

Book Recommendations:

Talkabout Light Webb & Faircloth

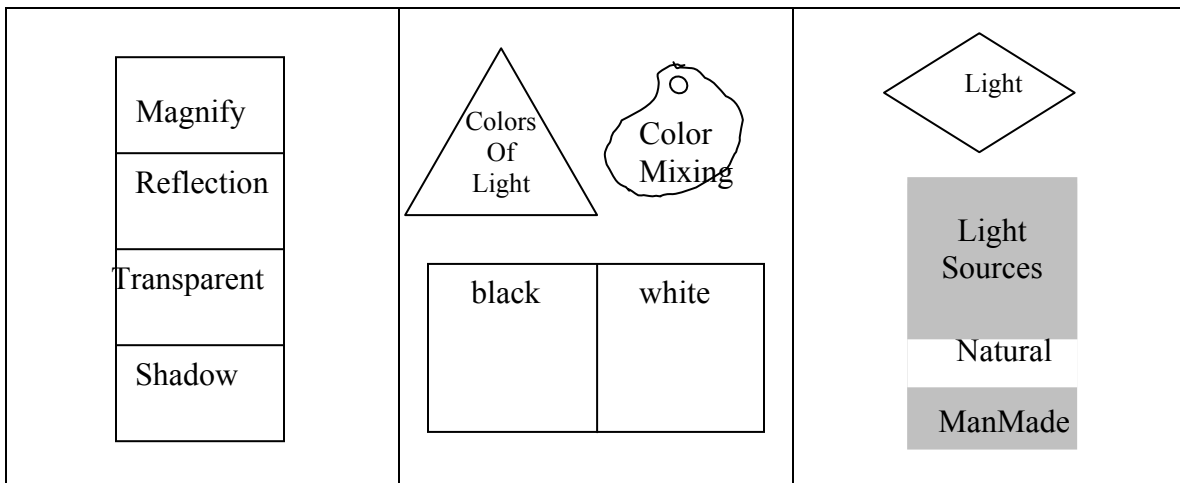
Light: A First Discovery Book By Scholastic

Lap book information:

This lap book has a double set-up and can be stretched over a month to make a complete science unit on Light. You will need 2 1/2 file folders; one file folder for each section of the double lapbook (sec. 1 & sec. 2), plus half of a file folder for the extra flap used in section 1. You will prepare section 1 and section 2 using individual file folders individually using instructions below. At the bottom of the instruction list instructions will be given for affixing the two sections together.

*The lap book set up will be as follows*

Lap book section 1:



**Right side**

**Hands On Definitions** – write the words on the top strip and the definition (in their words) on the paper under each flap. Examples of activities to enforce those vocabulary words are given in case there is a need for them.:

Magnify – bending light to make things look different, usually larger.

Ex: look at how an image looks under a magnifying glass or lens.

Reflections – when light bounces off of something else.

Ex: bounce a ball to show its path before & after the bounce.

Ex: turn off the light in a room and use a flashlight to bounce the ray off of a mirror.

Transparent – things are things that light can travel through, these things make light bend

Ex: put a pencil in water and see how it looks different in the water (because this substance is very thin and not dense)

Shadow – distorted images that are made by a source blocking light rays.

Ex: turn a table lamp on facing the ground and use different objects to show how a shadow works. Move the item further and closer to the light. Point out when things are closer to the light source they are more defined and they become fuzzy as it gets further away.

### **Left side**

**Light is...** – discuss the meaning of light; put it in their own words. Feel free to read online or in a book for reinforcement. *Light is – Heat from an energy source*

Ex: Draw a picture on a piece of construction paper and tape it to a window being sure to place it on the corners where it covers part of the paper itself. Leave it there for a week or so then have your child take it off and remove the tape. They will see the lines where the tape was on the paper and possibly a faded piece of paper. This will demonstrate the heat that comes from the light that hit the paper while it was on the glass window.

**Light Sources** – Find, discuss, or research to find light sources. Have them write, draw, or cut out from magazines the light sources in the correct page of tab book.

### **Middle**

**Color of Light Booklet** – use a prism (bought or hand made) to find the colors that are in light. Color each page of the booklet one of those colors.

Ex: in a dark room put a piece of cardboard with a small hole in it over the end of a flashlight. Turn the prism 15° downward and allow the color rainbow to show on the wall of the dark room.

Ex: you can also use a prism from online if needed:

[http://ww2.unime.it/dipart/i\\_fismed/wbt/mirror/ExplrSci/dswmedia/prism.htm](http://ww2.unime.it/dipart/i_fismed/wbt/mirror/ExplrSci/dswmedia/prism.htm)

Ex: an alternative to using a prism would be to make one with water, box, & small mirror. Instructions can be found here:

<http://www.lcesc.k12.oh.us/PorterCenter/Activities/rainbow.htm>

Ex: feel free to read a cute story that goes over these colors in depth (this will come in handy if the rainbow appears small) at this link:

<http://www.finetuneyou.com/Stories/colorsofrainbow.html>

**Mixing Color Palette** – use this small booklet to show how colors mix. Have them color each circle a color of the rainbow and draw a line from each circle to the larger circle using the small circle's color. Color the circle in the middle the color that those colors become when mixed. Use one page for paint and one for light.

Ex: use paint or colored icing for them to complete the paint page

Ex: color a circle (made by tracing a small saucer) the 7 colors of the rainbow (drawn in pie shaped sections). Poke a pencil tip through the middle of the circle with the color side facing you. Spin the pencil and circle on the floor as you would a top. You will see how all those colors make white in the center which will represent how colors mix in light.

**Light Color explanation** –On each side (black & white) tell why light shows those objects to be that color. On the inside explain how all other colored objects take the color you see due to light.

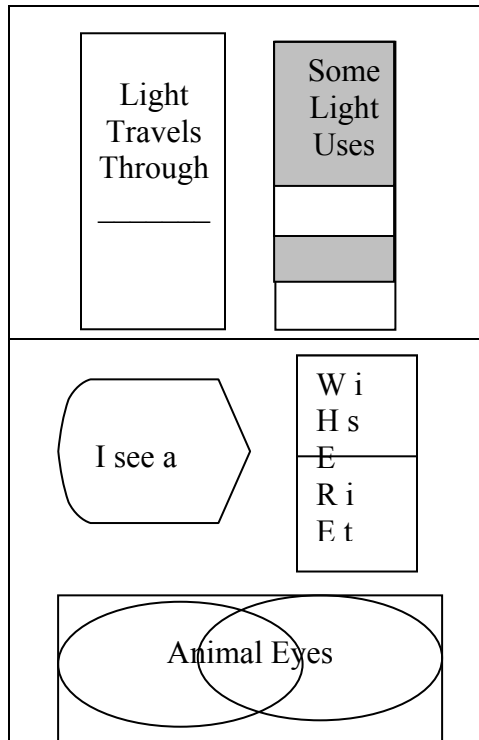
Ex: white objects appear to be that color because the object itself absorbs all colors of light and they mix.

Ex: black objects appear to be that color because the object itself rejects all colors of light.

Ex: all other objects take their color because they show the color (or a mixture of the colors) rejected. Because not all colors are rejected or absorbed you see different shades and tints of those colors.

### *Extra Flap*

You will cut the tabs off of a file folder then cut down the center. This will make a flap that can be taped to the middle portion of the already made lap book you have completed so far. The following interactive booklets will be located on it.



### **Top Flap Underside**

***I See a Cat Booklet*** – Have child draw the retina and lens in the correct spot on the eye using different colors of markers so they stand out. Have them use the Cat to demonstrate the path that images take from the point of entering to the point of leaving the eye.

Ex: Do an example to show how this works by making a room dark, turning on the television, placing a white poster board about 2 ft. from the television. Use a lens starting at the poster board and bring the lens slowly towards the television until the image coming from the screen shows upside down on the poster board.

***Animal Eye Comparison*** – compare how an owl and spider see. Use the inside to show the differences and things that are the same.

Ex: the spider has many eyes that look at the different angles because their head does not move. Etc...

Ex: the owl has large eyes that see really well etc...

**Where Is It Location Book** – use the top section to illustrate or explain how light bounces off and causes color on a smooth surface and bumpy surface under the folded tabs.

Ex: when a light bounce off and causes color on a smooth surface it will bounce in a straight line. You can show this by having light bounce off of a mirror in a dark place.

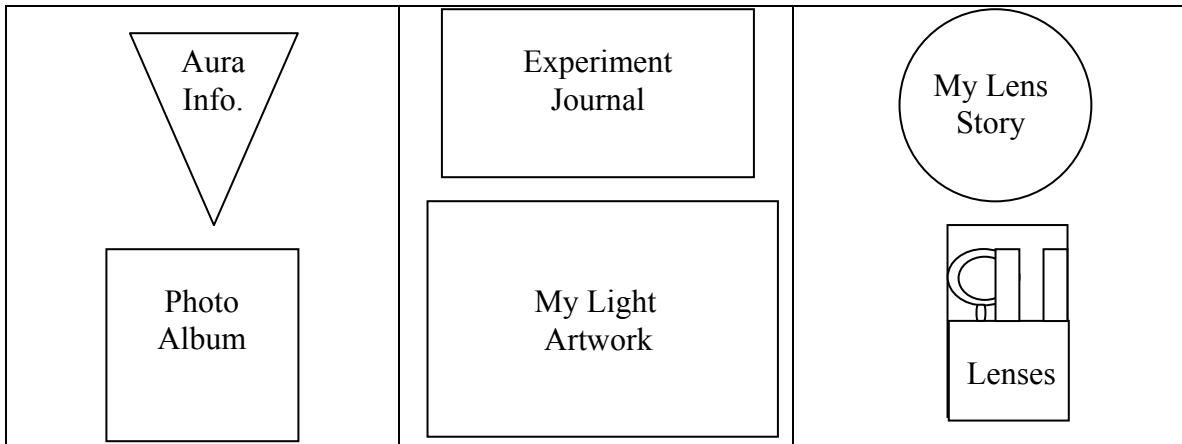
Ex: when light bounces off of a bumpy surface it will bounce in hits in many directions the different areas causing a variety of colors to show in lots of directions. This is the way most items are. This can be easily demonstrated by shinning a light on the bottom of a CD in a dark room. It might be nice to point out that although many colors can be seen with this one object, on a regular basis the color of the object is the color that bounces in the eyes view direction.

### Top Flap Up Side

**Light Travels Through Pamphlet:** Make a small pamphlet showing how light travels through different mediums (be sure to include at least 3). For younger children you may want to tell them the medium and allow them to experiment to see how light travels through it.

**Uses Layer Book:** The layers of this book should be used to write down the uses of light energy and/or the heat that comes from it. Have them write, illustrate, or paste pictures showing the type of lighting on each labeled tab.

Lap Book Section 2:



**Right side**

***Aura Information Fold-Out*** – research how an Aura is formed and explain it in easy to understand steps (one on each section) to complete the Aura circle.

Ex: put colored glass rocks or stones (decoration stones) in a small clear container and then cover them with water to represent the particles that are in the atmosphere around the earth. Explain that these are everywhere, but for this demonstration they will be located at the top or bottom of the earth. This location is where the magnetic poles inside the earth are their strongest. Next disturb the water by moving your hands a little on the side of the container to make waves which will show them that there is a lot of action at the poles. You will then tell them that the sun will hit the earth in that spot and shine a flashlight on the bottom of the container. Turn off the lights in the room and watch the aura on the wall or ceiling (depending on the room and or set-up). Explain that this will only happen sometimes and the area's way to the top or bottom will see the lights. You may even show them on a globe or map where that would be. A cute point to add is that on the bottom of the globe no country sees these lights because the land is too far from the source, but penguins and other animals that live there see them. Because they are seen mostly in the North they have been called "Northern Lights" instead of their proper name.

***Photo Album*** – have your child cut out the pictures (leaving a border) of the Northern Lights. Have them glue one picture per page. They can write or color a border around them to show the colors that are seen in each picture of the Aura.

### **Left side**

***Lens pocket*** – take the two cards and lay them on a table word side up. Take the paper & rubber lens out and have the child move the rubber lens to demonstrate the correct lens bend for each of the words. To make this more difficult you might give them a certain number and have them demonstrate that many of each of the lens versions. You could even turn it into a game to see how many times they can correctly identify the bend you are demonstrating.

***My Lens Story*** – They will make a homemade lens and use the book to tell about the experience. Be sure that they document if their lens worked or not. There are many ways to make a lens; a few of the easiest ways are listed here.

Ex: make jell-o according to package directions (for stronger lens use  $\frac{3}{4}$  C of water instead) and pout into a shaped container (ladle, ice cream scoop, round measuring spoons, wineglass, or other round-bottomed container. When done dump the jell-o lens onto a clear flat container (like the lid from a clear deli container) and place the lens over a newspaper to see if and how it works. Wetting hands before touching the jell-o will keep it from tearing up and sticking to hands.

Ex: make ice lens by filling a Styrofoam cups with water and letting them sit in the freezer for around 4 hours. The lenses will be done when you peel away the cup and some water spills out however the top and some of the middle bottom is frozen. Use a room temperature cookie sheet, bowl, or spoon to smooth out and shape the lens (to either concave or convex shapes). Be sure to smooth the ice

surfaces totally to keep them from looking bumpy. Use the ice lens by holding it over the newspaper.

### **Middle**

***Experiment Journal:*** Locate any light experiment online or in a book to do. As you are doing the experiment use the journal to document what is going on. Be sure to cover the steps of the scientific method, each page has been labeled to aid in this. Be sure that what is document is precise notes or drawings instead of worrying about grammar mistakes.

***My Light Artwork:*** lay a picture on the right side of a small table, and then lay another sheet of paper on the other side. Affix a glass or Plexiglas sheet between the two and be sure you can stand it up on its side. Shine a light on the picture. The light will bounce off of the picture, through the glass, and shine an image on the paper where it can be traced and copied. When done with this picture cut it properly and glue it into the frame provided.

### **Compiling the double lap book**

Place the two sections back to back (be sure the extra flap is out of the folded lap book and in up position) and carefully staple them together on sides and bottom. Try to put staples as close as possible to the edges and not hit anything that is affixed to the lap book. When done unfold each section carefully and crease the side flaps back for easy use later. Put back down the extra flap when all sides have been creased.

The section in between the two pages is a great place to put the Northern Lights page until it is cut by the child as well as any worksheets or hand-outs you would like to include in the lap book and/or unit.