



## Classroom Teacher Preparation

### Anatomy/Physiology 21: Hair Identification

Please use the following to prepare for the next SfS lesson.

#### Description:

This module teaches methods for analyzing different hair samples. It begins by discussing what hair is and why it is important in nature and in forensics. Students are taught the difference between different mammal hair samples based on microscopic differences. They will then examine cards with microscopic images of unknown hairs and identify them by comparing to a guide.

**\*This lesson will incorporate compound light microscopes when available. SfS may be able to supply up to 3 microscopes but please contact your SfS instructor if you can provide more for student use.**

#### Lesson Objectives – SWBAT (“Students Will Be Able To...”):

3<sup>rd</sup>-8<sup>th</sup>

- Identify the functions of hair
- Understand that a hair shaft is made of a cuticle, cortex, and medulla
- Use microscopic images to identify features of hair from different mammals

#### Disciplinary Core Idea (DCI)

LS1 From Molecules to Organisms: Structures and Processes – LS1.A Structure and Function

- (3<sup>rd</sup>-5<sup>th</sup>) Organisms have both internal and external macroscopic structures that allow for growth, survival, behavior, and reproduction.
- (6<sup>th</sup>-8<sup>th</sup>) All living things are made up of cells. In organisms, cells work together to form tissues and organs that are specialized for particular body functions.

#### Science & Engineering Practice (SEP)

Analyzing and Interpreting Data

#### Preparation:

There are no prerequisite modules for this lesson but it will be helpful if students have a basic understanding of how to use a compound light microscope.

#### Room Set Up for Activities:

Students will be working in pairs. Students can sit at desks or on the floor for the main activity.

If microscopes are available to use, then the microscopes can be set up off to the sides of the room for students to examine actual hair slides. Microscopes often need to be plugged into an electrical outlet so sturdy tables should be arranged to accommodate the microscopes; please contact your instructor if you need extension cords or power strips.

#### Safety:

There are no safety concerns for this lesson.



## Related Modules:

This lesson may be taught as part of a sequence or group of related modules on **Forensics**. Modules include but are not limited to:

*Chemistry 2: Chemical Identification* - Students investigate the physical and chemical properties of six similar-looking—but chemically different—substances, and use these observations to attempt to identify the substances

*Anatomy/Physiology 3: DNA Extraction* – Students extract DNA from a plant sample (strawberries or bananas).

*Anatomy/Physiology 22: Fingerprinting* - Students learn about fingerprints and then experiment with fingerprint inking, analysis, dusting, and lifting.

For other module sequences and groups, look here: [www.sciencefromscientists.org/sequences](http://www.sciencefromscientists.org/sequences)

## Standards Covered:

Please click the following link to our website to review the standards covered by this lesson, listed by state:

<http://www.sciencefromscientists.org/standards/>

Lessons are matched to both national NGSS and local state standards.

## After Our Visit:

*Extend this lesson by making and analyzing your own hair microscope slides.*

Access this Extension activity by visiting the Classroom Post found on our website at [sciencefromscientists.org/cohorts](http://sciencefromscientists.org/cohorts). Use the name of your school/cohort and password to log in.

To help Evaluate, check out our Open Response questions online at [sciencefromscientists.org/open-response-questions](http://sciencefromscientists.org/open-response-questions). They are freely available for all of our lessons for current teachers. Use the password supplied by your instructor to log in.

## Additional Resources:

- Detailed report on how the FBI analyzes hair and hair differences among human hair samples: <https://www.fbi.gov/about-us/lab/forensic-science-communications/fsc/july2000/deedric1.htm>
- Microscopic images of hair from many species: [http://bsapp.com/forensics\\_illustrated/forensic\\_text\\_adobe/text\\_unit\\_5\\_hair\\_fiber.pdf](http://bsapp.com/forensics_illustrated/forensic_text_adobe/text_unit_5_hair_fiber.pdf)
- How to use a compound microscope: <http://www2.mrc-lmb.cam.ac.uk/microscopes4schools/microscopes2.php>
- Hair functions in animals: [http://animaldiversity.org/collections/mammal\\_anatomy/hair/](http://animaldiversity.org/collections/mammal_anatomy/hair/)