Identifying Similarities and Differences

Classroom Instruction that works

Mid-continent Research for Education and Learning

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Handouts/Attachments

• Handout #1 – ISD Comparison Matrix
• Handout #2 – ISD Note Taking Guide – Metaphors and Analogies
• Handout #3 – Key Knowledge Organizer
Two questions that students ask every day when they arrive at school...

Will I be accepted?  Can I do the work?
Last time, we explored these instructional strategies:

- Setting Objectives
- Providing Feedback
- Reinforcing Effort
- Providing Recognition

<table>
<thead>
<tr>
<th>Category</th>
<th>Average Effect Size</th>
<th>Percentile Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifying Similarities &amp; Differences</td>
<td>1.61</td>
<td>45</td>
</tr>
<tr>
<td>Summarizing &amp; Note Taking</td>
<td>1.00</td>
<td>34</td>
</tr>
<tr>
<td>Reinforcing Effort &amp; Providing Recognition</td>
<td>.80</td>
<td>29</td>
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<tr>
<td>Homework &amp; Practice</td>
<td>.77</td>
<td>28</td>
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<tr>
<td>Nonlinguistic Representation</td>
<td>.75</td>
<td>27</td>
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<tr>
<td>Cooperative Learning</td>
<td>.73</td>
<td>27</td>
</tr>
<tr>
<td>Setting Objectives &amp; Providing Feedback</td>
<td>.61</td>
<td>23</td>
</tr>
<tr>
<td>Generating &amp; Testing Hypotheses</td>
<td>.61</td>
<td>23</td>
</tr>
<tr>
<td>Cues, Questions, &amp; Advance Organizers</td>
<td>.59</td>
<td>22</td>
</tr>
</tbody>
</table>
Identifying Similarities and Differences

Enhance students’ understanding of and ability to use knowledge by engaging them in mental processes that involve identifying ways items are alike and different.

Four Planning Questions for Instruction:

What knowledge will students learn? Which strategies will provide evidence that students have learned that knowledge?

Identifying Similarities and Differences

Which strategies will help students practice, review, and apply that knowledge? Which strategies will help students acquire and integrate that knowledge?
Generalizations from the Research on Similarities and Differences

1. Presenting students with explicit guidance in identifying similarities and differences enhances students’ understanding of and ability to use knowledge.

2. Asking students to independently identify similarities and differences enhances students’ understanding of and ability to use knowledge.

(Continued)

3. Representing similarities and differences in graphic or symbolic form enhances students’ understanding of and ability to use knowledge.

4. Identification of similarities and differences can be accomplished in a variety of ways and is a highly robust activity.
Recommendations for Classroom Practice: Similarities and Differences

1. Use **comparing, classifying, metaphors, and analogies** when having students compare similarities and differences.

2. Give students a **model** of the steps for engaging in the process.

3. Use a **familiar context** to teach students these steps.

4. Have students use **graphic organizers** as a visual tool to represent the similarities and differences.

5. **Guide** students as they engage in this process. Gradually give less structure and less guidance.
Comparing

The process of identifying and articulating similarities and differences among items.

Identifying Similarities and Differences

Characteristics:
- Color
- Size
- Shape
- Function
- Component Parts

Apples and oranges are the same because…
Apples and oranges are different because…
Identifying Similarities and Differences

Characteristics:
- Color
- Size
- Shape
- Function
- Component Parts

**Apples and oranges are the same because...**

**Apples and oranges are different because...**
What are the similarities and differences between apples and oranges as snack food?

__________________________________  ____________________________________

Summary

For Webinar: List how you would respond to this sorting activity
### Comparison Matrix

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Item 1 Civil War</th>
<th>Item 2 WWI</th>
<th>Item 3 Viet Nam War</th>
<th>Comparisons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Causes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Battles</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Hand-to-hand</td>
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<tr>
<td>combat, many</td>
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<tr>
<td>lives lost</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>No automatic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>weapons</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automatic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>weapons</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Nerve Gas</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Summary Statement

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### Comparison Matrix

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Item 1</th>
<th>Item 2</th>
<th>Item 3</th>
<th>Comparisons</th>
</tr>
</thead>
<tbody>
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<td></td>
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</tbody>
</table>

Summary Statement

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For Webinar: List some other topics you could use for this tool
What tips relate to the comparing process?

One key to a rigorous comparison is to identify items and characteristics that are meaningful and interesting. To do this, students need extensive modeling and feedback. If the items and characteristics are not meaningful, students will not make new distinctions or come to new conclusions about the targeted knowledge.

Make sure that students understand that the purpose of doing the comparison is to extend and refine their understanding of the knowledge they are learning. Asking students to select different characteristics will help them move beyond the obvious.

Rubric For Comparing

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>The student uses important, as well as some less obvious, characteristics to compare the items. The student accurately identifies the similarities and differences and explains his conclusions in a way that shows a complete and detailed understanding of the items.</td>
</tr>
<tr>
<td>3</td>
<td>The student uses important characteristics to compare the items. The student accurately identifies the similarities and differences and explains his conclusions.</td>
</tr>
<tr>
<td>2</td>
<td>The student uses characteristics to compare the items, but not the most important characteristics. The student's comparisons and conclusions show some misconceptions about the items.</td>
</tr>
<tr>
<td>1</td>
<td>The student uses insignificant characteristics to compare the items. The student's comparisons and conclusions show many misconceptions that indicate the student does not understand the items.</td>
</tr>
<tr>
<td>0</td>
<td>Not enough information to make a judgment.</td>
</tr>
</tbody>
</table>
Classifying

The process of grouping things into definable categories on the basis of their attributes.

What are the steps in the classifying process?

1. Identify the items you want to classify.
2. Select what seems to be an important item, describe its key attributes, and identify other items that have the same attributes.
3. Create a category by specifying the attribute(s) that the items must have for membership in this category.
4. Select another item, describe its key attributes, and identify other items that have the same attributes.
What are the steps in the classifying process?

5. Create the second category by specifying the attribute(s) that the items must have for membership in the category.

6. Repeat the previous two steps until all items are classified and the specific attributes have been identified for membership in each category.

7. If necessary, combine categories or split them into smaller categories and specify attribute(s) that determine membership in the category.

CLASSIFICATION GRAPHIC ORGANIZERS

<table>
<thead>
<tr>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

25

26
Classify the following geography terms:

<table>
<thead>
<tr>
<th>Basin</th>
<th>Harbor</th>
<th>Plateau</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bay</td>
<td>Highland</td>
<td>Port</td>
</tr>
<tr>
<td>Canal</td>
<td>Hill</td>
<td>Prairie</td>
</tr>
<tr>
<td>Canyon</td>
<td>Isthmus</td>
<td>Rain Forest</td>
</tr>
<tr>
<td>Cape</td>
<td>Lowland</td>
<td>Reservoir</td>
</tr>
<tr>
<td>Channel</td>
<td>Marsh</td>
<td>Strait</td>
</tr>
<tr>
<td>Delta</td>
<td>Mountain</td>
<td>Stream</td>
</tr>
<tr>
<td>Divide</td>
<td>Range</td>
<td>Swamp</td>
</tr>
<tr>
<td>Fjord</td>
<td>Peak</td>
<td>Tundra</td>
</tr>
</tbody>
</table>

For Webinar: List the categories you would use to classify

---

Rubric For Classifying

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>The student organizes the items into meaningful categories and thoroughly describes the defining characteristics of each category. The student provides insightful conclusions about the classification.</td>
</tr>
<tr>
<td>3</td>
<td>The student organizes the items into meaningful categories and describes the defining characteristics of each category.</td>
</tr>
<tr>
<td>2</td>
<td>The student organizes the items into categories that are not very meaningful but addresses some of the important characteristics of the item.</td>
</tr>
<tr>
<td>1</td>
<td>The student organizes the items into categories that do not make sense or are unimportant.</td>
</tr>
<tr>
<td>0</td>
<td>Not enough information to make a judgment.</td>
</tr>
</tbody>
</table>
Abstracting

- Help students understand unfamiliar information by recognizing it contains patterns similar to information that is more familiar.

- The changes that take place in a school using CITW are similar to a family moving into a new house.

Pattern for Metaphors

A is B
Pattern for Metaphors

A is B

Love is a rose

What are the steps for creating metaphors?

1. Identify the important or basic elements of the information or situation with which you are working.

2. Write that basic information as a more general pattern by
   - replacing words for specific things with words for more general things;
   - summarizing information whenever possible.

3. Find new information or a situation to which the general pattern applies.
When C.L. Sholes was inventing a typewriting machine in the early 1870’s, he found that the machine jammed if he typed too fast. So he deliberately arranged the position of the letters in a way that forced typists to work slowly. Nevertheless, Sholes’ typewriter design was a great improvement over earlier models, and it was soon in use all over the world.

Today, although typewriters have been improved in many ways, nearly all of them have keyboards like the one Sholes devised in 1872. The letter arrangement is called QWERT, after the five left-hand keys in the top letter row. You can see QWERT keyboards on computer consoles as well as on typewriters. Unfortunately, the QWERT arrangement slows typing, encourages errors, and causes greater fatigue than another arrangement devised by August Dvorak in 1930, which has proved in several tests to be much faster and more accurate than QWERT.

Millions of people have learned the QWERT keyboard, however, and it is being taught to students in schools right now. So, it seems that we will continue to live with this 19th century mistake.
What tips relate to identifying metaphors?

**TIP**
Identifying the important or basic information is often the most challenging for students. They will need many opportunities to practice and be given feedback on this step.

**TIP**
Students often have questions about how general the language in the abstract pattern should be. The level of generality that’s appropriate depends on the content and purposes of the assignment.

**TIP**
As students apply a general pattern to the new information or situation, encourage them to make connections that are less obvious and more interesting.
**Rubric For Creating Metaphors**

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>The student identifies the important information of the situation in detail and concisely and accurately states the abstract relationship that explains the general pattern. The student identifies another situation that has the same pattern and accurately explains their relationship in detail.</td>
</tr>
<tr>
<td>3</td>
<td>The student identifies the important information of the situation and states the abstract relationship that explains the general pattern. The student identifies another situation that has the same general pattern and accurately explains their relationship.</td>
</tr>
<tr>
<td>2</td>
<td>The student identifies some information about the situation, but the statement of the abstract relationship shows some misconceptions.</td>
</tr>
<tr>
<td>1</td>
<td>The student identifies trivial information about the situation. The statement of the abstract relationship shows that the student does not understand the general pattern.</td>
</tr>
<tr>
<td>0</td>
<td>Not enough information to make a judgment.</td>
</tr>
</tbody>
</table>

**Analogies**

The process of identifying relationships between pairs of concepts (e.g., relationships between relationships).
What are the steps for creating analogies?

1. Identify how the **two elements in the first** pair are related.

2. State the **relationship** in a general way.

3. **Identify another pair** of elements that share a similar relationship.

---

Pattern for Analogies

**A** is to **B**  
**AS** *(relationship)*  
**C** is to **D**
Analogies can help explain an unfamiliar concept by making a comparison to something we understand.

- **hot** is to **cold**
- **night** is to **???????

Relationship: opposites/dissimilar in meaning

**Types of Analogies**

- Synonym
- Antonym
- Part & Whole
- Whole & Part
- Characteristic or Quality
- Classification
- Cause & Effect
- Measurement or Change
- Function
- Location
- Degree
- Performer & Related Object
- Performer & Related Action
- Action & Related Object

McREL 2009
Relationship: thermometer is to temperature

Change: speedometer as is to

Relationship: I Have A Dream Speech is to Civil Rights Movement

Gettysburg Address is to Slavery
Relationship:

Graceful is to Late as Antonyms elaborate

1 ¾ is to 7/4 as

2 ½ is to ???
Mason is to stone

- Soldier is to weapon
- Lawyer is to law
- Blacksmith is to forge
- Teacher is to pupil
- Carpenter is to wood

Mason makes things out of stone. Carpenter makes things out of wood.
Create Your Own

is to

is to

Relationship: __________________________

as

For Webinar: List an analogy for the group to see in the chat feature

What tips relate to creating analogies?

TIP

Providing students with examples of relationships can help them to recognize patterns in the analogies they come across (e.g., similar concepts, dissimilar concepts, class membership, part to whole, change, function, quantity/size).

TIP

Students should be asked to explain and defend the relationships linking the two pairs. The more students have opportunities to examine the details of the relationships between the elements in each pair of an analogy, and the connection between the pairs, the better they will understand that analogies can reveal differences as well as similarities.
Small Group Discussions

• When asked to do so, move into teams of three and discuss how the four strategies associated with similarities and differences can be used in your classroom to increase student achievement.

• You will have 10 minutes to discuss the topic.

Reflecting on Practice

Individually complete the Identifying Similarities and Differences section on your Key Knowledge handout.

Be prepared to share one of your thoughts with the group.
Final Thoughts

• How will you share this information at your school?
• Where will you begin (comparing, classifying, metaphor, analogy)?