The Provenance of Rays

Angel Pintor
Mineral Composition

- Naturally occurring
- Inorganic
- Solids
- A definite chemical composition
- An ordered atomic arrangement
How Minerals Were Characterized
Foundation for sampling

Types of Electromagnetic Radiation

- **wavelength**
  - **radio waves** used to broadcast radio and television
  - **microwaves** used in cooking, radar, telephone and other signals
  - **infrared** transmits heat from sun, fires, radiators
  - **visible light** makes things able to be seen
  - **ultraviolet** absorbed by the skin, used in fluorescent tubes
  - **X-rays** used to view inside of bodies and objects
  - **gamma rays** used in medicine for killing cancer cells

![UVAB power as a function of angle from the Sun at 4pm on June 24th](chart.png)

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Procedure

1. Items to ensure the experiment goes smoothly, a sample of different quantities of titanium dioxide and zinc oxide, spectrometer (UV Meter), plastic wrapping, sheets of paper, spoons and bottled samples.

2. Prepare pieces of sheets of paper with holes of a radius similar to the bottle to ensure a consistent pathway for light to go through

3. Wrap the paper with the plastic wrapping with only 1 side covered

4. Once all steps have been completed. Layer out one of your samplings on the top of the plastic wrapping

5. Then have someone hold the wrapping with the sample directing it to the sun but as a leveled surface

6. Place the spectrometer underneath the sample

7. Record the output that resulted on the spectrometer

8. Repeat steps 6-10

9. Once you've gather the amount of samplings you want. Directly find and understand the differences in each sample of what happened and what was understood
Comparison to Commercial Samples

Zinc Oxide or Titanium Dioxide
- ZnO 3.5%
- ZnO 10.5%
- ZnO 17.5%
- TiO$_2$ 3.5%
- TiO$_2$ 10.5%
- TiO$_2$ 17.5%

Shea Butter and Coconut Oil
The Expermenation Route

Day 1 - Sunny, no clouds

Samples
ZnO 3.5%
ZnO 10.5%
ZnO 17.5%
TiO$_2$ 3.5%
TiO$_2$ 10.5%
TiO$_2$ 17.5%
2nd Day of Experimentation

Day 2 - Partly Cloudy

Day 2 - Partly Cloudy, normalized
Last Day of Experimentation

Day 3 - Sunny but hazy

Day 3 - Sunny but hazy, normalized
Conclusion

Why It Matters?

- Skin Cancer
- Coral Reefs
- Greenhouse Effect
- Heat Compaction