



ONLINE
WORKSHOPS

The Science Behind the Earth and Space Toolkit: Astrobiology - Searching for Life

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Online Workshop Follow-Up 3/14/2017

- **Recording of the workshop on nisenet.org**

<http://nisenet.org/catalog/online-workshop-science-behind-earth-and-space-toolkit-astrobiology-searching-life-recorded>

- **Key links shared during the workshop**

1. **Exploring the Universe: Imagining Life** activity page, includes written materials, training & content videos: <http://www.nisenet.org/catalog/exploring-universe-imagining-life>
2. **Exploring the Universe: Ice Orbs** activity, includes written materials, training & content videos: <http://www.nisenet.org/catalog/exploring-universe-ice-orbs>
3. **Exploring the Solar System: Pocket Solar System** activity page, includes written materials, training & content videos: <http://www.nisenet.org/catalog/exploring-solar-system-pocket-solar-system>
4. **TRAPPIST-1 info sheet** to use alongside Exploring the Universe: Imagining Life, and other activities: http://www.nisenet.org/sites/default/files/catalog/uploads/ExSci_Space_ImaginingLife_TRAPPIST1_InfoSheet.pdf

- **Explore Science: Earth & Space 2017 Digital Toolkit links**

Download digital toolkit: <http://www.nisenet.org/earthspacekit-2017>

All toolkit training and content videos: <https://vimeo.com/album/4249834>

- **Follow-up Q&A from workshop presenters**

Q: I have very little background in Science and would like ideas on how to simplify these activities for teaching. Do you recommend any videos I can have students watch?

A: There are lots of good, short videos about astrobiology. Here are two of my favorites:

“What is Astrobiology”? <https://www.youtube.com/watch?v=eJTfcV1ZceE>

“Launchpad: Astrobiology” <https://www.youtube.com/watch?v=H2xaFLROV4k>

Q: What is the process involved in detecting signatures that suggest a potentially habitable world? We see graphs of the results and say it has this and that, but what is the detection process? Same thing for exoplanets, how do we get the sizes, distances and atmosphere

composition? How are they all connected? Is there a good source out there that shows the mathematical process and technology used? – I think you covered this but maybe a bit more is desired

A: A potentially habitable world will have a few properties: it will orbit its star not too close in and not too far out (the size of the orbit is measured by calculating how long it takes the planet to complete one full orbit), it will probably be a rocky planet rather than a gas planet (since creatures need a surface to live on) (a planet's density, inferred from knowing its mass and size, can reveal whether it's rocky), its atmosphere will likely contain compounds such as oxygen, methane, and carbon dioxide (this chemistry can be measured by studying the light from the planet's atmosphere), and its host star will probably be long-lived to give life enough time to develop (a star's lifetime can be estimated based on its mass, which can be measured by observing how planets orbit around it). Here's a good summary page of these concepts: https://www.sfu.ca/colloquium/PDC_Top/astrobiology/discovering-exoplanets/calculating-exoplanet-properties.html

Q: Is Atacama where the telescope is that will search for life signs in 2022?

A: Are you referring to the Thirty Meter Telescope? This revolutionary telescope (with a mirror 30 meters in diameter!) will help astronomers study distant planets. It's slated to be built in Hawaii, but there have been discussions that it might instead be built in the Canary Islands due to tensions with the local native Hawaiian community over its construction.

Q: Is the red tholins, or something else?

A: I'm not aware of red tholins being found on Europa. Here's a NASA website that states that the features are due to magnesium sulfate or sulfuric acid: <https://www.nasa.gov/content/reddish-bands-on-europa>

Q: How does Trappist-1 compare to Jupiter in size?

A: TRAPPIST-1 and Jupiter are very similarly in size; TRAPPIST-1 is slightly larger. Here's an image showing their relative sizes from the European Southern Observatory: <http://cdn.eso.org/images/screen/eso1706d.jpg>



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