Low-Cost Experiments in STEM Education

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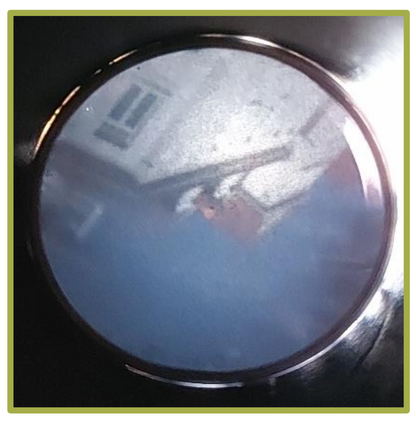
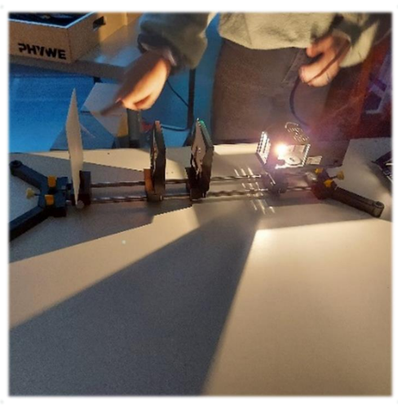
Photography with Pinhole Camera

Coffee Developer Helps Understanding Redox Reactions

Part 1: Understanding how a pinhole camera works.





Coffee does the trick

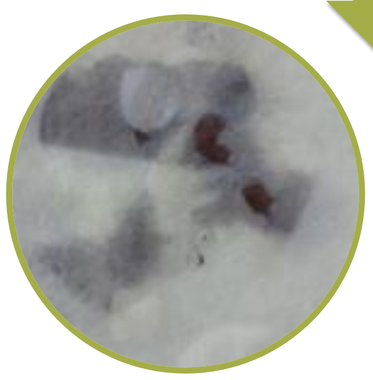
Part 2: Taking a photo with a crisps can, photographic paper and instant coffee – that‘s how it‘s done.

Caffenol

Positive Paper Negative Paper

Part 3: Exploring how a picture develops on photographic paper.

Aequeos solution of silverchloride tested with hydroquinone-developing agent, caffenol, instant coffee, water, ascorbic acid; five minutes without light exposure.



Light exposure of silver chloride

Light exposure of silver nitrate

Add on:

Black tea, red wine and carrot juice are also suitable developing agents

- ✓ Easy to make pinhole camera of a crisps can
- ✓ Understanding camera principle and photochemistry by experiments
- ✓ Substition of hydroquinone-developer  for inexpensive and non-hazardous household chemicals
- ✓ Playful acitivty connected to many international curricula
- ✓ Cross-over of all STEM fields, arts and history possible