



Equipment for demos

- **Spectroscopy (studying rainbows):**

Bright light (or the Sun), prism to make a rainbow, optional spectroscope

- **Making a comet:**

Must read RA before doing this experiment

- **Equipment:**

Thermally insulated gloves, goggles, neoprene gloves, lab coats, dry ice (frozen CO₂), water, sand, salt(s), soy sauce (or similar), vinegar, wine vinegar, plastic cup with a bag in with no holes to line the cup, trays for cups, stirring spoon/splints,

- **Optional flame tests**

- **ESA kids:** [Comet landing](#) videos

- **IOP Kids:** Mimi's rainbow adventure: [Mimi's Rainbow Adventure storybook \(iop.org\)](#) **Search for rainbows**

Teacher background:

- ESA Comet basics: [ESA - Comets: an overview](#), [ESA - Rosetta – Archive](#), [Rosetta's final images](#)

- Make a big comet: [Educator Guide: Create a Comet with Dry Ice | NASA/JPL Edu](#)



Rainbow Science and Comets

1. State some properties of rainbows and comets.
2. Describe the role of engineering in making discoveries.
3. Explain what light can tell us about our Universe and life.

Alan Hale and Thomas Bopp discovered Comet Hale–Bopp separately on July 23, 1995.

Image credit: Philipp Salzgeber





Why do we
see these
colours in the
sky?



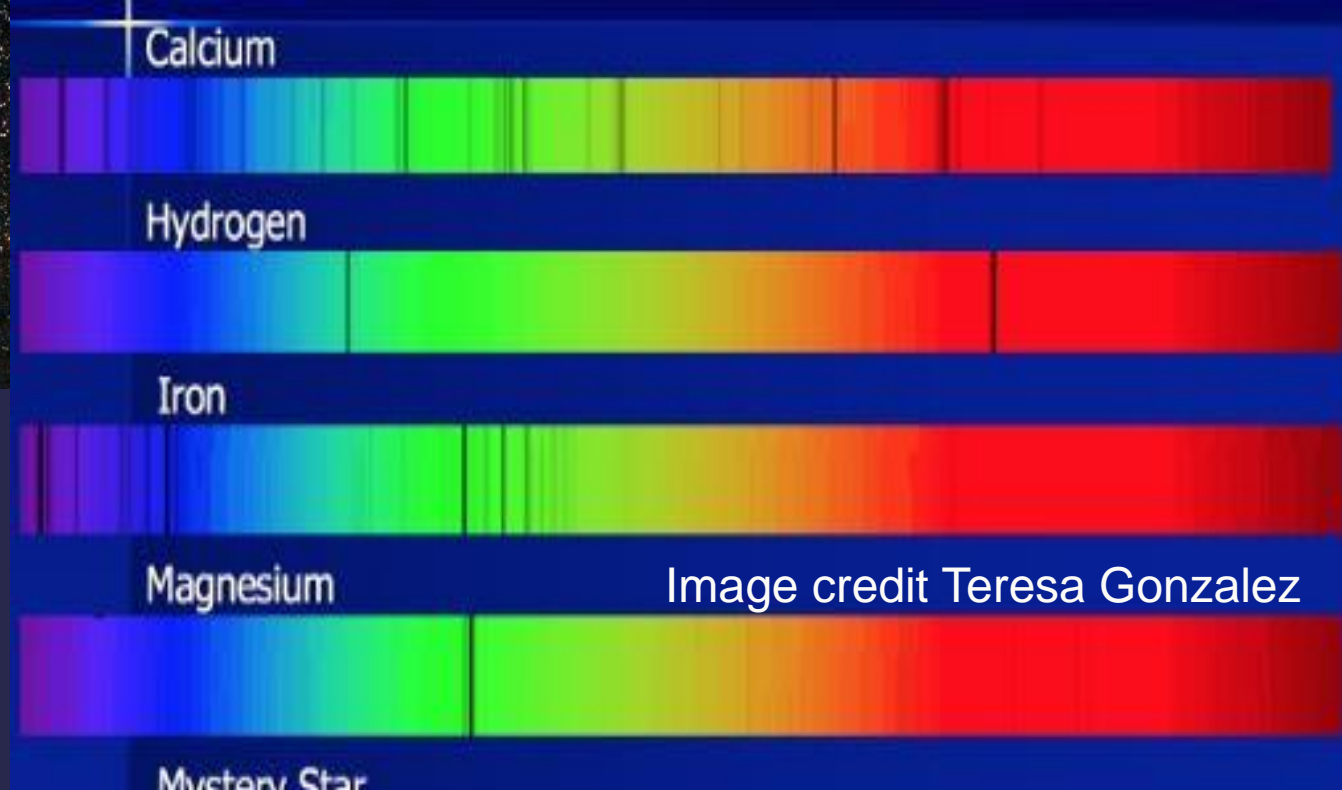


What is a rainbow?





What does a rainbow scientist do?



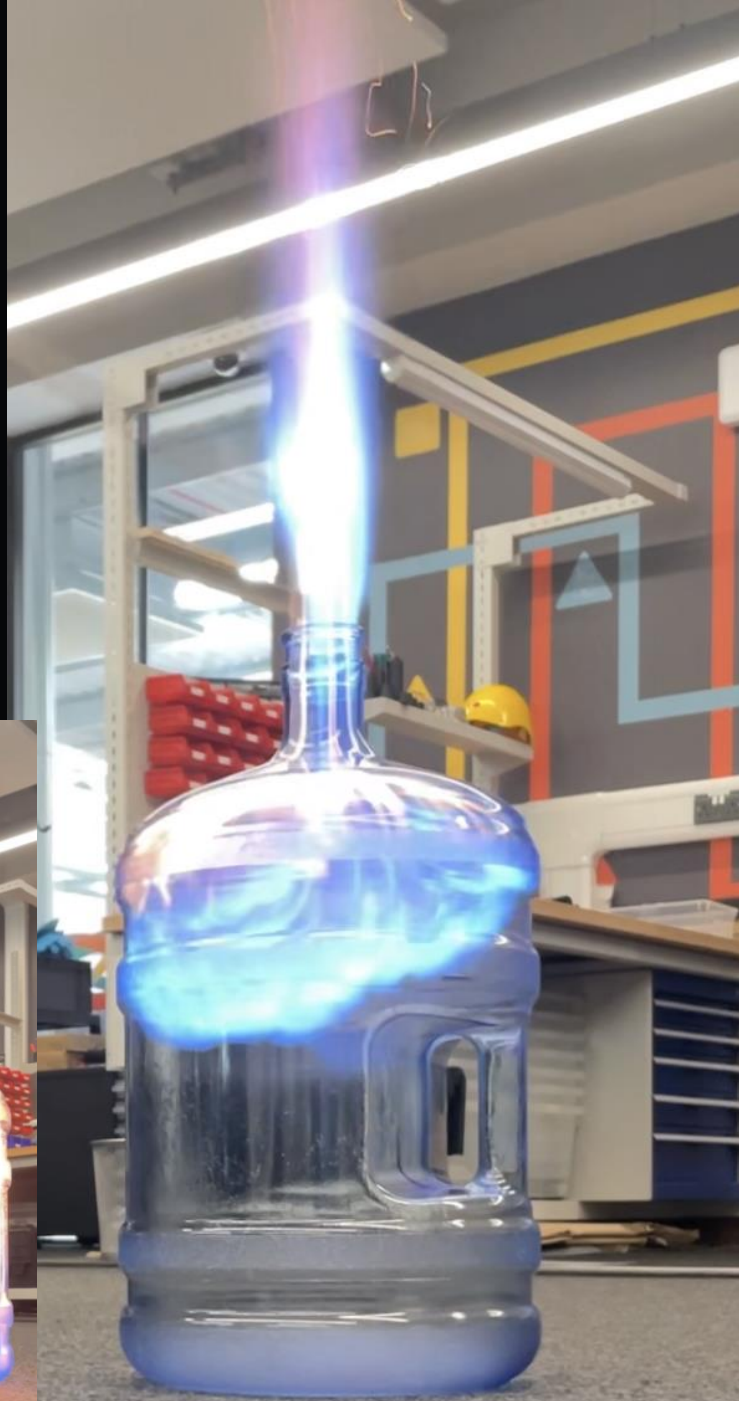
Flame Test



Li ⁺  Lithium	Na ⁺  Sodium	K ⁺  Potassium	Rb ⁺  Rubidium	Cs ⁺  Cesium
Ca ²⁺  Calcium	Sr ²⁺  Strontium	Ba ²⁺  Barium	Cu ²⁺  Copper	Fe ²⁺  Iron

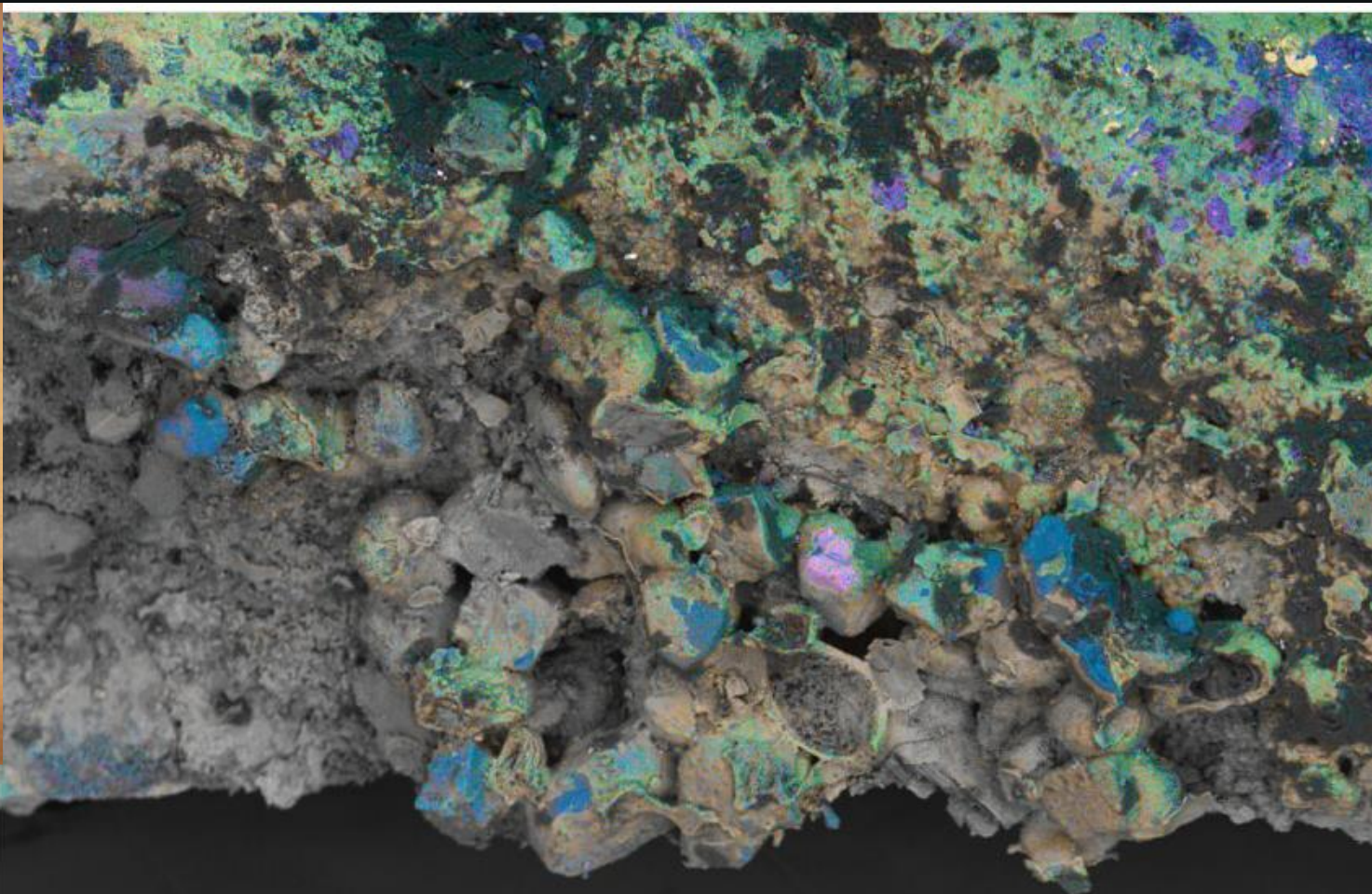
Image credit Teresa Gonzalez

Image credit:
The Sky at
Night





L5 chondrite meteorite older than Earth! Spectroscopy (rainbow science) told us what chemicals are inside it.

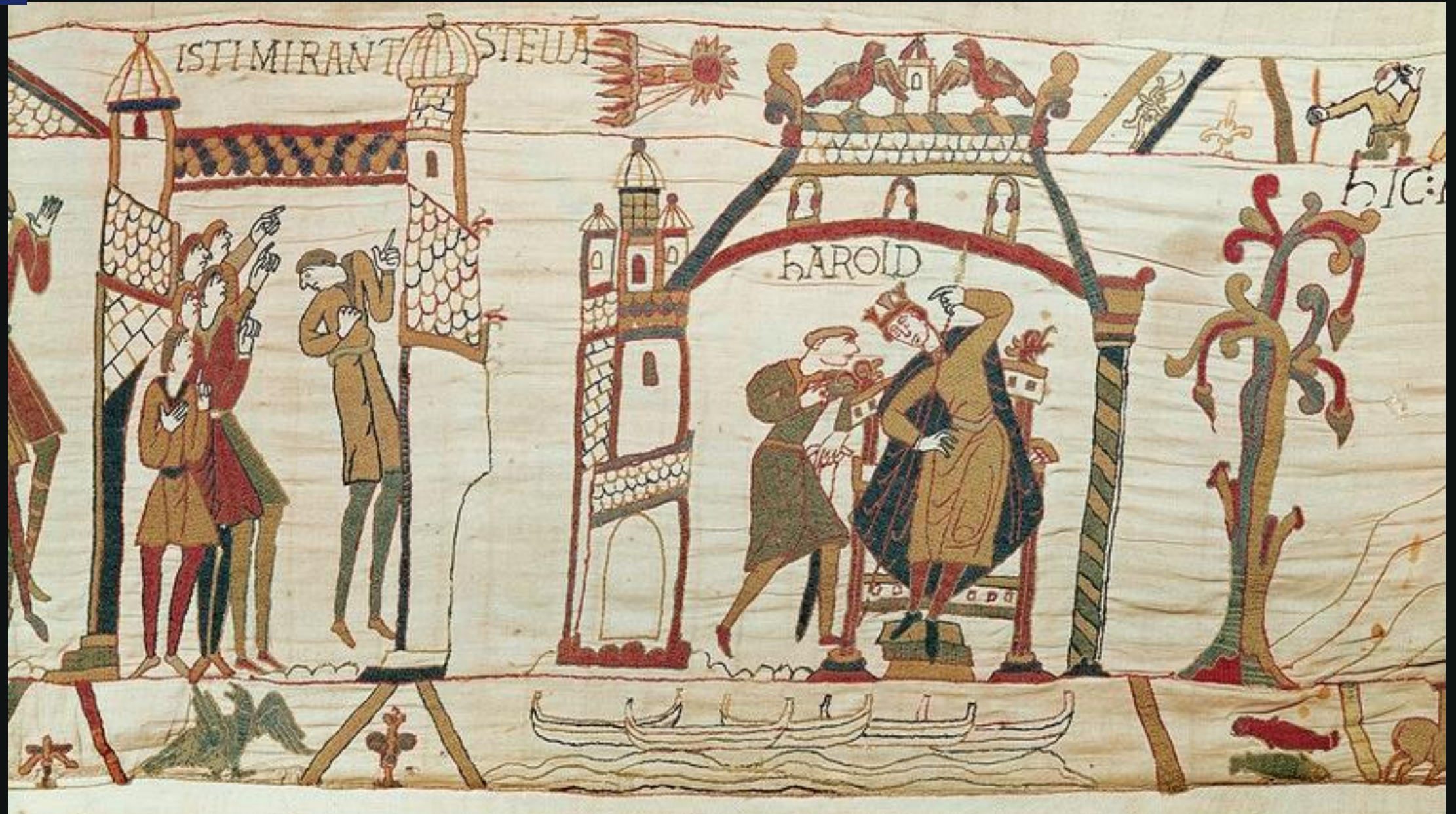


University of Nottingham
Under the microscope:
Luke Norman and Lorelei Robertson.



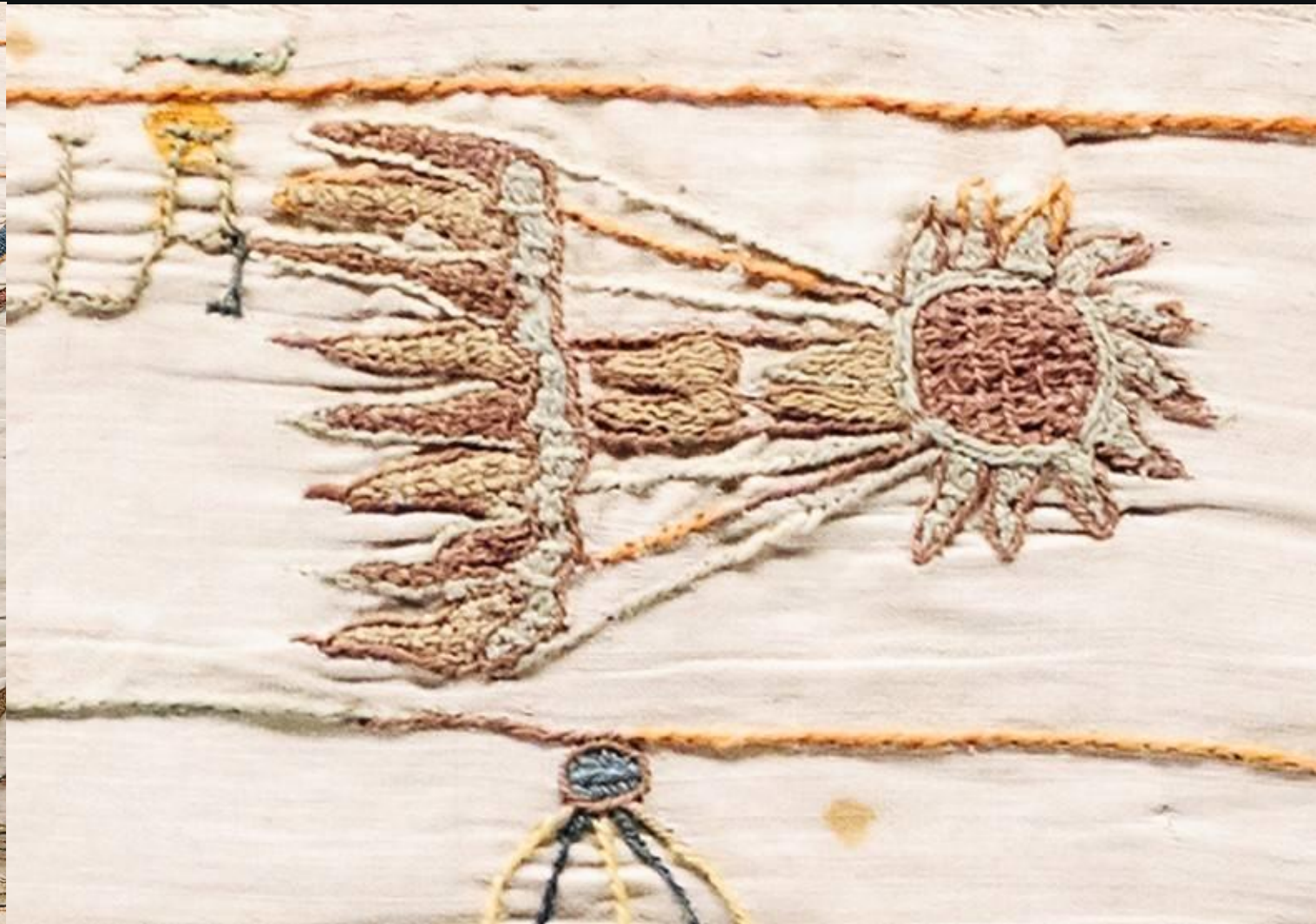


What are these people pointing at?





Halley's Comet visits Earth every 76 years





These are images of comet Halley...but what is a comet?



- Comet Halley in 1910 and 1986. Image credit: The Library of Congress.



Comet Hale-Bopp

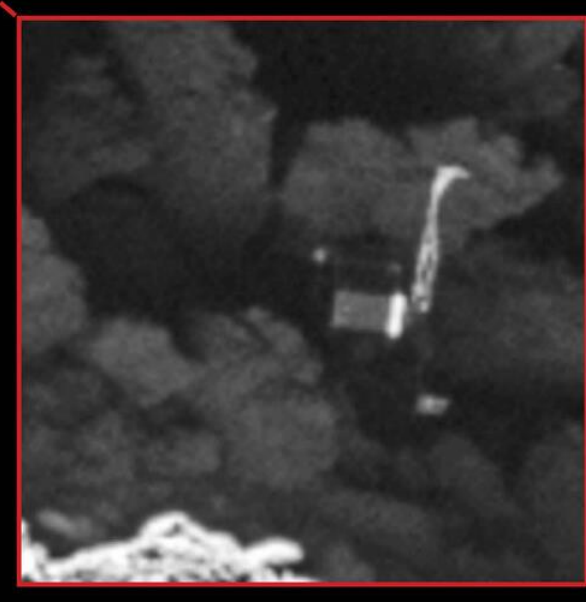
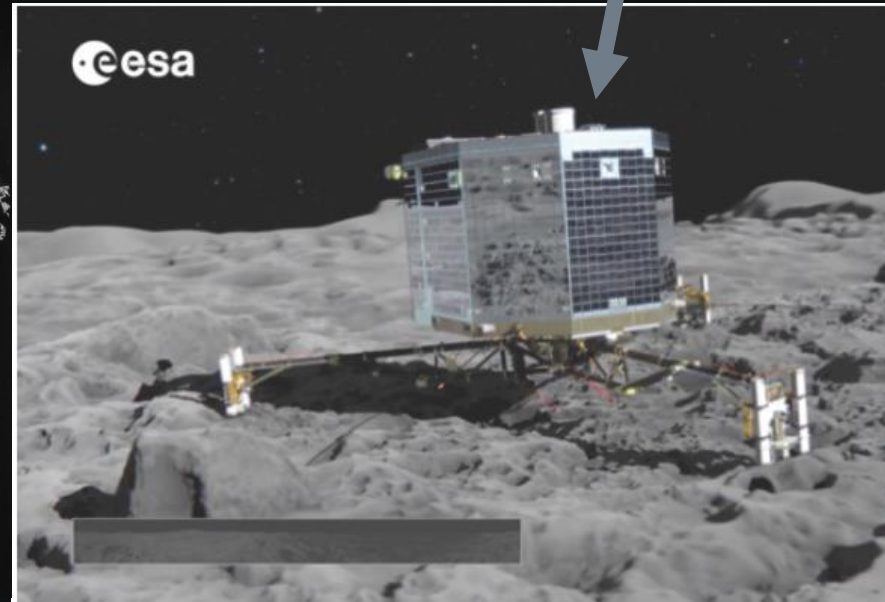
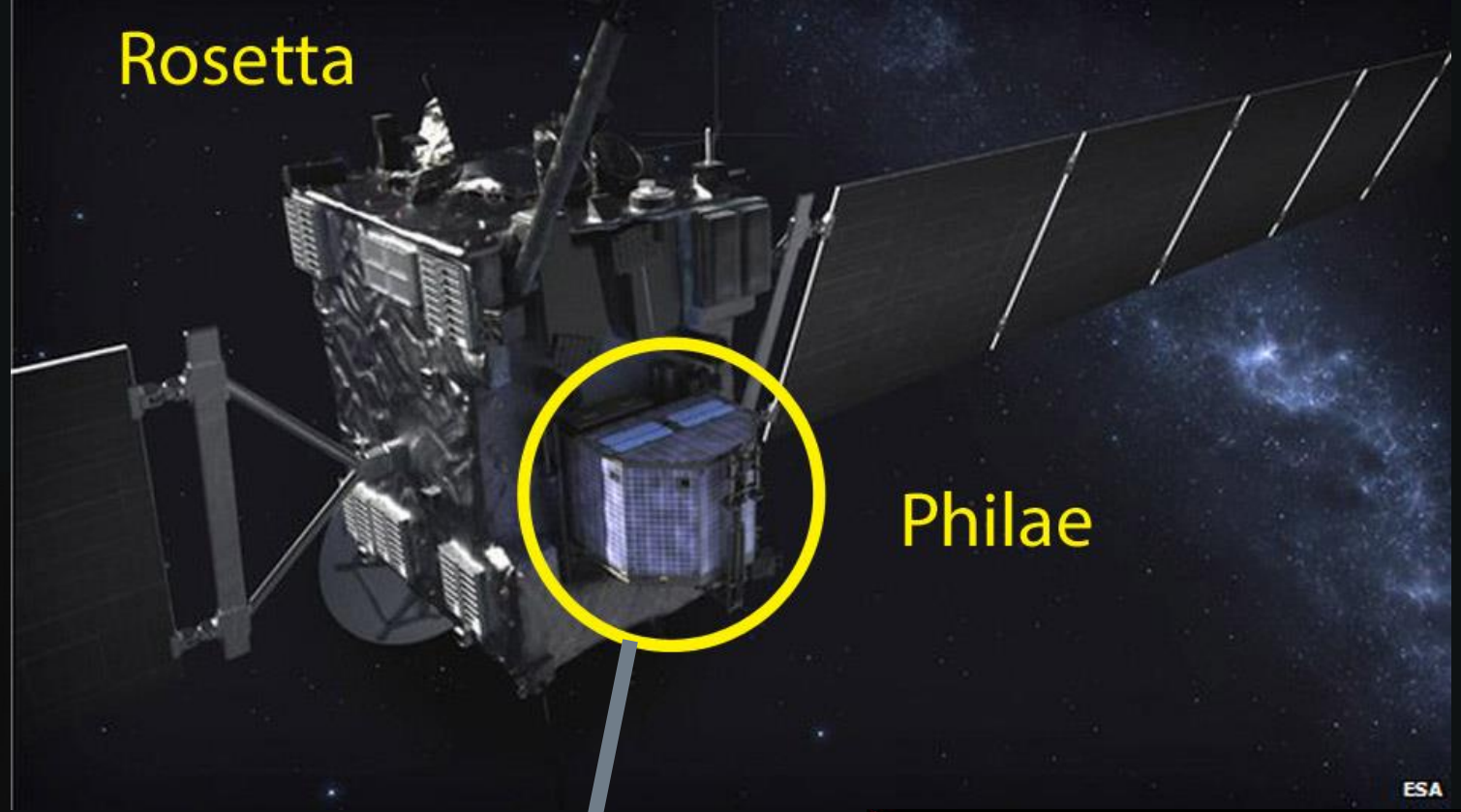
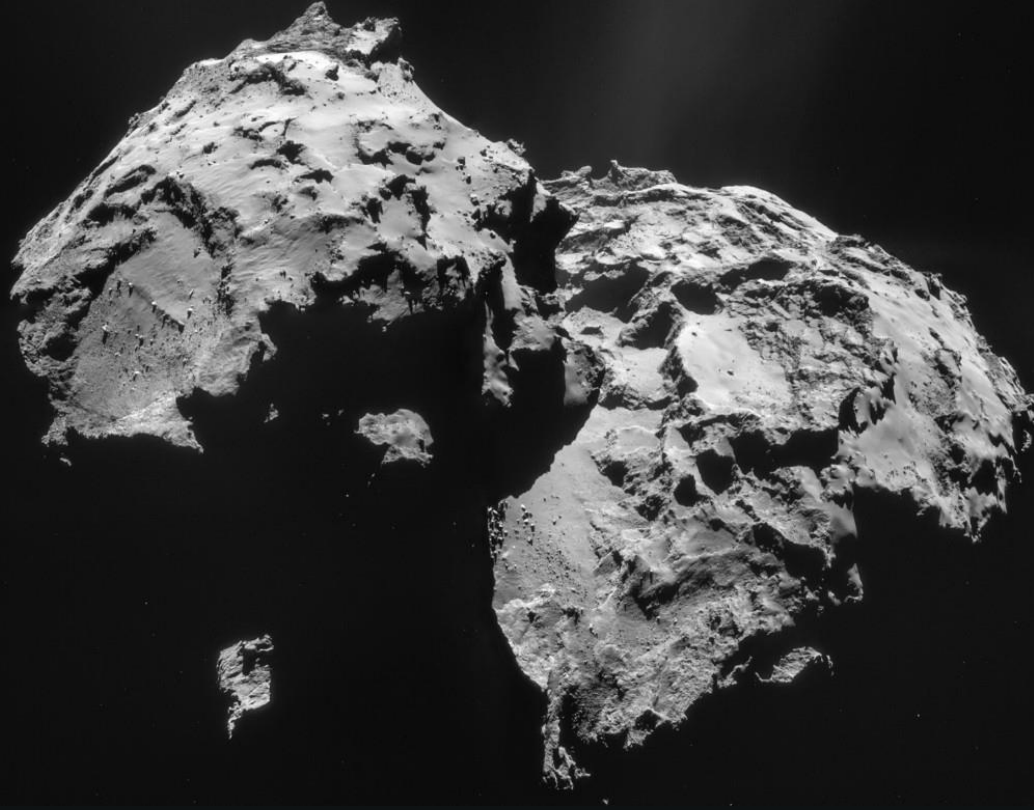
Alan Hale and Thomas Bopp discovered Comet Hale-Bopp separately on July 23, 1995.

Image credit: Philipp Salzgeber



Has anyone smelled a comet before?

Images from ESA





Make and smell a comet...wear gloves, long sleeves and goggles.

- Get a plastic cup and put a plastic bag inside it.
- **In any order you need to add:**
- Two or three spoons of sand (silicates)
- 1/3 cup of water
- A few **drops of** soy sauce (organic) and vinegar (acid)
- Some salt
- Mix them all up with the spoon
- Then Gloria or Jez will add dry ice (solid carbon dioxide) to freeze your comet.
- **Leave it for a few minutes then give the bag a gentle squeeze**
- Finally, pour off excess water into the waste bucket.

Warning!!!

Do not touch the
frozen comet!!!



Once upon a time... #cometlanding



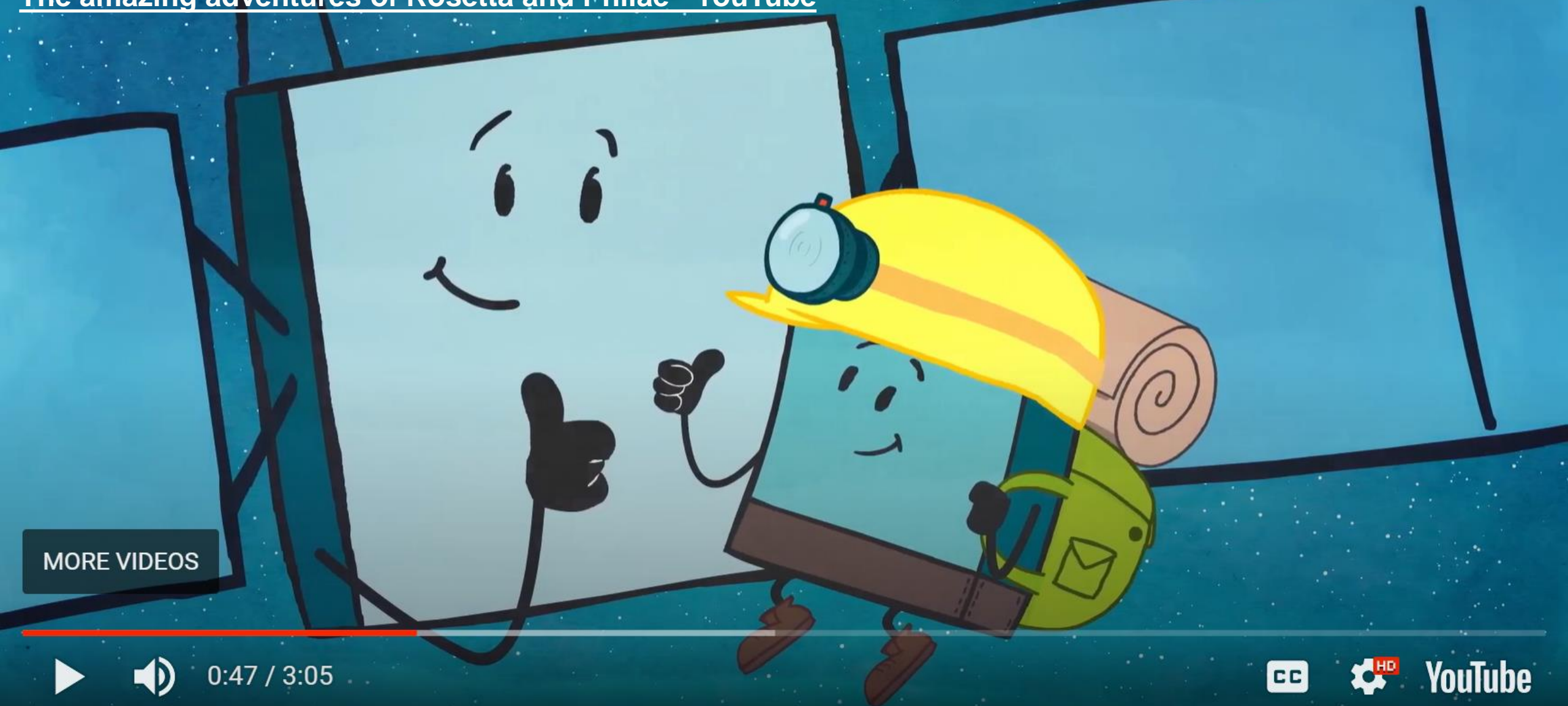
The amazing adventures of Rosetta and Philae

European Space Agency, ESA • 186K views • 7 years ago

24:42

Recommended watching:

[The amazing adventures of Rosetta and Philae - YouTube](#)



MORE VIDEOS



0:47 / 3:05



HD

YouTube



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Discuss the objects and ask questions please.

Image credit: Philipp Salzgeber

