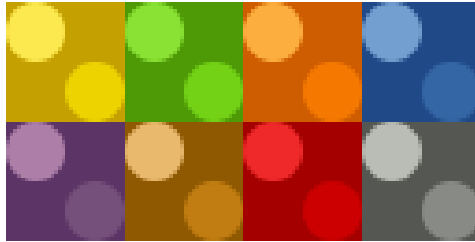# PATTERNS, ORGANIZATION, and CLASSIFICATION

Image by Wgabrie

Classification depends upon *pattern recognition.* This is an important concept between all scientific disciplines. The identification of similar characteristics, and grouping similar specimens into categories, are essential organizational skills that form the basis of classification in all scientific endeavors.

YOUR TASK: Each group needs a set of mixed "fastenetios"— various devices that hold pieces of paper together. As a team, divide and group your fastenetio specimens into categories. Be sure to thoroughly investigate each specimen as you determine your categories, and identify the similar traits that link all items in one category.

1. In the space below, describe the number of categories you need to effectively organize your fastenetios. You should sketch one example of each category.

2. Justify why each category is important, and distinct from the other fastenetio categories. A table is provided on the back of this page.

3. Each group will present its classification scheme to the class, and justify the number of categories and their discriminating characteristics. Be prepared to defend why *your* group's classification scheme is the best in the class for fastenetios!

Number/Explanation of Categories:

Category Name	Category Characteristics	Category Justification

PATTERNS, ORGANIZATION, and CLASSIFICATION, *Part II*

Return to your group and reflect upon your original categorization of fastenetios.

GROUP DISCUSSION*:* Reflect how your categorization of fastenetios is similar to Linnaeus' classification of organisms. Could your classification *represent* the organization of fastenetios into different species?

Comparison of your fastenetio categorization to Linnaeus' classification:

Organizational potential of your fastenetios as SPECIES of organisms:

YOUR NEXT TASK: Return to your fastenetio categories and determine higher levels of organization. You should first determine whether your fastenetios represent the remains of an organism, or the disarticulated remains of an organism—or several larger organisms.

Fastenetios Representation (single organisms, disarticulated parts)

Group your species into higher taxonomic ranks (i.e., order, family, genus,). Make a short list of the characters that you used to classify fastenetios into species. Then, make a list of characters that typify species within each genus, genera within each family, and families within each order (if your group determines that the fastenetios have orders). The following diagram illustrates what you are trying to accomplish.

species 1
species 2
genus 1
species 3
species 4
genus 2
family 1
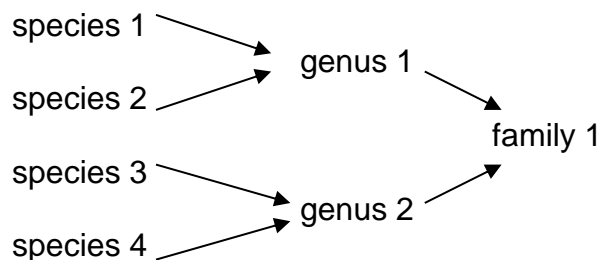
Construct a cladogram that illustrates the shared characteristics among your fastenetio categories. Your group must determine which characteristics are primitive (plesiomorphic) and which are advanced or derived (apomorphic). For example, a primitive character might be that all fastenetios exhibit one interior coil. An advanced character might be the material (composition) of which the fastenetio was constructed.

FINAL GROUP PROJECT: Summarize your classification scheme into a presentation booklet that includes your species' descriptions and sketches, the taxonomic heirachy, and the cladogram.

OPTIONAL EXTENSION: Groups will exchange presentation booklets and bags of fastenetios, and organize the specimens/reconstruct the hierarchy based on the information provided in the presentation booklet.

PATTERNS, ORGANIZATION, and CLASSIFICATION, *Extension*

Image courtesy of Jerzy Strzelecki

LIFE SCIENCE EXTENSION: Return to the cladogram and construct an explanation as to how natural selection may have influenced the acquisition of the advanced characteristics within the fastenetio population. Construct an argument that details how climate changes, geographic barriers, and/or other changes in the ecosystem may have led to these changes.

Image courtesy of Coro from the California Academy of Science

EARTH SCIENCE EXTENSION: Return to the cladogram and hypothesize what potential *geoscience* factors (such as rising ocean level, changes in atmospheric carbon dioxide, volcanic eruptions) may have been responsible for the biological evolution of the fastenetios over time. In your essay, consider whether your primitive characters correspond to a different time in Earth's history.