

SNC1D/1P Atoms, Elements and Compounds/Exploring Matter

Student Activity: Periodic Patterns

Topics	Timing
recognizing patterns periodic table Mendeleev's discovery	preparation: 20 min activity: 20 min

Specific Expectations

SNC1D

A1.10 draw conclusions based on inquiry results and research findings, and justify their conclusions

C3.6 explain the relationship between the atomic structure of an element and the position of that element in the periodic table

SNC1P

A1.10 draw conclusions based on inquiry results and research findings, and justify their conclusions

C3.3 identify general features of the periodic table (e.g., metals appear on the left of the periodic table; non-metals appear on the right; elements within the same group have similar properties)

C3.4 explain the relationships between the properties of elements and their position in the periodic table (e.g., with reference to atomic structure, group, and period)

Introduction

This demonstration emphasizes how we can make predictions based on patterns. A jigsaw puzzle is used as an analogy for the periodic table. Just as Mendeleev left gaps in his original periodic table, gaps are left in this jigsaw puzzle and just as he hypothesized the existence and properties of new elements, students hypothesize and find the missing pieces to the jigsaw puzzle.

Materials

large-piece jigsaw puzzle

Safety Considerations

None

Procedure

1. Before the class begins, assemble a jigsaw puzzle. Remove 3–5 pieces from the assembled puzzle. The pieces removed should include an object or some type of distinctive figure. If the pieces are small, remove a group of pieces.
2. **Predict/Explain**
Ask students to look at the assembled jigsaw puzzle and note that there are several missing pieces. Invite students to predict and describe what the missing pieces should look like.

Ask students to draw their prediction on a separate piece of paper and provide an explanation for their prediction.

3. **Observe**
Show students the actual missing pieces. Compare their predictions to the actual missing pieces.
4. **Explain**
Ask students how they were able to make such a good prediction.

Disposal

Store the puzzle for future use.

What happens?

With great consistency, students will successfully predict what the missing pieces look like.

How does it work?

Students use patterns and logic to predict the missing pieces.

Teaching Suggestions/Hints

1. This demo can be used to illustrate how the “holes” in Mendeleev’s original periodic table gave rise to predictions of undiscovered elements. During the construction of Mendeleev’s periodic table, he left gaps in his periodic table. He believed that the spaces left in his table corresponded to elements that were undiscovered and he was able to predict the specific physical and chemical properties that would allow an element to fit into his table at a specific location.
2. You can also use any other manipulatives that have patterns, such as playing cards.
3. Extension: The Alien Activity (see Additional Resources) introduces periodicity and trends in the periodic table by having students work in small groups to organize aliens into a meaningful pattern according to their characteristics.

Next Steps

A possible extension for this activity is to have each student make up his/her own jigsaw puzzle with an individual and creative theme. The student would remove some pieces and then ask a classmate to see if they can solve the puzzle or figure out the identity of the missing pieces.

There are several commercially available periodic table puzzle activities that strive to deliver the same type of experience. These puzzles can be much more challenging. They are sold through various vendors. An example of one such product is listed in Additional Resources.

Additional Resources

1. Alien Activity (4th in the list of Periodic Table files) from Partnerships for Research in Science & Math Education (PRISM) -
<http://www.gk12.ilstu.edu/chemistry/index.asp?page=periodicTable>
2. Set A and Set B templates of aliens for the Alien Activity -
<http://www.gk12.ilstu.edu/chemistry/PowerPoint%202006/Period%20Word/alien%201.jpg>
<http://www.gk12.ilstu.edu/chemistry/PowerPoint%202006/Period%20Word/alien%202.jpg>

3. A commercially available periodic table puzzle activity produced by American Educational Products - http://www.amazon.com/American-Educational-Understanding-Periodic-Puzzle/dp/B006582WVG/ref=sr_1_1?s=industrial&ie=UTF8&qid=1367434382&sr=1-1&keywords=periodic+puzzle