

Planning for Success for Low-Achievers in Science Class

The Unit Organizer Routine

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U.S. Department of Education • Teacher to Teacher Initiative • Supporting Success



Session Outcomes

- Discuss the research that supports effective planning
- Define the benefits of a “teaching routine”
- Practice creation of a visual device for making content accessible to diverse learners



Current Challenges in Teaching Science

- Increasing content
 - Available knowledge expanding as the world 'flattens'
- Limited time
 - Time in school day has not increased at the same rate
- Greater accountability for student progress
- Increasing student diversity in general education classrooms
 - Students with unidentified LD, limited English speakers
- Competition from electronic revolution
 - Video games, internet, television



Planning for Success with The Unit Organizer Routine

The UO Routine helps students to:

- Relate unit content to previous and future units and to bigger course ideas.
- Understand the main idea of the content through the use of a meaningful paraphrase of the "big idea" of the unit.
- See the structure of the unit's content.
- Focus attention on important relationships in the content of the unit.



Supporting Research

- Field tests took place in seventh- to 12th-grade classes.
- Teachers learned the routine easily.
- Students gained an average of at least 10 to 20 percentage points on unit tests.
- Teachers continued using the routine after the studies were completed.

D.J. Boudah, B.K. Lenz, J.A. Bulgren, J.B. Schumaker & D.D. Deshler, "Content Learning through the Unit Organizer Routine," *Teaching Exceptional Children* 32, no. 3 (2000): 48-56.



Supporting Research

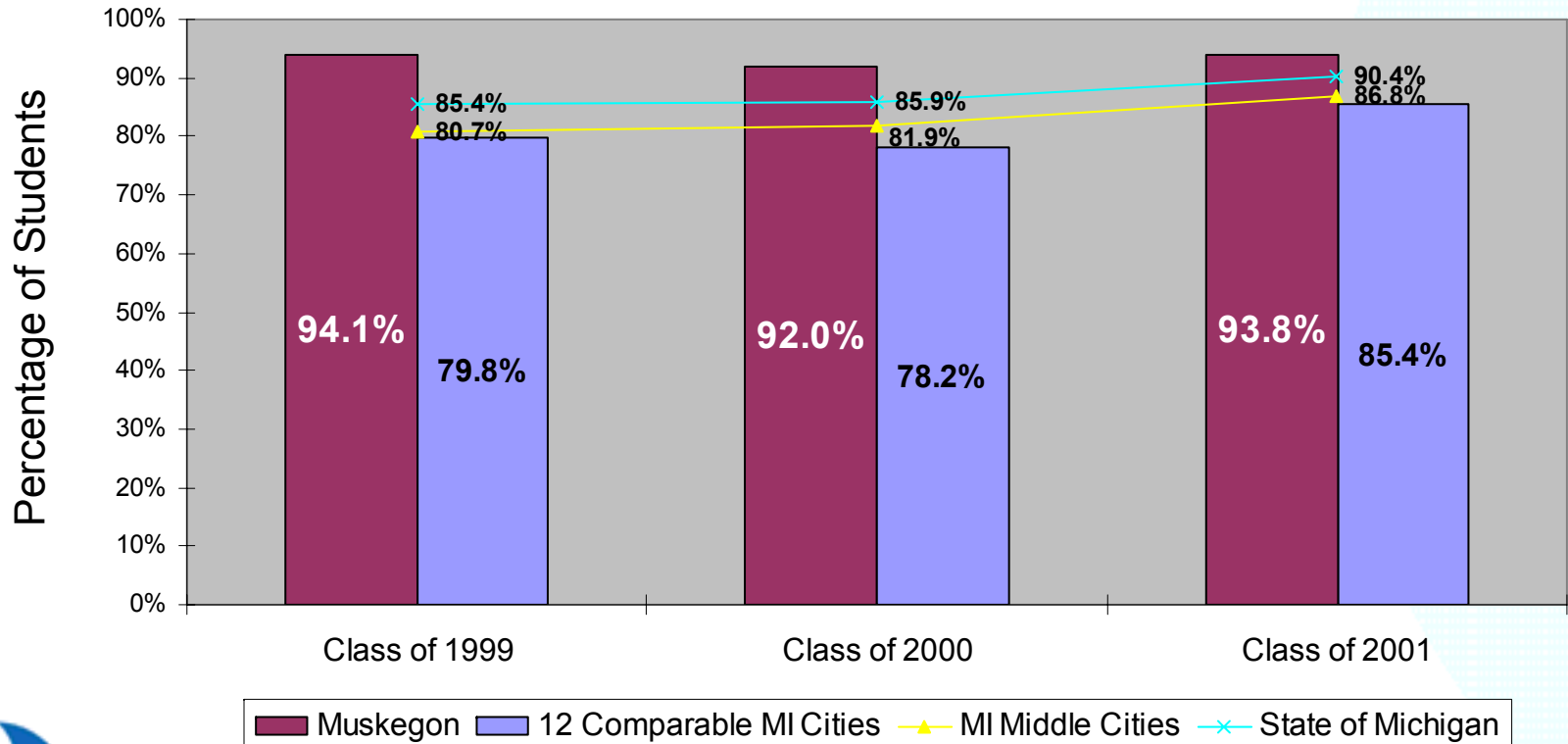
Positive results were achieved when teachers:

- Received in-depth instruction in the routine
- *Discussed* the routine with colleagues
- *Invested* the necessary time to plan use of the routine
- *Cued* students as to the importance of the UO
- *Used* the routine frequently
- *Reviewed* the content on the UO



School-Wide Implementation Results

Muskegon in Relation to Like Districts & State of Michigan
Comparisons of Writing MEAP Over 3 Years
% Students Passing the Test



Source: University of Kansas Center for Research on Learning www.ku-crl.org
U.S. Department of Education • Teacher to Teacher Initiative • Supporting Success

Long-Term Advantages of School-Wide Implementation

- Students will make content connections across grade levels
- Teachers and students can collaborate within and across grade levels
- Better opportunity to provide content access to students with learning difficulties
- Better opportunities for inclusion of English learners



Two Key Elements of the Planning Process

The Visual Device

in this case, *the Unit Content Organizer*

The Teaching Routine

Includes both the **words** and **actions** of the teacher plan then guide student learning

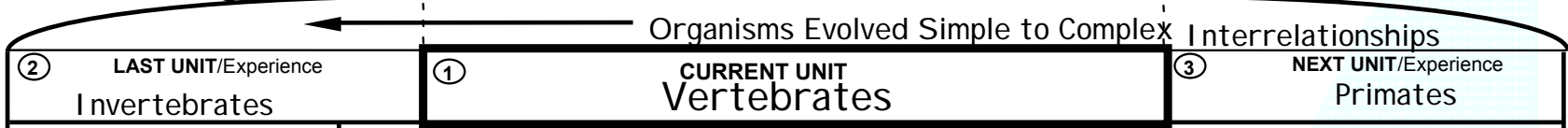


The Visual Device

The Unit Organizer

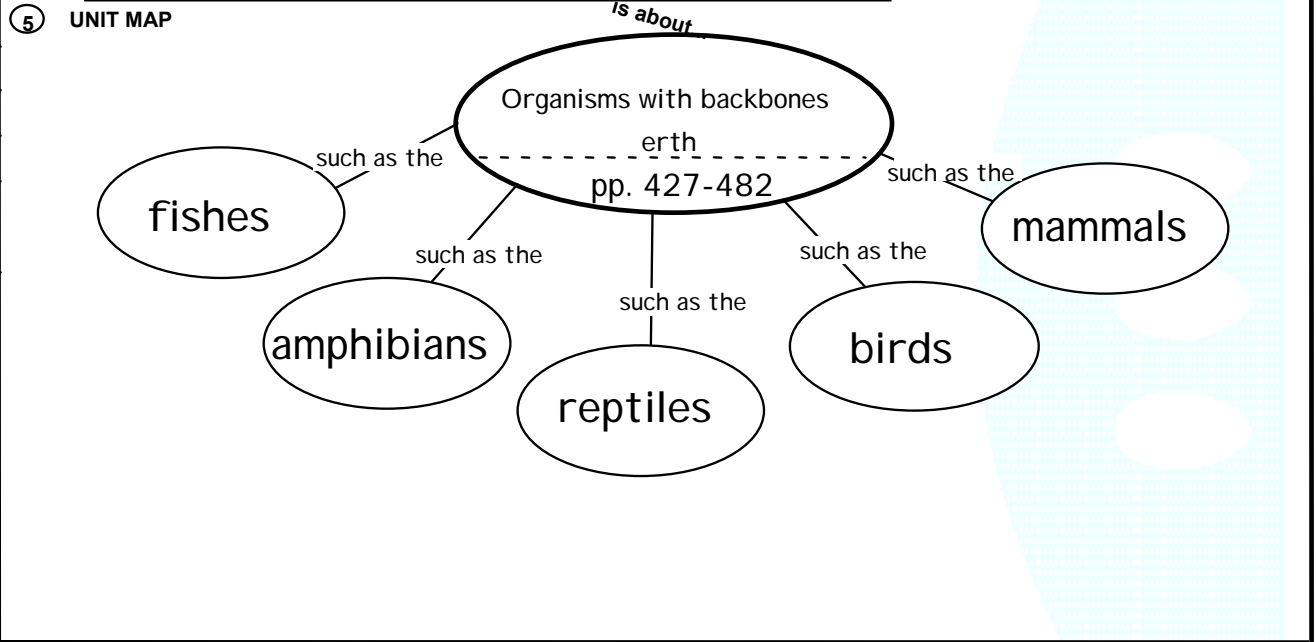
④ BIGGER PICTURE

NAME Sharra Ti
DATE 4/1



⑧ UNIT SCHEDULE

4/1	Introduce vertebrates
4/4	Fish/amphibian of choice report due
4/5	Fish/amphibian quiz
4/10	Reptile quiz
4/12	Trip to natural history museum
4/15	Trip report due
4/16	Bird/mammal quiz
4/17	Lab report due
4/18	Review
4/19	Test



⑦ UNIT SELF-TEST QUESTIONS

What are the basic differences among the major groups of vertebrates?
 In what ways is life on land more difficult than life in water?
 Which of the major groups of vertebrates is the most successful? How are they more successful?

⑨ UNIT RELATIONSHIPS

explanation
compare/contrast



The Teaching Routine

The Planning Stage

- **Create a context**

Explore how the information in this unit fits with previous, future, and bigger learning

- **Recognize content structures**

Identify how to think about and structure the information to be learned in the unit.

- **Acknowledge unit relationships**

Explore relationships that are or might be important in the unit.

- **Frame unit questions**

Generate and discuss the types of questions that reflect what the unit is really about.

- **Tie content to tasks**

Identify a schedule of tasks to be completed and how these tasks connect to learning the content.



Activity: Planning Together

- Group yourselves by grade level
- Each grade-level group will choose an appropriate California Science Content Standard and student outcome or create your own outcome from the standard.
- Using the CRAFT steps, together we will build a Unit Organizer that would be appropriate for your students.



California Science Content Standards

Concept Focus: The Connectedness Among Living Things

- Grade 4:
 - **Standard:** Living organisms depend on one another and on their environment for survival.
 - **Student outcome:** Students know that ecosystems can be characterized by their living and non-living components.
- Grade 5:
 - **Standard:** Plants and animals have structures for respiration, digestion, waste disposal and transport of materials.
 - **Student outcome:** Students know the sequential steps of digestion and the roles of teeth and mouth, esophagus, stomach, small intestine, large intestine and colon in the function of the digestive system.



California Science Content Standards

- Grade 6:
 - **Standard:** Many phenomena on Earth's surface are affected by the transfer of energy via radiation and convection currents.
 - **Student outcome:** Students know the sun is the major source of energy for phenomena on the surface; it powers winds, ocean currents and the water cycle.
- Grade 7:
 - **Standard:** All living organisms are composed of cells, from just one to many trillions, and details are usually visible only through a microscope.
 - **Student outcome:** Students know the characteristics that distinguish plant cells from animal cells, including chloroplasts and cell walls.



California Science Content Standards

Grades 9-12: Biology/life science

- **Standard:** Stability in an ecosystem is a balance between competing effects.
- **Student outcome:** Students know how to analyze changes in an ecosystem resulting from changes in climate, human activity, introduction of non-native species or changes in population size.



The Unit Organizer

④ BIGGER PICTURE

NAME Flida Cordora
DATE 1/22

← Organisms Evolved Simple to Complex. →

② LAST UNIT /Experience
Invertebrates

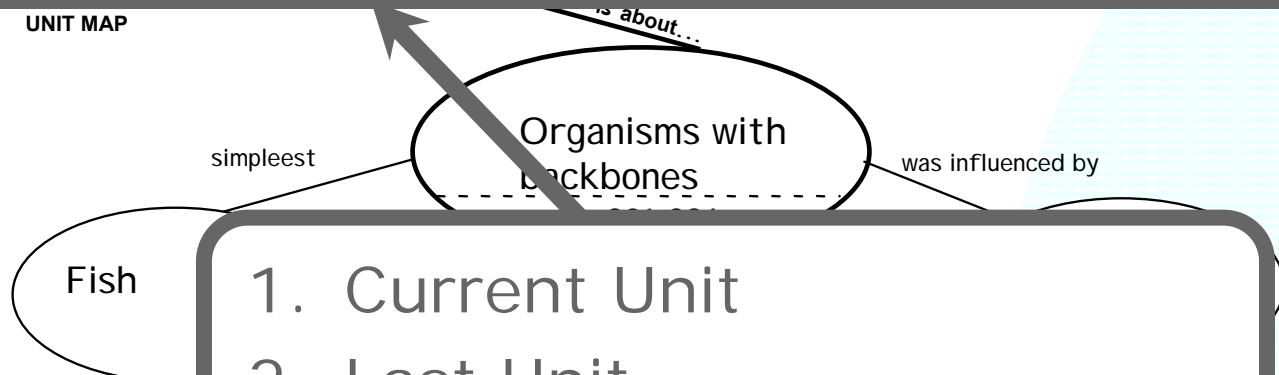
① CURRENT UNIT
Vertebrates

③ NEXT UNIT /Experience
Primates

⑧ UNIT SCHEDULE

1/22	Cooperative groups - over pp. 201-210
1/28	Quiz
1/29	Cooperative groups - over pp. 210-225
	"Influential Personalities" project due
1/30	Quiz
2/2	Cooperative groups - over pp. 228-234
2/6	Review for test
2/7	Review for test
2/6	Test

⑤ UNIT MAP



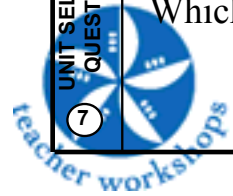
1. Current Unit
2. Last Unit
3. Next Unit
4. Bigger Picture

Information is listed to help students see how the current unit is related to other units and to course ideas.

⑦ UNIT SELF-TEST QUESTIONS

What are the basic differences among...
In what ways is life on land more complex...
Which of the major groups of vertebrates...
... more successful?

⑨ UNIT RELATIONSHIPS



The Unit Organizer

④ BIGGER PICTURE

NAME Sharra Ti
DATE 4/1

← Organisms Evolved Simple to Complex → Interrelationships

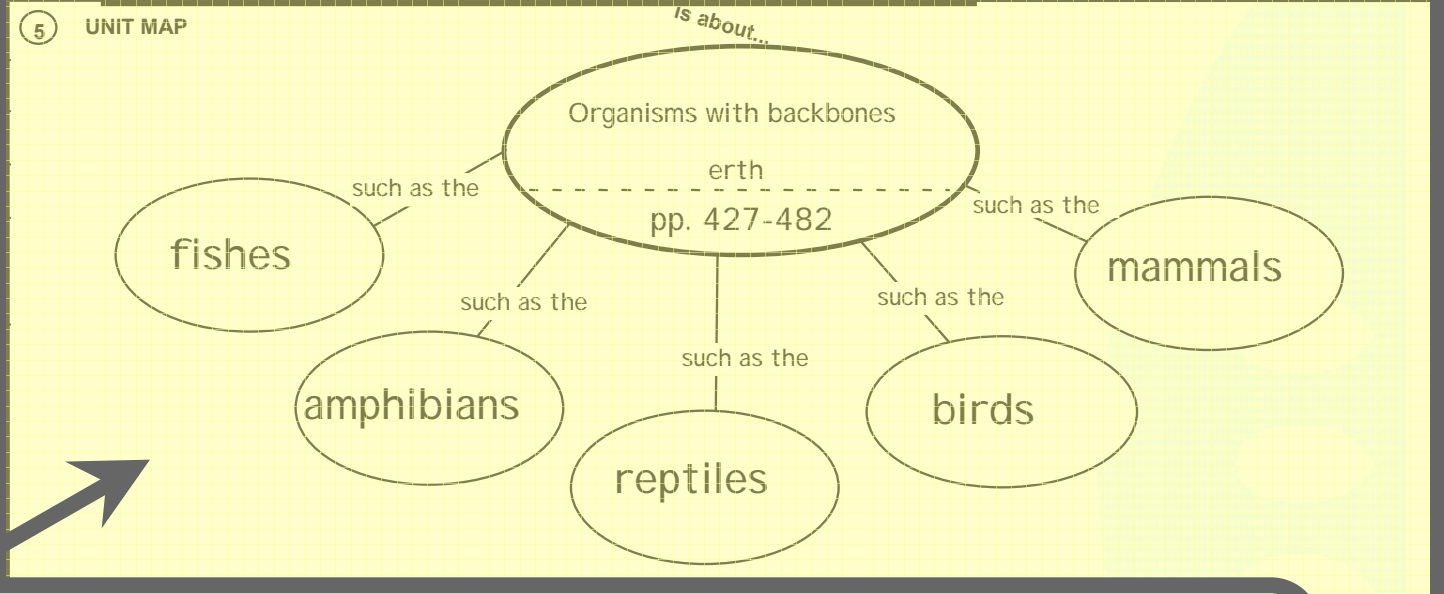
② LAST UNIT /Experience
Invertebrates

① CURRENT UNIT
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③ NEXT UNIT /Experience
Primates

⑧ UNIT SCHEDULE

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4/5	Fish/amphibian quiz
4/10	Reptile quiz
4/12	Trip to natural history museum
4/15	Trip report due
4/16	Bird/mammal quiz



5. Unit Map

A unit paraphrase of the big idea of the unit and a content map are used to show students how to think about and structure the information in the unit.

⑥ UNIT RELATIONSHIPS



The Unit Organizer

NAME Sharra Ti
DATE 4/1

④ BIGGER PICTURE

← Organisms Evolved Simple to Complex

Interrelationships

② LAST UNIT /Experience
Invertebrates

① CURRENT UNIT
Vertebrates

③ NEXT UNIT /Experience
Primates

⑧ UNIT SCHEDULE

⑤ UNIT MAP

is about...

4/1 Intro

4/4 Fish/
of ch

4/5 Fish

4/10 Rept

4/12 Trip
mus

4/15 Trip

4/16 Bird/mammal

4/17 Lab report due

4/18 Review

4/19 Test

6. Unit Relationships

A list of relationships that reflect the central ideas of the unit are provided so students can look for these relationships as the content of the unit is learned.

UNIT SELF-TEST
QUESTIONS

What are the basic differences among the major groups of vertebrates?

In what ways is life on land more difficult than life in water?

Which of the major groups of vertebrates is the most successful? How are they more successful?

⑦

explanation

compare/contrast

⑥

RELATIONSHIPS
UNIT



The Unit Organizer

NAME Sharra Ti
DATE 4/1

④ BIGGER PICTURE

← Organisms Evolved Simple to Complex

Interrelationships

② LAST UNIT /Experience
Invertebrates

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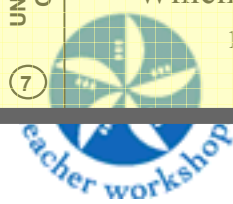
7. Unit Self-Test Questions
Questions students can use to check understanding of the big ideas and relationships in the unit are listed.

⑦ UNIT SELF-TEST QUESTIONS

What are the basic differences among the major groups of vertebrates?
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⑥ RELATIONSHIPS UNIT

explanation
compare/contrast



The Unit Organizer

④ BIGGER PICTURE

8. Unit Schedule

To help students organize task management and completion, experiences that promote learning and show students what they have learned are listed.

② LAST UNIT /Experience

Invertebrates

①

⑧ UNIT SCHEDULE

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⑤ UNIT MAP

UNIT SELF-TEST QUESTIONS

⑦

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compare/contrast

⑥

RELATIONSHIPS
UNIT

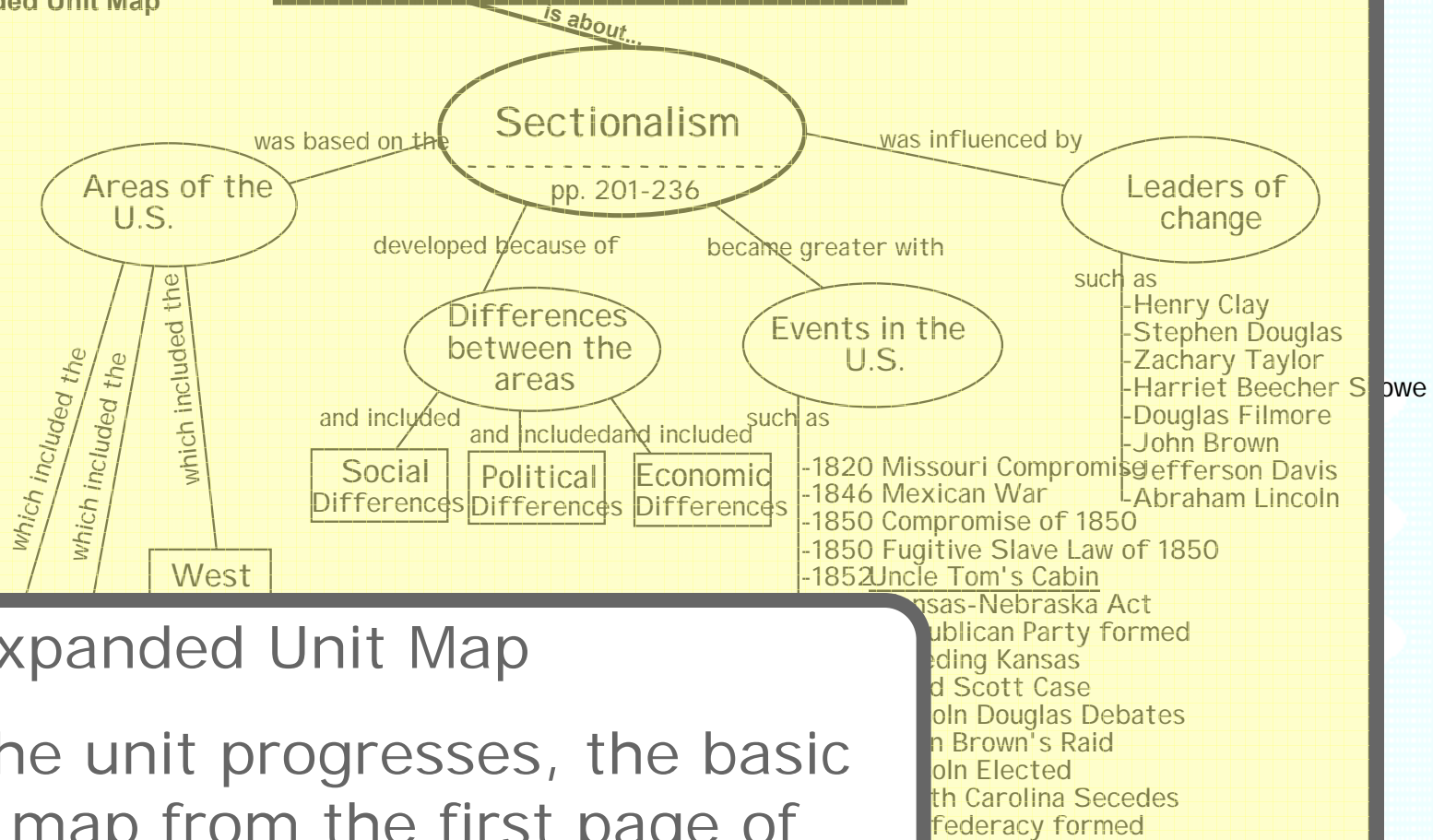


The Unit Organizer

Vertebrates

NAME Elida Cordora
DATE 1/22

9 Expanded Unit Map



9. Expanded Unit Map

As the unit progresses, the basic unit map from the first page of the organizer is expanded with key summary information about the content of the unit.

What sections of the U.S. apart?

The Unit Organizer

The Causes of the Civil War

NAME Elida Cordora
DATE 1/22

⑨ Expanded Unit Map

is about...

Sectionalism

was based on the

was influenced by

10. New Unit Self-Test Questions

As the unit progresses, new questions that seem important about the content of the unit are listed or old questions can be modified.

South

North

- 1854 Bleeding Kansas
- 1857 Dred Scott Case
- 1858 Lincoln Douglas Debates
- 1859 John Brown's Raid
- 1860 Lincoln Elected
- 1860 South Carolina Secedes
- 1861 Confederacy formed

⑩
NEW
UNIT
SELF-TEST
QUESTIONS

How did national events and leaders pull the different sections of the U.S. apart?

Share Using 'Numbered Heads'

- Each person at a table is given a number.
- A number is called in random order to share a specific part of the organizer with the group.

For example, "The 4s at each table will share their self-test questions."



Explicit Teaching

The Unit Organizer visual device is not effective by itself. It must be coupled with explicit teaching which ensures it is

- Used under teacher guidance
- Focuses student attention on critical outcomes
- Identifies critical unit content for the student
- Prompts elaboration on critical points
- Helps make relationships concrete and
- Promotes storage in long-term memory



The Teaching Routine

The Teaching Stage

- **Cue:** The teacher announces the Unit Organizer and explains its use.
- **Do:** The teacher and class collaboratively construct the Unit Organizer device using the CRAFT linking steps so the content is connected to the needs and goals of students.
- **Review:** Information presented in the Unit Organizer is reviewed and confirmed.



Activity

Look at the Cue-Do-Review steps

- Which are verbal teaching behaviors?
What do you think are the purposes for these behaviors? What results could be expected in terms of student learning?
- Which are visual teaching behaviors?
What do you think are the purposes for these behaviors? What results could be expected in terms of student learning?



Tools for Teaching/Learning

- www.kucrl.org
University of Kansas
Center for Research on Learning
- Barbara Glaeser
bglaeser@fullerton.edu



Implementation Ideas

- Select a standard.
- Follow the CRAFT steps outlined to create a unit organizer for the standard and outcome appropriate for your students.

