Seeing Photography - Lesson Plan

Theme of Presentation & Exhibits:

***Seeing Photography* through History, Composition, Exposure, and Optics**

How does a camera record the image it views without pen, pencil, or paint? How has this technology progressed over the years? With digital cameras built into our cell phones, both the creative and mechanical processes appear to produce photos by magic. Students will discover the magic and the science in the art of creating photographs!

Artist Quotes:

"Photography is the art of frozen time… the ability to store emotion and feelings within a frame." ***- Meshack Otieno***

"You don't take a photograph, you make it." ***- Ansel Adams***

"A portrait is not made in the camera but on either side of it." ***- Edward Steichen***

Art Objectives:

Rather than focus on a particular photographer, in this unit CPL volunteers will present 4 interactive, hands-on exhibits for students to explore the relatively new medium of photography. While learning the essential parts of a camera, students will get to see old wooden box cameras, polaroids, 35mm, and digital cameras on display as examples of the technological changes in the camera over the past 175 years. Using frames and masked images students will learn about composition, perspective, and visual cropping. Photography means "drawing with light", and at this exhibit students will place small items on photosensitive paper to compose a picture and investigate how light exposure will create a permanent negative-image of their composition. And finally, entering a life-size Camera Obscura, students will learn about the human eye compared to the camera - using a pin-hole, and then a lens.

Why should we consider the camera & photography in art?

Throughout history, from Stone Age hieroglyphics to U-Tube, the visual arts have often been used to record people, places, and time. Human kind wants to leave a record that says "I was here." With photography, the artist tells a story....frozen in time.

We look at photography and the camera to investigate a relatively new creative medium. This art form has progressed very quickly, both technologically and socially, in the short span of 175 years. Hundreds of millions of dollars have been spent on research & development in this field and today cameras are within reach of the common person. Any one of us can be an artist when we use these tools.

We want to show the evolution of the camera over time, and bring the science and art of photography into the present by showing how the mechanics of cameras continue to mimic the human eye, still today.

Grade level: Graphic visuals for K-2. Reading for 3-5.

Skills: per WA State Standards (EARLS) - reading, math, and science concepts.

SET-UP/PREP TIME: 60 minutes for a single person, 45 minutes with two people. A minimum of 5 volunteers are needed during the presentation. Plan on the location to be secure enough for set-up to be done once for the 5 days of presentation and take down is done once at the end.

During each class's time, one volunteer is the timekeeper, the other 4 instruct at the exhibits. We recommend that as student groups rotate to each exhibit, the same volunteer remains at that exhibit to instruct the next group of students. The timekeeper and extra volunteers can assist where needed most. (especially at the History and Exposure exhibits w/K & 1st)

Preparation for this unit primarily involves setting up the 4 exhibits in a museum-like fashion. A minimum room size is 30'x22' if the Camera Obscura is to be set-up inside near the other 3 exhibits, as opposed to the Camera Obscura tent being located just outside the classroom.

PRESENTATIONS & EXPLORING EXHIBITS TIMELINE: 1 hour 15 minutes

75 minute blocks per class
5-10 minute opening presentation
4 exhibits, rotating @ 15 minutes each
1 minute for the rotation change & settling in to new exhibit
up to 7 students per exhibit
10 minutes between classes
5 days presenting (4 classes per day, 3 on Wednesdays)
1/2 hr. lunch

Introduction / Orientation - 10 minutes

Info. for volunteers:

Assign one adult to be the Timekeeper who keeps the timer/stopwatch and bell for ringing at the time change: 15 minutes per exhibit. The timekeeper is also an extra pair of hands with the History or Exposure exhibits when K and 1st visit. Timekeeper should announce the approaching end time (ie: 5 minutes left, 2 minutes left) to the other presenters.

All students will follow the blue tape arrows on the floor to their next exhibit.

As student groups rotate to each exhibit, the same volunteer remains at that exhibit.

TEACHING:

Ask entire class to join you on the floor, criss-cross applesauce for a few minutes.

Ask students what they know already about cameras and photography.

Explain that they will be investigating 4 different exhibits today to learn more about just how a camera records the image it views without pen, pencil, or paint - from olden days to now.

Review 6 BIG ideas basic to visiting all exhibits. *USE display board.*

Explain that when students hear the bell, that is the signal to move to the next exhibit following the blue tape arrows on the floor.

Count off the students (1-2-3-4, 1-2-3-4, etc.) into groups and direct all the 1s to the first exhibit, all 2s to the next exhibit, and so on.

Exhibit #1: History of the camera - 15 minutes

Students will see examples of different cameras and equipment.

A display board will show an abbreviated timeline/history of the major developments in cameras.

Another display board will identify the 7 basic parts of all cameras: 1. body, 2. lens, 3. shutter, 4. viewfinder, 5. film compartment OR sensor with memory card, 6. mirror, and 7. prism. (#6 & #7 are the "brains" of the camera that flip the image right-side up and left to right in the viewfinder.)

Main points to relate:

Photography is a relatively **NEW medium** = only been around **for the past 175 years.**

Cameras have been trying to imitate the human eye and brain from the very start. What our fantastic brains do automatically for us, the camera needs a mirror and prism to do.

As we explore how different cameras work, observe that over time we see:
1) decrease in sizes of camera **(smaller)**
2) increase in automation **(faster)**
3) increase in # of photos we can take **(more)**
4) decrease in the time it takes to see the actual photos **(instant)**

TEACHING:

1) Ask students if they would like to see how this 100+ year old camera works. Ask 2 students to pose as models, and 2 students to kneel and look through the glass at the back of the camera. Cover them with "the cloth" and open the lens cap. Rotate through students to give all a chance.

2) Explain that the reason this camera shows the image upside down is because it doesn't have "a brain". Tell the students that the brain in a camera is a mirror and a prism working together to turn the image over. Follow the red line on the "Parts of a Camera" display board. (This info. is easier to convey once the students have been through the Camera Obscura and learned the optics of how light travels in a straight line - ALWAYS, unless we re-direct it as with mirrors/prisms. For groups who have not been through that exhibit, you will have to explain this a bit to them.)

3) With older groups, briefly go through the timeline display board, noting the changes in cameras over time.

4) With younger students, skip #3.

5) Show how each of the cameras work and the features unique to each - follow notes on tags.

6) Pass the newer cameras around the group as you explain them. **NOTE:** Traditionally, we do **NOT** touch the glass lens or the shutter curtain please !

7) Remind students about how cameras have gotten smaller, faster, with more photos, sooner - as times have changed.

Vocabulary to introduce:

Camera - a lightproof enclosed box that focuses light through an opening (aperture) to a lens (like the eye) and onto a recording medium.

plate (metal or paper) / film / memory card: the different ways (mediums) in which photographs are stored or saved.

BODY - the box containing all the other parts. The camera body is a dark room, must not let any light in.

LENS - the "eye". A piece of curved glass for concentrating light rays into the camera and focusing it on the film/digital sensor.

SHUTTER - the "eyelid" - a mechanical device for opening and closing the lens to allow light into the camera. Controls the amount of time for light to hit the film/digital sensor.

VIEWFINDER - the window that shows you what the camera sees, to help you frame your picture. On a digital camera this is the screen.

MIRROR - a reflective surface at the back of the camera. Used to bounce light off of the prism.

PRISM - a glass object, especially one that is triangular, that is used to change the direction of light rays. By "bending" the light rays it serves to reverse the image L ---> R and up ---> down for correct vision.

Refraction - the fact of light being deflected (changing direction).

Polaroid - a camera that can produce instant pictures. As the print comes out of the camera, it is squeezed through rollers to activate chemicals that stop any further exposure to light and start the developing process. Colored dyes rise through the layers to the surface of the print to form the final image.

35mm - film that comes in a light-proof metal cassette. Film is wound out of the cassette when in camera and moves forward for each picture. Film is wound back into the cassette before being taken out of the camera for processing. Like a scroll.

http://electronics.howstuffworks.com/cameras-photography/digital/digital-camera6.htm

http://www.historiccamera.com/historiccameras/historiccameras.html

Background for Volunteers:
Mini History/Timeline

500-400 B.C. Chinese & Greek philosophers describe basic principles of optics and the camera.
Aristotle - 330 B.C. - questioned why the sun could make a circular image when it shined through a square hole.

1011 - 1021 First Camera Obscura built by scientist Alhazen (Ibn Al-Haytham), a pinhole camera room. Alhazen, born in Basra, Iraq, was a mathematician and great authority on optics in the Middle Ages.

mid-1600's Camera Obscuras were used to help artists trace images onto paper, to create a lifelike drawing/painting.

1814 Nicephore Niepce (nyeps) achieves first photographic image w/ camera obscura known as a heliograph. It required 8 hours of light exposure then eventually fades. Niepce is a Frenchman.

1826 First permanent photo was made - oldest surviving image.
Special chemicals were applied to a special metal plate, put in a very simple camera, and exposed to light. From an upstairs window in his house, Niepce took a crude, fuzzy photo of his barnyard.

1839 Daguerreotype < 10 minutes exposure - invented by Jacques Daguerre (dah-GAIR).
This process made a clear, detailed photograph of his studio.

1840 First American patent issued in photography to Alexander Wolcott for his camera.

1841 Calotype is a negative - positive process, making multiple copies possible.
Englishman William Henry Fox Talbot invented the paper negative, but they didn't make very clear pictures. Next, glass plates were used for negatives.

1851 Collodian process, requires only 2-3 seconds of light exposure.

1859 Panoramic camera.

1871 negatives didn't have to be developed immediately.

1884 Flexible, paper-based rolled film and a camera that held it were invented by George Eastman, changing the history of photography.

1900 First mass-marketed camera - The Brownie. Various models sold 'til the 1960's - made by Kodak.

1913-14 First 35 mm still camera created.

1936 The first popular color film was sold - called Kodachrome film.

1948 Polaroid - First one-step instant camera.

1957 First self-contained amphibious underwater camera.

1968 Photo of Earth from the Moon.

1975 First digital camera invented by Steven J. Sasson. The technology was devised by the American Space program as they sought to be able to transmit images from space probes back to earth.

1978 First point-&-shoot, autofocus camera.

1980 First camcorder for consumers demonstrated.

1981 Sony released the first commercial digital camera. At this point it was really just a video camera that took freeze frames.

1990 Photo CD for storing digital images announced.

1994 First digital, electronic still camera widely available.

Exhibit # 2: Composition - "What's In Your Frame?" - 15 minutes

Students learn to "see" images through frames and learn to compose the image for the viewers' eye.

5 different photograph display boards will have areas framed with "masks" to show examples of composition (i.e: panorama, close-ups, partial views) and provoke discussion as more and more of the photograph is revealed. Using each of the 5 display boards and their **"layers of revealing"** may take the entire 15 minutes. That's o.k.

If time permits, different shaped frames for each child to handle can help students mimic panorama (rectangle), standard (square), and oval views of objects. Students can explore different views through the different frames at different distances.

Main points to relate:

When taking a picture, try to **focus in on the most interesting view that tells the best story**. Don't wait to adjust the photo after it's printed. Look through your camera to frame the important objects. Consider the subject, the foreground, and the background - should they all be equal to tell a good story with your photograph? What is the relationship between objects? Should you shoot straight-on, from underneath, or only 1/2 of it?

TEACHING:

1.) Explain to the students that the activity they will do at this station is more **looking/seeing/discovering and lots of discussion!** Get the students to sit quietly and re-focus after excitement of other exhibits. We want them to SLOW DOWN and THINK ABOUT what they see.

2.) Bring their attention to the first of the 5 masked images. Begin with the smallest opening and ask what do you think this is a picture of? Continue by "unveiling"/removing different masks on the board to reveal more & more of the full image. **As each layer is unveiled, talk about telling the story.** Help them make connections between that "story" and the compositional choices that the photographer made. Repeat using the other 4 masked images. Can use the entire time here if students are really into it.

Some example questions:

"What/who is the subject of this photo?"

"What is happening in the photo?"

"What do you see that is different, now that more of the photo is revealed?"

"Where was the photographer standing when they took the photograph?"

"What story does the photographer want to tell?"

"What's in the frame? - What's missing?"

3.) Information about each of the photographs will be labeled on the backside of the display board. Each "revealing layer of masks" will be numbered so that you can unveil parts of the photo in the desired order.

Additional activity, if time permits:

I**f there is time,** allow the students to choose 1 of the small frames. Have them practice taking pictures with their frames - Start "full frame" and then come in for a "close-up" or "macro" shot. Challenge them to take a picture that they think no one else has ever taken! (Underside of the table, trashcan, etc.)

1) Volunteers instruct students to use frames with one eye closed. Keep elbows close in to body when holding frames.

2) Stand about 10 feet away and view the Still Life through the frame (entire table + background).
3) Then move about 5 feet closer and view it again (table top only).
4.) Then move very close and choose a single item in the Still Life to view in the frame (macro).
5) Try standing on tip toe or looking up from below.
6) Repeat using other frame shapes.
7) Repeat using their friends as the subject - ie: head to toe, face and shoulders only, just the eye.

Vocabulary to introduce:

Composition - the artistic arrangement of the parts of a picture; how objects/subjects are arranged to create a picture.

Visual cropping - changing the edges of a photograph in order to produce a better picture or to fit a given space. Eliminating anything you don't want in the view to focus your viewer's interest.

Still life - an arrangement of objects, typically including fruit and flowers and objects contrasting with these in texture, such as bowls and glassware.

Portrait = up/down, higher than it is wide.
Landscape = left/right, wider than it is high.
Panoramic = wide angle, with a wide sweeping view.
Macro = close-up

Exhibit # 3: Exposure - 15 minutes, this is the "take-home" item.

A display board will show 1) examples of correct, over, & under exposed pictures, and 2) light rays demonstrated as a cone-shape.

Main points to relate:

It is the **combination** of **how long the paper/film is exposed** to light, **and how much light** hits the paper/film that influences the quality of the photo.

Movement by the subject/object or the photographer holding the camera as well as **distance** from the subject to the camera **(focal distance)** will also influence the quality of the photo.

TEACHING:

(Place photo sensitive papers at stations with white side up before students arrive, if possible)

How to do it:

1) Explain to students that **they will produce a negative image using solar paper** under a Light Stand w/ blacklight bulbs to expose the images on to the photo sensitive paper. The "photo" will be very similar to what could be done in the 1800's.

2) Have each student **write their name** on the white side of the paper**.**

3) Have students begin to **select items to place on their paper**- if you are very low on time and the group seems to be having trouble deciding give them limits like "You have 2 minutes to choose 5 items and place them on top of the ***blue*** side of the paper."

4) Ask the students to **think about placing items that will create: 1) Shadows from the object, 2) see-through items (feathers, leaves), 3) solid items, and 4) portions of an item not fully on the page**.

5) Have students **push paper towards the middle of the board, directly under the light.**

6) **Turn on the light!** Volunteers should keep one timer to themselves and serve as the official timekeeper for the **2 minute wait.**

(*If they move the paper around too much they may get blurry images- which you can explain are like old-time photos where no one smiled because the exposure time was so long it would get blurry if they couldn't hold their smile. Also, if they mess around with the objects or lights you can let them know that photography is 1 part art and 1 part science and that a lot of photographers experiment with different new ways to take photos- but there is always a risk that the photo/their project might not turn out well- Just don't let them mess up their partner's project.)*

7) **Develop/Fix the paper in water.** Have them put the blue side up so they can see the reaction and make sure that they push the paper all of the way into the water. Don't leave the paper in the water for very long - just sliding it through works fine. Have the napkins pre-set out if possible and have the kids PAT dry their paper.

- **This is negative-imaging: notice how now the paper doesn't really show the actual items used, but it is really showing their absence.** The paper now shows everywhere the light did hit, and where the paper was covered no light hit.

8) Put the photos in the plastic bags - easiest if you put your hand in the bag and pull the bottom of the photo into the bag. Recruit any non-occupied volunteers to help you with this at this point!

9) Mention to students that they may submit their photograph to be displayed at our annual Art Collective, and if they wish to do so, they should fill out the given tags, and have them attached to their art before rotating on.

Explaining HOW this works:

Explain how this solar paper project works - Here are some possible talking points:
(Kindergarteners will understand some of the basic concepts, but if they are super squirrely they may just want to play with the extra toys!)

- "You **need 3 things to make a photograph (a drawing with light)**:
  - **a camera (dark room)**,
  - **light** (reflecting off of your subject into the camera), and
  - **something to capture/record** the light/image (film, light sensitive paper, or a sensor in a digital camera)"

- "Our **solar paper is working like film works in a camera** - the light that hits the surface of the paper reacts with the special light sensitive/photosensitive chemicals on it to record an image. See how if you put an object on a piece of paper it casts a little shadow right onto the paper? The object is blocking the light from hitting the paper. So everywhere around the object **where the light hits our solar paper a reaction is going to occur- but wherever our objects cast a shadow no light will get to that part of the paper and no reaction will occur**. When light is let into a camera and it hits film a similar type of reaction occurs creating our picture. "
  - ***Kindergarten version****: "The special paper we are using reacts to light so we can record images. Whenever light hits this special paper a chemical reaction happens and the paper will turn a different color. This reaction is similar to what happens to film in a camera when light hits it."*

- "Just like film, **if we do not stop the chemical reaction from happening the light will continue to expose our film/paper.** That is why photographers take their film into Dark Rooms and use special chemicals to stop the reaction from happening, called fixative, which **FIX the image** to the film. We are lucky we just get to use water to fix our image on our paper. If we don't our paper will end up being OVEREXPOSED and it will turn all one color! "
  - ***Kindergarten version***: "*Now in order to make sure that we don't OVEREXPOSE our paper we are going to put the paper in water to fix our image so you can save it and take it home. Make sure that you put the paper face-up/blue side up in the water so you can see the cool reaction happen!"*

- Use the display to talk about **Overexposed & Underexposed** photographs. "Do you think that the picture on the left has TOO MUCH or TOO LITTLE light? What about the one on the right? Do you remember what EXPOSURE means?"

Additional Info., if you'd like:

Explain how in 1814 the Frenchman Joseph Niepce (nyeps) achieved the first photographic image with a camera obscura known as a **heliograph.** It required 8 hours of light exposure and then the picture eventually faded because there was no way to preserve (FIX) the image. Then in **1826**, Niepce used **special chemicals applied to a special metal plate**, put it in a very simple camera, and exposed

it to light. From an upstairs window in his house, Niepce took a crude, fuzzy photo of his barnyard. **The FIRST permanent photo was made!**

- "Our modern digital cameras have light sensors in them that read the amount of light coming into the camera and automatically adjust the exposure time. Before that kind of technology, photographers had to act like scientists and use special devices to measure the light on their subject and they also would have to do experiments or test shots to see if their exposure times were correct. The reason that we use these timers is to make sure that we don't OVER or UNDEREXPOSE our paper - someone has already done some experiments so we know our exact exposure time!"

Vocabulary to introduce:

Photography - means "drawing with light"

Photosensitive / solar paper - having a chemical response to light

Composition - how objects are arranged to create a picture.

Exposure - the amount of light required to produce a photo image.

Negative-image - showing light and shadow *reversed* from those of the original, characterized by the absence rather than the presence of distinguishing features.

Blacklight (UV) - ultraviolet light, invisible to the eye.

Exhibit #4: Optics - 15 minutes

Students will step in to a Camera Obscura ("movie room") and watch their classmates produce moving pictures right before their eyes.

Main points to relate:

All points of light travel in a STRAIGHT line !!! - ALWAYS, unless we redirect the light.

The camera has tried to copy the human eye and what our fantastic brains do for us with our sight!

TEACHING:

Ask the group to join you on the floor, criss-cross applesauce for a few minutes.

- Tell the student the name of the exhibit. **Camera obscura**….say it with me camera obscura which means dark room. **Camera=room and obscura=dark.** Also has been called movie room.

- Start at the beginning… when we are babies….**first day or so babies see things upside down and reversed…Why? Because light travels in a straight line.**

- But **our fabulous wonderful brains flip the image/picture upright.** We have a thing in our brain called a corpus callosum and it attaches our right side of the brain with our left side and it also flips the image/picture that we see through our eyes.

- Talk about **the study of the inverting lenses,** the lenses made test people see upside down and then in a few days the brain flipped the image upright. Then the inverting lenses were removed and guess what happened?.....they saw thing upside down for few days and eventually the brain flipped the image/picture upright again.*

- **Explain how the camera tries to copy our eyes and brains.** Talk about how our eyes send pictures to our brain and the brain records the image. But you cannot pass your brain around to show someone else the picture they see. So to share a picture that someone takes it needs to be recorded on a piece of paper…voila the camera was invented.

- Show the student the picture of the eye and camera. Compare the different parts of the eye comparing it to the camera …..ex. **shutter= eyelid (lets the light in)**….**aperture=pupil (opening)**….**lenses(focal point)**….**retina=film (where the image is the clearest or crispest)** as you point to each parts on the display.

- Talk about focal point/focal length….**if the focus point or focal length is in front or behind the retina or film the image/picture is blurry.**

- Talk about how **glasses correct the focal point**/ focal length on the retina/film.

- Ask why is the image/picture on the retina/film is upside down…..because light travels in a straight line. Then **show the students how the light at the top of the tree enters the top of the opening and travels straight down…..how the light at the bottom of the tree enters the bottom of the opening and travels in a straight line upward.**

- Explain that you will show them **this very thing happening inside the camera obscura**/movie room.

- Ask if anyone is afraid of the dark while guiding the students to the room and hold open the front flap of room and instruct the students to take a seat.

- Tell the students that we are going to **pretend to shrink and be really little people and that we will be inside a pinhole camera or eye ball.**

- Close the door flap. It should be almost completely black then….**lift the small flap and explain how the eyelid/shutter has opened and reveal the opening.**

- Explain how this is the opening like the pupil in the eye or aperture in the camera and that **depending on how much light is coming in or that is needed** for the retina/ film to make an image/picture **dictates the size of the opening and how long the light is needed to create an image/picture.**

- Give the example of how in a dark place it takes a longer amount of time for the light to create an image/picture on retina/ film and **how the pupil is bigger (gather more light) in a dark room and how it is smaller (needs less light) in a bright room.**

- **Explain how the screen is the retina/film and ask how they see the image/picture**…. blurry or clear? Outside images will appear in color, but will be reversed and upside down. Image is rather blurry, but recognizable. This is what people with glasses see when they do not have their glasses on…..focal point/focal length not concentrated on the retina/film……a blurry image.

- Now when the eye Dr. prescribes glasses the lens is what helps to focus directly on the retina….where the brain sees the image clear and crisp.

- **Attach the lens to the opening. Image/picture is crisp and clear on the screen now**… the lens is used to provide clarity to the images "coming into the camera". The lens focuses or concentrates the light rays on to the screen. If the screen is moved front or back the image/picture becomes blurry because it is not the correct concentration of light at the focus point.

- So why is this image/picture upside down and reversed? **Because light travels in a straight line.**

- Go to the opening and explain to the students that **the sky's light is coming in through the top of the opening and is traveling in a straight line and appearing on the bottom of the screen**. Move your hand back and forth between the top of the opening and the bottom of the screen in a STRAIGHT line. (Repeat this with the next three to indicate the direction light travels.)

- Go to the opening again and explain how **the ground's light is coming through the bottom of the opening and is traveling in a straight line and appearing on the top of the screen.**

- Go to the opening again and explain how the **objects' light on the right side outside is coming through the right side of the opening and is traveling in a straight line and appearing on the left side of the screen.**

- Go to the opening again and explain how the **objects' light on the left side outside is coming through the left side of the opening and is traveling in a straight line and appearing on the right side of the screen.**

- **Have 3 students do a little skit outside of the exhibit and switch students after 2 minutes.**

- Explain to the students that stayed inside the exhibit how **artists use to use the camera obscura to trace objects that were outside onto a canvas upside down and then they would flip them and paint them right side up.** The Italian landscape painter Canaletto used it to create his amazingly accurate perspective views of Venice. The Dutch painter Vermeer used a camera obscura.**

- In Medieval times it was thought to be **magic** when being inside a room, one could see what was happening outside.

* http://www.physlink.com/education/askexperts/ae353.cfm

** http://www.essentialvermeer.com/camera_obscura/co_two.html

Vocabulary to introduce:

Camera Obscura = also referred to as a "movie room". Camera means "room", Obscura means "dark".

Sometime between 1011 - 1021, the first Camera Obscura was built by a scientist and mathematician from Iraq. His name was Alhazen (Ibn Al-Haytham). Alhazen was a great authority on optics in the Middle Ages.

A camera-obscura is darkened room with a tiny hole in one wall. As light comes through the hole, an image of whatever is outside the hole is projected onto the opposite wall. In the mid-1600's, Camera Obscuras were used to help artists trace images onto paper, to create a lifelike drawing/painting. Johannes Kepler coined the phrase "camera obscura" in 1604. In 1609, he suggested using a lens to improve the image projected on the opposite side.

In time, the dark room was reduced to a small box. A lens was again placed over the pin-hole where the light comes in to help condense (focus) the light rays.

Lens - piece of curved glass for concentrating or dispersing light rays. In our case, the lens concentrates the light's rays to focus and make the scene outside clearer and more sharply defined.

Books for each school's library:

The Kid's Guide to Digital Photography:
How to Shoot, Save, Play, and Print Your Digital Photos by Jenni Bidner

Photojojo: Insanely Great Photo Projects and DIY Ideas by Amit Gupta

Click Click Click! Photography for Children by George Sullivan

*** Liz George is going to ask each school librarian to pull any books on cameras, photography, and photographers from their collections to have "on display" or highlighted during the month of our visit.

Follow-up:

A project for making your own Camera-Obscura at home will be on the CPL website for teachers/parents to seek out as a follow-up activity.