

Science		
Science Exploring Light	Engage	Year 5
Lesson 3 90 mins	Looking for light	
<p>Ways of Working:</p> <p>Pose and refine simple questions, and make predictions to be tested</p> <p>Communicate scientific ideas, data and findings, using scientific terminology and formats appropriate to context and purpose</p> <p>identify and apply safe practices</p> <p>Reflect on and identify different points of view and consider other people's values relating to science</p> <p>Reflect on learning to identify new understandings and future applications.</p> <p>Plan activities and investigations, identifying and using elements of a fair test</p> <p>Collect and organise data, information and evidence Evaluate information and</p>	<p>Science Understanding</p> <p>Physical sciences</p> <p>Light from a source forms shadows and can be absorbed, reflected and refracted (ACSSU080)</p> <p>Science as a Human Endeavour</p> <p>Nature and development of science</p> <ul style="list-style-type: none"> Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena (ACSHE081) <p>Science Inquiry Skills</p> <p>Questioning and predicting</p> <ul style="list-style-type: none"> With guidance, pose questions to clarify practical problems or inform a scientific investigation, and predict what the findings of an investigation might be (AC SIS231) <p>Planning and conducting</p> <ul style="list-style-type: none"> With guidance, plan appropriate investigation methods to answer questions or solve problems (AC SIS086) <p>Processing and analysing data and information</p> <ul style="list-style-type: none"> Construct and use a range of representations, including tables and graphs, to represent and describe observations, patterns or relationships in data using digital technologies as appropriate (AC SIS090) Compare data with predictions and use as evidence in developing explanations (AC SIS218) <p>Communicating</p> <p>Communicate ideas, explanations and processes in a variety of ways, including multi-modal texts (AC SIS093)</p>	

evidence to support data gathered from activities and investigations

Select and use tools, technologies and materials suited to the activities and investigations

Draw conclusions that are supported by evidence, reproducible data and established scientific concepts

The Australian Curriculum: Science for Prep (F) – 10
<http://www.australiancurriculum.edu.au/Science/Curriculum/F-10#cdcode=ACSSU080&level=5> Retrieved 6th October 2013.

The objective of this lesson is to show students how light allow humans to see. This lesson is the first of the engagement section of this unit, in the first two lessons we used questions to glean understandings and perceptions. The next section is about testing theories and experimenting. The students will engage with the resources and through questioning and scientific processes generate and evaluate knowledge ideas and possibilities. They will make visual representations (labelled diagrams) reflect on their outcomes through reflections, posing questions and analysing the evidence.

Introduction:

Firstly we will review the previous lessons, this will include the chat board and word wall and encourage students to use the words listed in their writing. We will revise proper scientific drawings and their purpose.

Body of lesson:

I will explain to the students that we will work in our groups to explore the problem of the peek box.

The manager from each group will collect the materials needed for the problem of the peek box. Each group will have a box with no lid and they will make a small hole to peek inside, there will be a small object inside.

I will display the problem.

- How can we change the box so that we can see the object?
- Can we see the object in the box?
- Do your eyes adjust to the dark?
- Could we see it in the dark if it were white?
- Are there shadows in the dark?

The groups will discuss the problem and we can record solutions on the science chat board.

Or mind mapping on Buble.us

This discussion will be an opportunity for me to review student perceptions.

We will then select a suggestion that all of the groups will test to solve the problem.

Discuss how they can see the object.

The will then explain that light is connected to vision, when we see things it is light entering our eyes. The way that we see things is through reflected light.

We can now compare the human eye to a pinhole camera.

This link goes to a great kid friendly explanation into how we

see.

- <http://www.childrensuniversity.manchester.ac.uk/interactives/science/brainandsenses/eye/>

This is a great kid friendly version of how the eye works

We can now introduce my prepared pinhole camera, I will explain that we will make our own pinhole the instructions for this come from the CSIRO source. If the class doesn't have time for making their own version of the pinhole camera we can use the supplied one and still complete observations. It is preferred that students construct their own.

Extension experiments for the pinhole camera.

- Design some modifications to the pin hole camera
- What happens if you change the pinhole size?
- What happens if you use a shorter box
- What happens if you paint the inside of the box white
- What is the best type of paper to use for the screen?

The pinhole camera will be passed around the class; the students will record what they observe in their science journals.

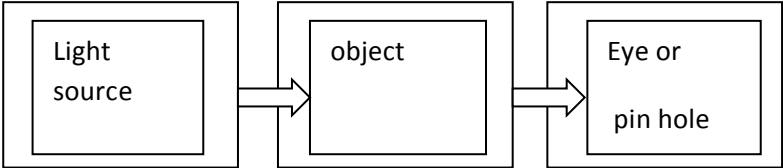
Suggestions for recording processes, ray diagram, using arrows to point the path of the light I will model this on the board.

Questions for observations:

- What did you notice about the image on the paper?
- How was it different to the object the camera was facing?
- What do you think happened
- <http://www.curriculumbits.com/physics/how-does-a-pinhole-camera-work/> This web site has an animation about how a pin hole camera works, it aligns with the video about how the eye works.

The class can discuss the clip; the rays are on the extreme ends of the tree and cross when they enter the camera.

- How is the way we see similar to the pinhole camera?
- What happens to the image when the light enters our eyes?
- How is the image turned up the right way?

	<ul style="list-style-type: none"> • How is this different to the pinhole camera <p>Conclusion:</p> <p>The class can now note the process of how the pin hole camera worked on either in a flow chart in their science journals or on the I pad app suggested previously. http://ipadapps4school.com/2013/09/12/create-mind-maps-and-flow-charts-with-lucidchart-for-ipad/ or can be done simply</p>  <pre> graph LR A[Light source] --> B[object] B --> C[Eye or pin hole] </pre> <p>I will check the flow charts to determine the students understanding.</p>
<p>Knowledge and understanding: Science as a human endeavour.</p> <p>Scientific ideas can be used to explain the development and workings of everyday items</p> <p>Science can contribute to people’s work and leisure</p>	<p>Resources:</p> <ul style="list-style-type: none"> • Science journals • Science chat board • 1 enlarged copy of the Peek box problem • A4 Cardboard • Wax paper • Roll of tape • Ruler • Foil • Rubber bands • Pencils • Instructions <p>For Teams:</p> <ul style="list-style-type: none"> • Badges for team roles, Manager, Director, Speaker. • Marking Pens • Scissors • Glue • Instructions for making a pin hole camera • 3 pin hole cameras for sharing between groups. • Small box for peek box

	<ul style="list-style-type: none"> • Small object for peek box • Or a prepared pin hole camera depending on time and class. • Torch • Objects for box
<p>Evidence of learning:</p> <ul style="list-style-type: none"> • Student will understand that objects either need to reflect light or be a light source to see them • Students will understand how light allows humans to see. 	<p>General Capabilities:</p> <p>Literacy</p> <p>Word Knowledge</p> <ul style="list-style-type: none"> • Understand learning area vocabulary <p>Composing texts through speaking, writing and creating</p> <ul style="list-style-type: none"> • Compose texts <p>Compose spoken, written, visual and multimodal Grammar knowledge</p> <ul style="list-style-type: none"> • Use knowledge of sentence structures • Use knowledge of words and word groups • learning area texts <p>Critical and Creative Thinking:</p> <p>The particular elements of Critical and creative thinking addressed by this content description</p> <p>Inquiring – identifying, exploring and organising information and ideas</p> <ul style="list-style-type: none"> • Organise and process information • Pose questions • Identify and clarify information and ideas <p>Reflecting on thinking and processes</p> <ul style="list-style-type: none"> • Reflect on processes <p>Analysing, synthesising and evaluating reasoning and procedures</p> <ul style="list-style-type: none"> • Evaluate procedures and outcomes

	<p>Personal and social capability</p> <p>The particular elements of Personal and social capability addressed by this content description</p> <p>Self-management</p> <ul style="list-style-type: none"> • Become confident, resilient and adaptable • Work independently and show initiative <p>Social management</p> <ul style="list-style-type: none"> • Communicate effectively <p>Information and communication technology capability</p> <p>The particular elements of Information and communication technology capability addressed by this content description</p> <p>Creating with ICT</p> <ul style="list-style-type: none"> • Generate ideas, plans and processes <p>Investigating with ICT</p> <ul style="list-style-type: none"> • Define and plan information searches
<p>Helpful Teachers Resources:</p>	<ul style="list-style-type: none"> • http://www.engineeringinteract.org/resources/alienattack/flash/concepts/sourcesandrays.htm good interactive resource about light sources • http://www.sciencentre.qm.qld.gov.au/Events+and+Exhibitions/Exhibitions/2013/02/Playing+with+Light Great resources, power points worksheets ect • http://www.youtube.com/watch?v=DIDV3lcCgxw bbc documentary on light, the first minute makes for a great discussion topic, this discussion could lead into a discussion on light through time and culture, what did they do before artificial light? • http://www.youtube.com/watch?v=8jkTBTDlhJ8 information about light sources • http://www.curriculumbits.com/physics/how-does-a-pinhole-camera-work/ This web site has an animation about how a pin hole camera works, it aligns with the video about how the eye works. • http://www.childrensuniversity.manchester.ac.uk/interactives/science/brainandsenses/eye/ This is a great kid friendly version of how the eye works

	<ul style="list-style-type: none">• http://www.exploratorium.edu/science_explorer/pringles_pinhole.html This is the resource we used
Possible Alternative conceptions or misunderstandings about light.	Students may believe that light comes from the eye and reflects off objects. Explain that light comes from a light source, reflects off an object and then enters our eyes