

Domains & Kingdoms: Taxonomy of Cells/Cell Taxonomy: Tissue Observation/Grouping

Taxonomy of Cells: Students observe slides from Plant, Animal, Fungus, Protist, and Bacteria and use that knowledge of the characteristics of these organisms to determine the identity of an unknown slide. This is for advanced students and take more than one 50 minute class period.

Tissue/Cell Observation: Students observe unknown slides labeled A-E and try to determine from what type of organism the slides were made. This usually takes one class period, depending of if students are familiar with microscopes. This is usually for advanced students – merit middle school or high school students who have studied Domains, Kingdoms, and cell structure.

How Scientists Group Things: Students review cell structure and how scientists group things, then are given known slides of two types of organisms to determine the likenesses and differences. This is capped by sharing what they found and by the instructor sharing pictures taken from the slides used as well as discussing the main differences and likenesses between the groups. Mostly for middle school students learning about classification.

Alignment: Diversity of Life I & 2: Classifying life, Domains & Kingdoms (7).
Taxonomy & Classification (9).

Supplies needed for this activity:

- Ideally, 1 compound microscope for each group of 2 students
- Prepared slides representing the following:
 - Mixed bacteria
 - Plant tissue
 - Animal tissue
 - Fungal tissue
 - Protists
- Optional: Prepared or fresh, wet mount slides of each group
- Student hand-outs
- Ideally, a compound microscope attached to a projector or similar for sharing at the conclusion of the lab or pictures taken from the slides used.

Directions:

For the Domains & Kingdoms: Taxonomy of Cells: Give each group of students or each student a freshly prepared slide of live tissue or a purchased prepared slide of tissue with the label hidden. This is the “unknown” or “mystery slide”.

Provide prepared or fresh slides of known representatives of the Domain Eukarya, Kingdoms Plantae, Animalia, Protista, and Fungi, as well as from Domain Bacteria. Students are asked to examine the known slides, determine the visible characteristics of the various types of organisms, compare and contrast what they see, and determine what type of organism was the source of their unknown. They should give evidence for their conclusion(s).

This exercise should be modified to fit the level of the students with which it is used. Tailor the handout to focus on specific learning goals. You may want to tell students what magnification to use for their drawings and specifically what organelles or structures to label. For older students, it may be more challenging to ask them to determine what magnification allows them to see pertinent details and what organelles or structures are present in the specimens for labeling. This is a starting point that works best when customized for your class.

At the beginning of the exercise, it would be a good idea to refresh students' memories about the different cell types, Domains, and/or Kingdoms. This can be done through guiding questioning or by splitting students into groups and asking them to create something (a poster?) outlining the major characteristics of a particular cell type, Kingdom, or Domain. A pre-lab assignment asking the students to research this and remind themselves of what they know would be a good way to make sure they come into class ready to proceed with the review and then the exercise.

We have done this by placing posters labeled, Plants, Animals, Fungi, Protists, or Bacteria around the room. At the beginning of class, students circulate and write down what they know about these groups and how they would use a microscope to tell tissues/cells apart in these groups.

For Tissue/Cell Observation: Students observe two slides. Slides are labeled A-E, covering the original label of the slide. Their job is to try to observe the characteristics of the cells and tissues that allow them to determine if the cells/tissues belong to a plant, animal, fungus, protist, or bacterium. If using the poster approach at the beginning of class, student then post their slide's letter on the appropriate poster. For instance, if they think A is a Fungus, they would write the letter A on the Fungus poster. At the end of class, the instructor brings the students back together to process what they've learned by going through the posters and/or having students share what they observed. Pictures taken from the slides used can be displayed and shared to show the important characteristics.

For How Scientists Group Things: Students share what they know about the different groups of organisms and cell structure.