

It's in the Cards

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Introduction to the Periodic Table

Have you ever tried to find a specific song on iTunes® and you cannot remember the exact title? The songs are arranged, or classified, according to the following scheme: new releases, top ten releases, and genre (rap, country, jazz, rock, or classical). All the songs in a particular section have something in common and are arranged by some pattern, whether it is alphabetically by song title, or by artist, or numerically by trending statistics. When you go to a different section, the alphabetical arrangement is repeated along with the trending statistics.

In this activity, you will arrange a set of 18 out of 20 cards in rows and columns that will display certain patterns and trends, and then predict the missing two cards. You will organize the cards in a manner that simulates the “chemical solitaire” that led Mendeleev to devise his Periodic Table of the Elements, which is the basis of the periodic table we use today.

ABOUT THIS LESSON

In this lesson, students will be given a set of cards that contain certain patterns. Students will attempt to put the cards into some logical order. They will be to explain their reasoning to their classmates and to construct four rules that govern the arrangement of the cards. Working in small groups, the students are then asked to predict the two missing cards.

PURPOSE

In this activity, you will be provided 18 cards to arrange into rows and columns. You will formulate four rules, and then apply those rules to predict two missing cards.

This organization of the elements into a logical table is one of the great achievements in the history of science. However, the genius of Mendeleev was that he recognized that just as in the card game Solitaire where some of the cards are hidden, so too some of the elements were hidden or undiscovered. Mendeleev left spaces for elements that he predicted should exist but had not yet been discovered.

MATERIALS AND RESOURCES

EACH GROUP

cards, colored pattern

OBJECTIVES

Students will:

- Arrange the cards in an order that is logical and systematic
- Formulate four rules that govern the arrangement of the cards
- Predict the missing two cards

LEVEL

Middle Grades: Chemistry

PROCEDURE

1. Each group will be given an envelope that contains 18 cards. Do not look at the cards until instructed to do so.

When directed by your teacher, remove six cards at random and place them on the lab table in a logical order. Make observations and describe the patterns you used to organize the six cards on your student answer page.

2. When directed by your teacher, remove six more cards at random from the envelope and combine them with the previous six cards on the lab table in a logical order.

Describe the patterns you used to organize the cards in vertical columns and horizontal rows on your student answer page. If a card appears to be missing, leave a space for it.

3. When directed by your teacher, remove the remaining cards from the envelope and combine them with the previous 12 cards on the lab table in a logical order.

Describe the patterns you used to organize the cards in vertical columns and horizontal rows on your student answer page. Your final arrangement should include space for two missing cards.

4. Once your group has finalized the arrangement of cards, describe the resulting classification system in the Analysis section. You will formulate four rules, and note any exceptions to the pattern.
5. Predict the properties (shapes, color, number, and so on) of the two missing cards. Record your predictions on your student answer page.
6. Return the cards as instructed to your teacher.

DATA AND OBSERVATIONS

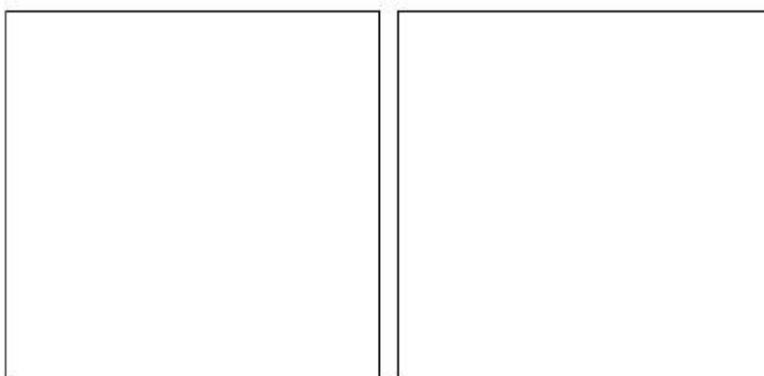
6 CARDS:

12 CARDS:

18 CARDS:

ANALYSIS (CONTINUED)

4. Predict the patterns (shapes, number, color, and so on) of the missing cards. Sketch your prediction for the two missing cards in the spaces provided.

Two empty rectangular boxes are provided for sketching predictions. The boxes are side-by-side and are completely blank, intended for the student to draw their predicted patterns for the missing cards.

