

THE KEY TO CLASSIFICATION



Develop a classification system based on observed structural characteristics

Materials

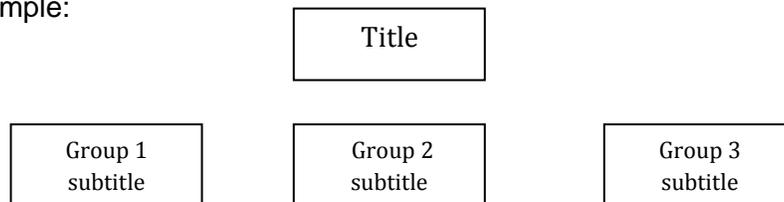
Sets of pictures with multiple examples for each Kingdom (1 set/team of 4 students)
Copies of the Podette Family and Key
Paper for shoe rubbings (11x14)
Crayons

Part A: Grouping by Patterns

Procedure:

1. Divide students into teams of 4 to complete a concept development activity that introduces the concept of classification. Have teams look at pictures of living organisms and group them in any way they choose. Students should derive names for their groups (formal names are not required). Additionally, they should derive an overall title for all of the subgroups. The number of groups is determined by the students. Any answer should be considered correct in this first step.

Example:



2. Next, have a spokesperson from each team share the groupings with the class.
3. Once all groupings are shared, have teams look at their pictures again and regroup with the concept of "Animal Kingdoms." Have student teams sort animals into the 6 different kingdoms.
4. Get students to look for patterns that justify the groupings and share some of the obvious patterns.
5. Introduce the idea of creating a key for classifying animals based on observed structural differences and similarities.

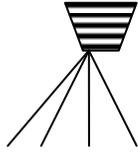
Part B: Developing a Key

Procedure:

1. Model for the class the steps for setting up a key by working through the examples of Podettes provided. Hints for setting up a key:
 - ❑ Pull out any unique examples that are different from the group as the key progresses.
 - ❑ Always set up statements in pairs—leaving at least one of the pairs with the instructions to go to the next step until the very end when the last name is given.
 - ❑ Derive names that describe the patterns observed.
2. Once the students have worked through the key to identify the Podettes, have each student make a rubbing of the bottom of his/her shoe on a sheet of 11 x 14 inch paper using a crayon. These rubbings represent models of an imaginary organism (they look very much like Protists).
3. Divide the class into groups of 6-8 students. These groups will work as a team to develop a classification key of their rubbings that represent organisms in the same family.
4. The student teams will derive a classification key for their examples by following the model of the Podette Family. Once their keys are complete, they will trade stations with another team and work through the examples and key developed by the other team to verify the correctness of the keys in identifying unknowns.
5. Have students share with the class the identifications they have derived from the keys developed by the other teams.



Name the members of the Podette Family using the key below.



a. _____



b. _____



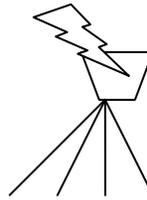
c. _____



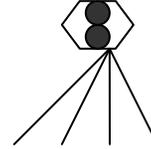
d. _____



e. _____



f. _____



g. _____

Start with the following plan as a model. (Students should derive their own plans for classification of the rubbings. The example is for guided practice.)

1A Has one leg and a large hole in the surface.....**Holapoda**

1B Does not have one leg.....Go to 2A

2A Has multiple legs and a checked body.....**Nascarpoda**

2B Has multiple legs and no checks.....Go to 3A

3A Surface has small white dots in one area.....Go to 4A

3B Surface does not have any small white dots.....Go to 5A

(note that an individual is not named in step 3)

4A Has 3 legs and surface with dots and dashes.....**Codatripoda**

4B Has 3 legs and surface has dots and lines..... **Dottitripoda**

5A Has 4 legs and 2 circles on surface.....**Googletetrapoda**

5B Surface is not as described in 5A.....Go to 6A

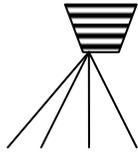
6A Has 4 legs and surface has lines.....**Linustetrapoda**

6B Has 4 legs and surface produces light flashes....**Flashatetrapoda**

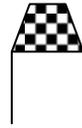
(The key continues to pull out examples until the last example is named.)

TEACHER ANSWER KEY

Name the members of the Podette Family using the key below.



a. **Linustetrapoda**



b. **Nascarpoda**



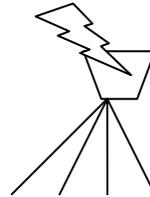
c. **Codatripoda**



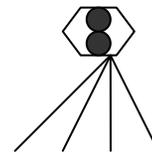
d. **Holapoda**



e. **Dottitripoda**



f. **Flashatetrapoda**



g. **Googletetrapoda**

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6A Has 4 legs and surface has lines.....**Linustetrapoda**

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Gymnosperm Key

| | |
|--|-----------------------------------|
| 1a. Leaves fan shaped..... | Ginkgo |
| 1b. Leaves not fan shaped..... | 2 |
| 2a. Leaves flat and scale-like..... | Juniper |
| 2b. Leaves needle-like..... | 3 |
| 3a. Needles are single..... | 4 |
| 3b. Needles are in bundles held by a fascicle..... | 6 |
| 4a. Needles are square (feel edges when rolled between fingers)..... | Spruce |
| 4b. Needles are flat..... | 5 |
| 5a. Needles are waxy with strong fragrance..... | Fir |
| 5b. Needles are flat and soft..... | Yew |
| 6a. Needles are in bundles of 5..... | White Pine |
| 6b. Needles are in bundles less than 5..... | 7 |
| 7a. Needles are in bundles of 3..... | Yellow Pine |
| 7b. Needles are in bundles of 2..... | 8 |
| 8a. Needles are less than 5 cm in length..... | Black Pine (Pinyon) |
| 8b. Needles are greater than 5 cm in length..... | Black Pine (Austrian or Japanese) |

WILDFLOWER KEY



- 1a. Square stem, opposite leaves.....see 2.
- 1b. Does not have both square stems and opposite leaves...see 3.

- 2a. Irregular shaped flowers..... *Lamiaceae* (mint family)
- 2b. Gingerbread boy-shaped flowers..... *Verbenaceae*
(verbena family)

- 3a. Plant has cactus-like characteristics.....see 4.
- 3b. Plant is not cactus-like.....see 5.

- 4a. Plant has spines; leaves are not sword-shaped..... *Cactaceae*
- 4b. Plant has sword-shaped leaves and flowers in spikes.....
..... *Agavaceae*

- 5a. Petals in multiples of 3.....see 6.
- 5b. Petals in multiples of 4 , 5 or more.....see 8.

- 6a. Three petals..... *Commelinaceae*
- 6b. 6 petals.....see 7.

- 7a. Flowers look like a tulip or a lily..... *Liliaceae*
(lily family)
- 7b. Flowers look like a daffodil..... *Amaryllidaceae*

- 8a. 4 petals, 8 stamen, and 4-lobed stigma..... *Onagraceae*
(buttercup family)
- 8b. Does not have 8 stamen.....see 9.

- 9a. 4 petals with fruit up and down a stem..... *Brassicaceae*
(mustard family)
- 9b. Does not have fruit as described above.....see 10.

- 10a. Regular looking flower.....see 11.
- 10b. Irregular looking flower.....see 20.

- 11a. 5 petals fused together (some at base only).....see 12.
- 11b. Does not have 5 fused petals on a single flower.....see 17.

- 12a. Showy stamen and a star sometimes obvious.....*Solanaceae*
(nightshade family)
- 12b. Does not have showy stamen.....see 13.
- 13a. Funnel-shaped flower.....*Convolvulaceae*
(morning glory family)
- 13b. Not as described above.....see 14.
- 14a. 5 petals with a stamen tree in the middle.....*Malvaceae*
(mallow family---hibiscus, okra, cotton)
- 14b. 5 petals, base of the flower is a tube.....see 15.
- 15a. Fruit coils like a scorpion.....*Boraginaceae*
- 15b. Fruit is not coiled like a scorpion.....see 16.
- 16a. Tube becomes 5 distinct petals, no vine.....*Polemoniaceae*
- 16b. Plant is a vine with a gourd-type fruit.....*Cucurbitaceae*
(gourd family)
- 17a. 5 single petals, bird beak fruit, palmately veined leaves.....
.....*Geraniaceae*
- 17b. Not as described above.....see 18.
- 18a. 5 petals with many stamen; herb, tree, or shrub.....*Rosaceae*
- 18b. Not a rose.....see 19.
- 19a. Flower appears to have many petals like a sunflower or
dandelion, and petals are lobed.....*Compositae*
- 19b. Flower is yellow with many petals, fruit is red berry, leaves are
holly-like*Berberidaceae*
- 20a. Flower looks like a seed head, plant looks like grass...*Graminea*
- 20b. Plant does not look like grass.....see 21.
- 21a. Flower is irregular or pom-pom shape, leaves are bipinnately
compound, compound, or singular, fruit is a bean.....
.....*Fabaceae* (legume family)
- 21b. Irregular yellow flowers have 4 petals; the uppermost petal is
the longest; leaves are alternate and divided..... *Fumaceae*