations can you discover?

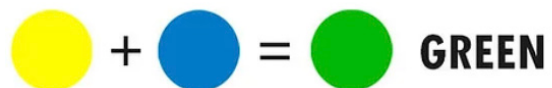
## How it works:

In this experiment, when you look through the two colors at once (the blue water in the cup and the yellow water in the container), the colors appear to mix together because you are seeing the blue light and the yellow light together even though the colors are still in their separate containers.

Red, yellow, and blue are primary colors.

When primary colors are combined together

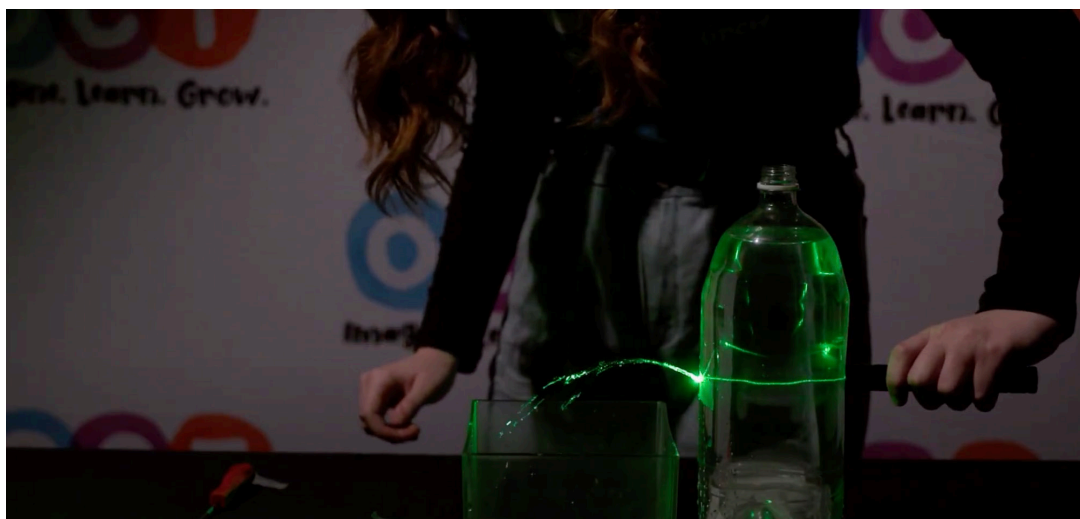
in different amounts, they produce other colors like Orange, Green, and Purple. We call these secondary colors.



## MAGIC OF LIGHTS AND LASERS

How can water bend light and change the direction of an arrow? Join Dr. Rae and OCT's Young Professionals member Bailey in [this video collaboration](#) with OMSI as they experiment with the magic of light and lasers.

Want to experiment more with light and reflection? Why not make your own spectroscope with a paper towel tube and an old cd or dvd?



## BONUS ACTIVITIES

Check out these [bonus activities and games](#) from our friends at the American Museum of Natural History!



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APRIL 19-21, 2024 • WINNINGSTAD THEATRE

## WRITE TO OCT!

We love hearing student feedback and responses to our shows!  
Please feel free to share any comments from students with us.

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