Teacher Guide to Starry Lights Video

With a renewed focus on inquiry, BC’s re-designed Science curriculum provides students with opportunities to ask questions, identify their beliefs and opinions, consider a range of views, work collaboratively, and ultimately make informed conclusions that lead to responsible choices for themselves, their families, and their communities.

Inquiry processes are complex and students, especially younger ones, will need a great deal of guidance and practice. The three videos produced by Simon Fraser University are helpful in framing Inquiry for students of many ages and abilities. Each one is designed to be shared in small “bite-size” portions that offer time for student reflection and application of the ideas presented. The information below is organized to align the structure of the re-designed curriculum (which follows the Scientific Method) with the viewing process suggested by each video.

After some initial exposure to the concepts of Inquiry and Light, begin the short Starry Lights video.

**PAUSE Question # 1 on screen:**

What different parts of the sun do you see?

Encourage students to look closely, to notice fine details.

Scientists often sketch or write about what they see initially, then pick sections of an object/ space to observe more closely.

From this point, the video introduces a lot of vocabulary relevant to the equipment and strategies scientists use to study the sun. Consider pre-teaching some of these terms (e.g. spectroscope, spectrum, emit, particles, elements, etc.)

**Curricular Competencies addressed**

(all taken from Gr 7 science; adjust as needed for your grade, though they are very similar K-9):

- Make observations aimed at identifying their own questions about the natural world
- Observe, measure, and record data
Encourage students to move well beyond, “a rainbow”. Describe and draw in detail the intensity and shades of the colours that appear, the fact that they appear in vertical lines (not a blur or consistent cloud), are there spaces between any lines, etc.

Are there opportunities here to apply skills learned in Art? Science is everywhere!

What about the scale? Why is that relevant? Notice the numbers, the measurement units, nm (nanometers). Describe nanometers. What other things are likely measured in nanometers?

Have students predict why this particular scale might be useful (hint: do we expect all forms of light to have the same spectral pattern as sunlight?)

What mathematical concepts are also relevant here? E.g. “Estimate reasonably” – when we are using nanometers, what do we mean by “reasonably” (as compared for example to measuring larger distances with meters).

Curricular Competencies addressed:

- Observe, measure and record data (qualitative and quantitative), using equipment, including digital technologies, with accuracy and precision.
- Use appropriate SI units and perform simple unit conversions (nm to m; what do we measure with these units?)
It may be helpful to have students draw both spectra in order to compare and contrast the solar and incandescent bulb spectra.

**Curricular Competencies addressed in Q 3 and Q 4**

- Observe, measure, and record data (qualitative and quantitative) using equipment, including digital technologies.
- Experience and interpret
- Seek patterns and connections in data from their own investigations and secondary sources
- Use scientific understandings to identify relationships and draw conclusions

**Curricular Competencies addressed**

- Demonstrate a sustained intellectual curiosity about a scientific topic or problem of personal interest
- Make observations aimed at identifying their own questions about the natural world
- Identify a question to answer or a problem to solve through scientific inquiry
- Transfer and apply learning to new situations
- Generate and introduce new or refined ideas when problem solving
Useful Resources to Support Inquiry around Light and Stars

NASA educational resource website: (covers many topics)

http://nasawavelength.org/

The Sun:

http://nasawavelength.org/resource/nw-000-000-003-222/

http://multiverse.ssl.berkeley.edu/Solar-Week

Atomic spectra:

http://lasp.colorado.edu/home/education/k-12/project-spectra/

http://nasawavelength.org/resource/nw-000-000-002-972/

https://www.mrl.ucsb.edu/sites/default/files/mrl_docs/ret_attachments/curriculum/spectrscopy%20lesson%20plan.pdf

https://phet.colorado.edu/en/simulation/legacy/discharge-lamps

https://phet.colorado.edu/en/contributions/view/3075


Blackbody spectrum:

https://phet.colorado.edu/en/simulation/legacy/blackbody-spectrum

https://phet.colorado.edu/en/contributions/view/4133