# Inquiry #1: Color and Light Inquiry

Time limit: 4.5 hours

## Background:

- Maka'ainana college students
- Engineering/science students

## Goals:

Process Skills:

- Developing scientific inquiry mindset
    - Questioning observed phenomena
    - Developing methods/process to answer a question
    - Comfort in using various methods/materials to answer a question
- Working effectively in a group
- Presentation skills
    - Creating an organized poster / presentation
        - Use of images
        - Limit word content
            - Bulleting
            - Summarize critical information
    - Communicating effectively in front of an audience
        - Using time efficiently
        - Speaking loud and clear
        - Avoid use of scientific lingo
    - Working within time limits

Content:

- Understanding color and light
    - Components of light
    - Light is a spectrum of many colors/types
- Filters and light collection
    - Different color filters given different information
        - Usefulness in terms of telescopes (connection made during synthesis)
        - Combine/subtract colors to learn different properties

Attitude:

- Comfort with inquiry process / self-learning
- Confidence in solving problems / answering questions (on their own)
    - Sense of ownership
- Respect for materials
- Respect for others' ideas

Diversity:

- Working with students from different backgrounds (culture and education)

## Activity Description:

**Introduction: *Sarah**

- Introduce the process of inquiry
- Explain different stages of inquiry and goals for each stage???
    - Inquiry starter
        - Learners explore materials, make observations, and raise questions related to content goals
    - Focused investigation
        - Learners plan and carry out investigations based on their questions
    - Sharing understanding
        - Learners share investigation results to further their understanding of scientific concepts
- Explain role of the facilitators
- Present inquiry schedule and timeline

**Starter Activity**:

- Exploration and question generating
    - Facilitator demonstrates a specific phenomena
    - Students then use materials and explore properties of phenomena
    - Students write down questions that come up as they explore
- 3 stations
    - Overhead / gel filters
    - Projectors / colored filters
    - Ray boxes / dichroic filters

**Form Investigation Groups:**

- Facilitators collect questions and categorize them
    - Questions that cannot be answered grouped as QWWWNDWATT
- Participants read all the questions and form groups of 2 or 3 to investigate a specific question
- 3 stations
    - Overhead / gel filters
    - Projectors / colored filters
    - Ray boxes / dichroic filters

**Investigation:**

- Participants use materials/tools to investigate their question

**Presentation Preparation:**

- Prepare presentations and prep explanations

**Presentations to Group:**

- 3 minutes / group
- Questions

**Synthesis and Inquiry Closing: *Heather**

- Summarize presentations
- Address content goals
- Explain the various phenomena investigated
    - White light is made up various colors
    - Filters block some colors, but allows others to pass through

## Facilitators:

- *Stations:* John, Betsy, Sarah
- *Floater:* Heather

## Timeline:

10 min – Introduction
10 min - *Questions metamoment*
25 min – Starter activity / question generating
Lunch
10 min - *Groups metamoment*
10 min – Form groups
90 min – Investigate
5 min - *Thinking tool*
30 min – Investigate
10 min - *Presentation metamoment*
15 min – Presentation prep
30 min – Presentations
30 min – Synthesis
**270 min (4.5 hours) - Total**

## Materials:

- gel filters (red, blue, green, cyan, magenta, yellow)
- dichroic filters (the glass square filters)
- large diffraction grating (for an overhead)
- ray boxes (3)
- a variety of light bulbs
- fiber fed computer spectrograph
- extension cords
- power strips
- meter sticks
- rulers
- protractors
- markers
- sentence strips
- scissors
- scotch tape, painting tape, masking tape
- poster paper

Things need from Hilo:
- overhead projectors (2)
- slide projectors (3)