

# The Environmental Learning Center

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Join us for our virtual Nature Near You meetups!

**UNBOXING** Monday, July 27th *11am-Noon*

**SHOW & TELL** Friday, July 31st *11am-Noon*

*Instructional videos available on our website*

Visit our website for more info:

<https://www.discoverelc.org/nature-near-you-kits>

Questions? Or to register for the virtual meetups,

e-mail [heatherk@discoverelc.org](mailto:heatherk@discoverelc.org)

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Nature Near You Kits were made possible by generous support from:

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# The Environmental Learning Center

# NATURE NEAR YOU

## Light & Color

### Materials Included:

- NNY box
- Wax paper
- Tube
- Kaleidoscope triangle
- Mirror pieces
- Self-laminating paper
- Aluminum foil
- Black paper
- Clear plastic cup
- Bead
- Pencil
- Glove
- Needle & Thread
- Hand template
- Flashlight
- Brads
- Craft dowels
- Cardstock

Light is a form of energy that enables us to see the world around us. Our main source of light is the sun, and it travels to Earth faster than anything else in the universe, 186,282 miles per second. That's right, light travels at the *speed of light*. You can observe how fast light travels by turning the light on in your house and watching how quickly it illuminates the room.

We have the power to change light. We can block it and cast a **shadow**, we can **absorb** its energy with dark colors and we can **reflect** light with mirrors. We can even break it into red, orange, yellow, green, blue, indigo and violet by **refracting** it with a prism or even a glass of water.

Nature is a great place to observe all these amazing qualities of light. Just grab your Nature Near You Kit and your very special light grabbing tools (your eyes) and head outside!

Happy exploring!

### VOCABULARY

- **Absorb:** take in or soak up
- **Reflect:** to throw back
- **Refract:** to bend
- **Solar:** of the sun
- **Shadow:** a dark shape that is created by an object blocking light
- **Nocturnal:** active at night
- **Camouflage:** a quality that helps something blend into its surroundings



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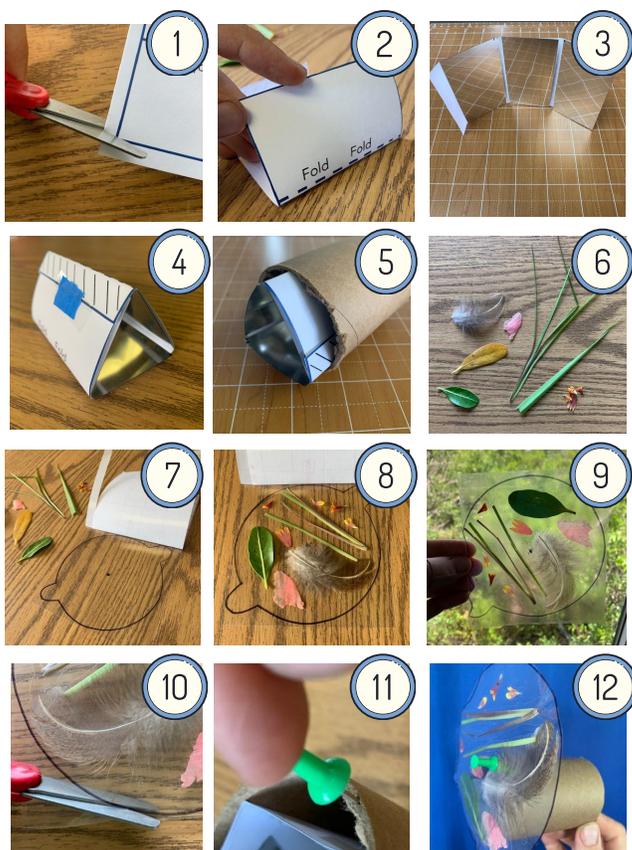
# KALEIDOSCOPE OF COLOR

The light from the sun comes to us in all colors. This combination of colors is observed as white light. The objects that we see with our eyes are **absorbing** all these colors EXCEPT for the ones we see.

The colors that are not absorbed get **reflected** back to us and are seen with our eyes. Using the materials provided, can you create a nature kaleidoscope that reflects all the colors of the rainbow back to you?

### Materials Needed:

- Tube (provided)
- Triangle template (provided)
- Mirrors (provided)
- Self laminating paper (provided)
- Colors from nature
- A tack
- Tape
- Scissors



### Instructions:

1. Cut out your triangle template along the solid blue lines.
2. Fold your template on all the dashed lines, text facing out, and open up to the blank side.
3. Attach your mirrors to all three sections of the blank side of the triangle, making sure not to put any on the folds.
4. Re-fold your triangle along the dotted lines, and tape the tiny strip to the outside so that the triangle holds its shape.
5. Slide your triangle inside the tube, it should fit snugly.
6. Set aside and go outside to gather materials for your kaleidoscope disc.
7. After collecting as many colors as possible from nature, peel off the backing of ONE SIDE of your sticky paper.
8. Stick your nature items inside the circle.
9. Peel off the other side of the sticky paper and fold in half so that the disc is covered (*you may need an adult's help*).
10. Cut out your kaleidoscope disc along the lines.
11. Poke a hole with a tack through the center of your disc, and leaving it poked through, poke it also into the edge of your kaleidoscope.
12. Look through the open side, and spin! Enjoy your nature kaleidoscope of color reflecting back to you!

*Note: When collecting objects from nature, be careful not to harm any insects, plants or animals*

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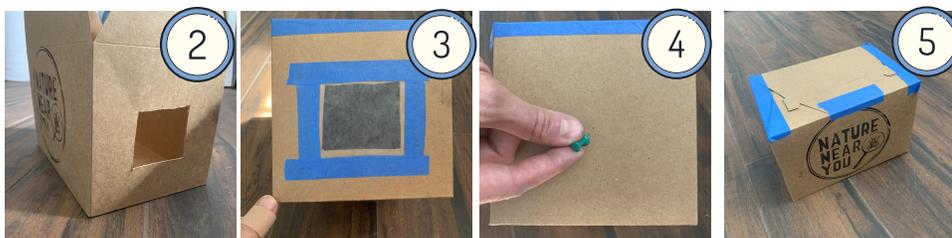
# PINHOLE CAMERA

Our eyes are built for capturing light. The light that enters through our eyes enables us to see. In this activity, you will build a pinhole camera, which works very similarly to our eyes when capturing light.

See if you can figure out which pieces of the camera are working like the parts of our eyeball.

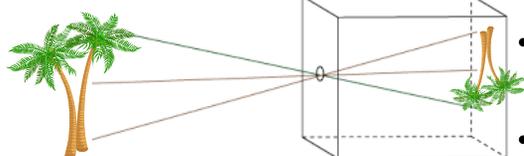
### Materials Needed:

- Box (provided)
- Wax paper (provided)
- Tape
- Scissors
- Thumb tack
- Heavy blanket



### Instructions:

1. Begin by taking out all the materials from your box.
2. With a parent, cut a 2 inch by 3 inch square on one of the short sides of your box. There is already a small slit where you can begin your cut.
3. Tape the wax paper to cover the open square.
4. On the side of the box with the sticker, poke a small hole with your tack.
5. Tape the top 4 pieces of the box so no light leaks in.
6. Grab your box and a blanket and go outside.
7. Cover yourself and the box with the blanket so that it is dark on the inside of the blanket. Leave the side with the tiny hole facing out towards the outside or towards something bright.
8. Hold the box at least a foot from your face, and move it around until you can see what happens on the wax paper!



- What do you notice about the image you are seeing?
- What is happening to the light as it enters that tiny pinhole?
- How is this camera similar to our eyes?

### How eyes work

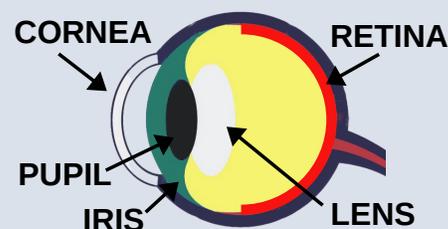
**CORNEA:** Light must first pass through this clear dome at the front of your eye. It bends the light, much like a magnifying glass. This helps you focus.

**PUPIL:** The tiny black opening at the center of your eye that lets the light in.

**IRIS:** The colorful part of your eye that controls how much light can pass through the pupil.

**LENS:** The lens is on the inside of your eye, and works with the cornea to focus the light you are seeing onto the retina which is at the back of your eyeball.

**RETINA:** This tissue on the back of your eye is light sensitive because it has special cells called photoreceptors (light receivers). These photoreceptors send the information to your brain which turns them into the images we see!



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# SOLAR OVENS: A DESIGN CHALLENGE

Harness the energy of the sun to make your own tasty treat in this solar oven design challenge.

## Materials Needed:

- Nature Near You kit box (provided)
- Aluminum foil (provided)
- Black construction paper (provided)
- Plastic wrap
- Glue or tape
- Scissors
- Newspaper (optional)
- Tasty treats you want to cook (optional)



## How to make a solar oven:

Use the box of your Nature Near Your kit to create a solar oven. Solar ovens use light and heat energy from the sun to warm or cook food. While you are building think about the following to refine your design and capture the most energy in your solar oven:



**Aluminum Foil:** Aluminum foil *reflects* the energy coming from the sun. Where do you think the foil should be placed so that the light and heat from the sun is reflected into your oven?



**Black Construction Paper:** Black construction paper *absorbs* the energy from the sun. Where should the black construction paper be placed to absorb the most energy inside your oven?



**Newspaper:** Adding *insulation* can help keep heat from escaping your oven. Rolled up newspapers can serve as insulation. Where would you add insulation to your oven?



**Plastic Wrap:** Use the plastic wrap to cover the opening of your oven to trap the warm air inside.

When you are finished building, decide what you would like to cook in your oven. S'mores or a cheese sandwich are both easy to cook in a solar oven. Place your oven outside in a sunny spot. Monitor your oven as it is cooking, and see if there are ways to tell it's working. Enjoy your treat!

*Caution: Please observe all food safety protocols. Eating raw or undercooked food may cause illness. Solar ovens may become very hot. Use caution and an oven mitt when handling.*

# REFRACTION HUNTERS

Can you hunt like a heron? It's harder than you might think! Because of **refraction**, which occurs when light bends as it enters the water, objects are not always where they appear to be.



## Materials Needed:

- Clear plastic cup (provided)
- Bead (provided)
- Pencil (provided)

## What is Refraction?

Light travels as waves, and these waves usually move in straight lines. When light waves enter a new medium, or substance, such as from air to water, the light waves are forced to bend, or change directions. This occurs because water is more dense, which means the light waves move more slowly.

Fill your clear plastic cup with water and place it on a flat surface. Put your pencil in the water. Do you see how the pencil appears to be bent or broken? This is because of refraction!

Birds such as herons, who hunt for fish from above the water's surface, must account for refraction as they hunt. Because of refraction, the fish are not where they appear to be. In this activity, test your skill at hunting like a heron.



## Instructions:

1. Fill your plastic cup with water and place on a flat surface.
2. Place your bead in your cup of water. This bead is the "fish" you are trying to catch.
3. Your pencil will be your "beak."
4. Starting with your "beak" above the water, quickly move your "beak" into the water, trying to touch the "fish" at the bottom, as a heron would have to do when hunting. Were you successful? Was the "fish" where you thought it would be?
5. Think about why you were or were not successful your first time. Because of refraction, the "fish" was likely not where it appeared to be compared to your "beak."
6. Try this activity from different angles. What happens if you are looking at your "fish" from above the cup of water? Beside it? At eye level?

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# CAMOUFLAGE CREATURE

Animals use color for many things: to communicate, to warn, and even to hide. When animals use color to blend into their surroundings or disguise their appearance, it is called camouflage. **Camouflage** allows animals to avoid predators and to sneak up on potential prey.



## Materials Needed:

- Glove (provided)
- Needle and thread (provided)
- Hand template (provided)
- Items to add to your glove for camouflage
- Glue (optional)



## Instructions:

1. Take a look around your home or backyard. Pick a location that you like and that you think would make a good place to camouflage.
2. Closely observe the location you selected. What colors, shapes, or textures do you see? What would it take to camouflage in this spot?
3. Gather materials that you can use to transform your glove with camouflage. These materials might be items from nature, scraps of fabric, left-over craft supplies, or recycled items such as bottle caps.
4. Cut out your hand template with scissors.
5. Place the template inside the glove, making sure the cardboard fingers find their way into the glove fingers. This will help give you a stable surface and protect you from pokes from the needle.
6. Using your needle and thread, attach the items to the glove. If desired, you may also use glue to help attach your items.
7. Put on your glove and see how well it blends into your location.

## Master of Disguise

An octopus is able to change the color and the texture of its skin to blend in. Can you find the octopus hiding in each of these photos?



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# NOCTURNAL SHADOWS

**Shadows** are created when an object blocks the light. Have you ever spent time observing your shadow? How does your shadow change throughout the day? In this activity, create shadow puppets to experiment with light and shadows.

### Materials Needed:

- Flashlight (provided)
- 4 Craft sticks (provided)
- Card stock (provided)
- 4 Brads (provided)
- Tape or glue



### Instructions:

1. Draw a sketch (or several sketches) of the outline of an animal that you would like to create into a shadow puppet on the card stock. (Note: If you would like to make a shadow puppet with several moving parts, make sure to sketch each part separately. For example, you might want to create a tail that can wag or an arm or head that can move.)
2. Once you have a sketch that you like, cut out each part.
3. Punch a small hole in the card stock cut-outs where you would like to attach each moving part. Use brads to connect the parts. You have enough brads to create 4 moving parts.
4. Attach a craft dowel to each moving part.
5. Find an empty wall for your shadow puppet theater. Darken the room, and shine your flashlight on your puppets. Watch their shadow on the wall behind them.

### Nocturnal Eyesight

*Nocturnal* animals are awake and active at night. Their eyes are often uniquely adapted to see better in the dark. Some nocturnal animals have very large eyes. Others, such as cats, have a *tapetum lucidum*, or a layer of cells behind the retina that reflects light making the eye look like it is glowing.

