

Keys and Classifying

Science
Standard

V

Objective

3

Connections

Standard V:

Students will understand the physical characteristics of Utah's wetlands, forests, and deserts and identify common organisms for each environment.

Objective 3:

Use a simple scheme to classify Utah plants and animals.

Intended Learning Outcomes:

1. Use science process and thinking skills
4. Communicate effectively using science language and reasoning

Content Connections:

Science V-3; Creating a classification key

Background Information

Classification is the scientific process of organizing organisms into logical groups. Students need to know that they can discover the identity of any organism by following classification schemes. These schemes focus on similarities and differences. Students need lots of experience classifying anything and everything. By providing lots of exposure in various ways you provide more opportunities to succeed. This activity is more beneficial if taught multiple times using various objects for classification.

Research Basis

Wolfe, P. (2001). Brain matters: translating research into classroom practice. *Association for Supervision and Curriculum Development*, Alexandria, VA.

Writing should be combined with other learning activities to provide different cognitive experiences. Having students write their results or procedures extends the scientific thinking, because writing is a more complex skill.

Marzano, R.J., Pickering, D.J., Pollock, J.E. (2001). Classroom instruction that works: Research-based strategies for increasing student achievement. *Association for Supervision and Curriculum Development*, Alexandria, VA.

Comparing, classifying, and identifying similarities and differences are effective instructional methods that encourage scientific thinking.

Invitation to Learn

Invite students to pretend that it's 2030 and we know aliens exist. Explain that 3 alien ships were fighting and they shot each other down. The remnants of the ship are in the desert and need to be cleaned up. The officers want to bury the bodies of the aliens with their ship,

but the aliens are scattered all over the place. The officials need your help to determine which aliens went with which ship. Pass out the *Alien Cards* and *Alien Organizer* to each group. Ask groups to cut out the pictures and put them in the column with the ship they traveled in. *The idea is for students to group aliens with the similar symbol into the ship with the same symbol.* After allowing time for groups to work, have them share their findings with another group and defend why they did it that way. Discuss how students determined the ship to put each alien.

Instructional Procedures

1. Have students get out their science journals. Explain that they are going to do a Quick-Write. The purpose is for students to write for 2 minutes about classification, to get them thinking about the topic, drawing out any prior knowledge. Tell the students that you want them to write the whole time because sometimes we get more ideas as we write our current ideas down. Sometimes this means they will be writing about other things, but encourage them to keep it as close as they can to classification. This might take practice to keep them writing for 2 minutes (use writing time or do it every day before some lessons).
2. Explain that students are going to be learning about classification today.
3. Define classification as grouping objects according to similar characteristics. The purpose of classification is to provide a way to look at similar objects but know which is which through classification.
4. Model classification by taking a group of objects and sorting them.
 - Talk as you sort so students can hear your thinking.
 - Point out characteristics and similarities.
 - Name each group using the characteristics (make sure it relates to why those objects are in that group).
 - Defend the reason for making those groups.
5. Show students the other groups of objects and explain that they now have the chance to sort/group objects. Put the objects around the room and allow students to decide where they would like to work.

Materials

- Alien Cards*
- Alien Organizer*
- Sorting objects
- Students journals



6. Explain that groups need to discuss and decide how to sort the objects. Then determine a name for each group of objects based on the characteristic for that group.
7. Allow groups time to work while you monitor and listen to their thinking. Make sure students are talking to each other. Ask questions where needed.
8. After sorting, ask groups to create a chart that shows the objects in each group and has a written defense for placing those objects together.
9. After all groups are completed, have a spokesman from each group travel to the other groups to share what they did. The spokesman moves in a clockwise motion and spends about 30 seconds at each group.
10. Model how to single out each object. If the group has more than one object, then they need to single each object by a difference. Show how each object is in the same group but a little different. Then give each object a name.
11. Allow each group time to single out and name each object.
12. Show students a classification key and explain that scientists use it to identify objects. Model how a classification key works. Show students how to read the characteristic and then look at the object to determine if it fits the characteristic. Then follow the directions on the key.
13. Model how to write a classification key for your objects. Make sure to focus on characteristics (if an object is round go to 2a, etc.).
14. Have groups create a classification key for their objects. Provide assistance and support as needed.

Assessment Suggestions

- Written assessment: Students must describe their groups and defend their reasons for making those groups.
- Performance and written assessment (can be done individually or as a group): Provide students with a new collection of objects, have them group them and create a classification key. (See rubric.)
- Use the Quick Write as a pre-assessment. At the end, ask students to answer the question again to see if understanding has changed, improved, deepened, etc.

- Have students create a classification key and then pass it on to a neighbor. The neighbor must use the classification key to identify the objects. To go even further, the neighbor could provide feedback on whether the key was helpful or if more work needed to be done.

Curriculum Extensions/Adaptations/ Integration

- Provide a center for students who finish early to continue with the same activities by grouping new objects and creating classification keys. They must have someone use their key successfully.
- For early finishers provide a classification key and an object. Students must identify their object using the key.
- If students are struggling, make sure they continue to work with a student who knows how to create the key successfully.
- If students are having trouble spelling or writing, allow them to record the instructions or script them to another person.
- Sort words by homophones, prefixes, suffixes, plurals, etc. Students group the words and identify similar characteristics.
- Show a group of numbers and have students sort them based on mathematical characteristics (try to avoid the shape or size of numbers). e.g. (2, 4, 5, 9, 12, 13, 20. 2, 4, 12, and 20) would be in the even group. (5 and 13) would be in the prime number group. (9) would be in the square number group. Students could also sort different types of fractions by congruency, less than $\frac{1}{2}$ or larger than $\frac{1}{2}$, etc.
- Give students different triangles to sort by angles, types, or sizes.
- After reading a story with lots of characters, have the students group the characters together.
- Group books/stories by genre, plot, setting, theme, etc.

Family Connections

- Ask students to classify something from their home. Pass out *Home Classification Sheet* to complete as they classify.
- Have students teach the alien classification activity to someone else in the family. A family member sorts the aliens, the

student write about what the family member did, and the family member signs off.

- Assign students to write a paragraph explaining what classification is and how to create a classification key.
- Students create a classification key using objects at home and share the key with a fellow student the next day at school.

Additional Resources

Books

Linking Science and Literacy in the K-8 Classroom, NSTA

Web sites

http://www.sciencenetlinks.com/lessons_printable.cfm?DocID=87

Lessons on classification and a great online classifying activity (Touch of Class E-Sheet)

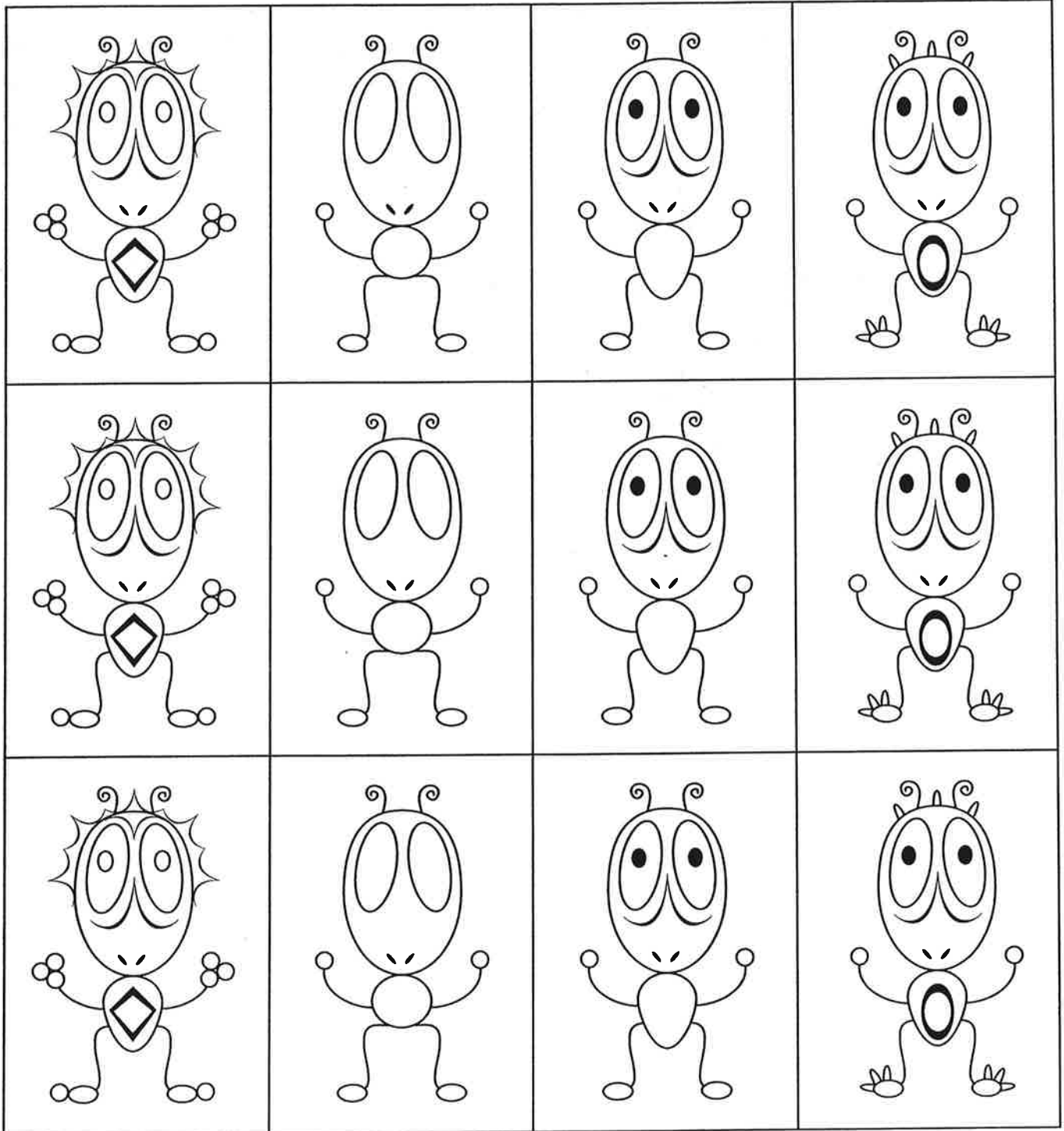
http://www.microbeworld.org/resources/experiment/experiment_creepy_critters.aspx

Fun classifying alien activity




<http://www.sciencelinks.com>

National Science Teachers Association, www.nsta.org

Alien Cards



Alien Organizer

Ship #1 	Ship #2 	Ship #3 

Rubric for Classification Key

	1	2	3	4
Format	The key has no format. Characteristics are unclear and reader has no idea how to follow the key.	The key has some format and the reader can read and follow parts of it. The characteristics are unclear.	The key is mostly formatted correctly. The characteristics are clear and the reader can mostly follow the key.	The key follows the correct format, with each characteristic clearly labeled. Directions tell reader exactly where to go.
Use	The key was difficult to use and confusing.	Parts of the key were confusing and difficult.	Most of the key was easy to use, but some parts were still confusing to use.	The key is easy to use and very self-explanatory.
Neatness	The information is disorganized and messy. Conventions are missing.	Parts of the information are disorganized without any conventions. Parts are neat.	Most of the information is neat with mostly correct conventions.	All information is neat and conventions are correct.

Name _____ Date _____

Home Classification

1.	Find at least 10 different objects that you can group. Write those items here.
2.	Now group those items. Then draw the groups and give them a title.
3.	Include a written description of the characteristics of each group.