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THE  
**CANE  
INSTITUTE**  
FOR  
**ADVANCED  
TECHNOLOGIES**

### Hello ADHUS and FAUHS Students (and Parents)!

The Cane Institute is excited to provide your fourth TCI STEM@Home mailer in collaboration with the FAUHS Owls Imaging Lab! This mailer includes a gateway to the microscopic world with the Carson MicroMini 20x LED Lighted Pocket Microscope with Built-in LED and UV Flashlight! This microscope allows you to see things 20 times closer than with your naked eye. It is super easy to use, and small enough to fit into your pocket! Funding for this mailer came in part from a GoReach Grant through the Education Foundation of Palm Beach County.

Use this microscope to become a scientist! Discover a new world- a world of fine structures, of living things, rocks, and man-made objects. Your understanding of the macroscopic world will change, as you explore the microscopic world and record your observations and make deductions.

#### How it Works:

This edition of the Carson MicroMini 20x pocket microscope comes with a universal smartphone adapter clip. Attach the clip to your smartphone, iPad, or other tablet. Open your built-in camera app to take pictures and record video of your subject. You can then share your content with friends, family, and The Cane Institute on social media, email, and texts. The MicroMini is extremely lightweight, compact, and portable. It contains a built in LED light to use in conjunction with the microscope. In addition, it also has a built-in stand-alone LED and UV flashlight to illuminate your subject matter. **Be reminded that the UV products are not designed to be used on the skin, the eyes, and any part of the body. Inappropriate and improper use of UV products could be dangerous and harmful.**



Use the Carson MicroMini pocket microscope to examine fabrics, hair follicles, currency (both paper and coins), plants parts such as seeds, flowers, fruit, and leaves, and so much more! Try the UV light to see security features on paper currency and nectar guides on flowers (bees and other insects see in the UV range of the electromagnetic spectrum)!

#### Social Media Challenge:

As part of this TCI STEM@Home mailer there will be seven monthly microscope challenges. For each challenge, take microscopic pictures of *at least* three different specimens within the challenge category. Do your best to identify the specimens and upload your data and photos to this Google Form (<https://bit.ly/3igYUfg>). Challenges close at 11:59pm on the last day of each month.

Once per month the Owls Imaging Lab (OILab) will choose a specimen from the monthly collection of your student photos and take images of your specimen in the OILab using our specialized electron scanning microscope! We might even highlight your images in our "What is it Wednesday" weekly post! Follow the OILab in Instagram and Twitter @fauhs\_research and keep an eye out for your images! Prizes will be awarded if your image is chosen!!!

## RESEARCH CONNECTION

### Microscopy in the K-12 Classroom

Microscopy can be used to enhance student learning and engagement in STEM both in and beyond the classroom. Here are a few sources on microscopy in in the K-12 classroom.

Denaro, F., Gabriel, M., Noe, A., & Nyaga, S. (2018). Developing Tools for STEM Education: The Foldscope, a Very Inexpensive Monocular Microscope for Biological Research. *Microscopy and Microanalysis*, 24(S1), 1374-1375.

Dickerson, J., & Kubasko, D. (2007). Digital microscopes: Enhancing collaboration and engagement in science classrooms with information technologies. *Contemporary Issues in Technology and Teacher Education*, 7(4).

Grier, Z., Soddu, M., Kenyatta, N., Odame, S., Sanders, J., Wright, L., & Anselmi, F. (2018). A low-cost do-it-yourself microscope kit for hands-on science education. *Optics Education & Outreach*. 10741.

Kim, H., Gerber, L., Chiu, D., Lee, S., Cira, N. (2016). Accessible Interactive Smartphone Microscopy for Life Science Education. *PLOS ONE*, 11(12).

Prakash, M. (2018). Every Child in the World Should Carry a Microscope in Their Pocket. *Microscopy and Microanalysis*, 24(S1), 2356-2357.

Wicks, L., Cairns, G., Melnyk, J., Bryce, S., Duncan, R., & Dalgamo, P. (2018). EnLightenment: High resolution smartphone microscopy as an educational and public engagement platform. *Wellcome Open Research*, 2.

### Monthly Challenge Categories:

October 31	School Supplies
November 30	Fabrics and textiles
December 31	Seeds and Fruit
January 31	Flower parts
February 28	Vegetables, Mushrooms, Lichens
March 31	Insect Parts
April 30	Rocks, dirt, sand, shells
May 31	Choose your own adventure! Ask a research question and answer it with a microscope photo

Please use the attached data sheet to help you on your scientific quest to collect data while you are using your microscope. Remember, scientists take a lot of notes about their observations! Please use the Google form (<https://bit.ly/3igYUfg>) to share your microscope photos with TCI and the OILab at ADHUS/FAUHS.

When saving your images and videos, please use the file format below: **LastNameFirstnameGrade\_identification of object**.  
ex: CoyleJasmine3rd\_dancing lady orchid flower petal

If you do not know the name of the organism you have photographed, try using [www.iNaturalist.org](http://www.iNaturalist.org). Upload a picture to the app and they use AI to identify plants and animals down to the species level!

We look forward to your photos! We will host the “World’s Smallest Digital Nature Photography Art Exhibit” in May to highlight the best student microscope photos! This will be a virtual event that will highlight the diversity of organisms and objects found at home in our backyards!

Remember to share your photos on social media and tag @FAUCanelInstitute on Facebook or Twitter. Follow the OILab in Instagram and Twitter @fauhs\_research and keep an eye out for your images! Prizes will be awarded if your image is chosen!!!