

Sharpening Thinking Skills: Inspirations to Examine the World

by Dr. Paul Nagel. Presented at the 2011 Texas Council for the Social Studies

Abstract:

This engaging workshop for elementary and middle school will challenge students to think about the world in which we live. Participants will learn how to engage their students in analytical thinking, which is as an active process where students construct knowledge of the world. In order to learn, students need to make connections between what they already know, new information and new ways of seeing things. Learn how to incorporate analytical skills into the classroom.

Grade level and suggested time limit:

This lesson is intended **for elementary and middle school** lasting **one fifty-minute** class period. However, concepts from this lesson could be taught as part of a larger unit of study about geographic inquiry and taught throughout the year.

National Geography Standards:

- How to Analyze the Spatial Organization of People, Places, and Environments on Earth's surface – Standard Three
- The Physical and Human Characteristics of Places – Standard Four
- The Physical Processes That Shape the Patterns of Earth's Surface – Standard Seven

Transition:

Higher order thinking questions about Sharpening Thinking Skills.

TEKS:

4(7) The student understands the concept of regions.

5(7)B,C The student understands the concept of regions in the United States

Activity One:

- Review how to place items in logical order
- Practice placing items in logical order

Transition:

Analytical thinking about the seasons, states, regions and countries.

Activity Two:

- Steps to creating your own logical problems
- Creating My Geography Line-Up – Assessment

Continuing the Inquiry:

How to engage your students in inquiry and why it is important

Motivation

Sharpening Thinking Skills

What are the three countries of North America in order from south to north?

1. _____
2. _____
3. _____

What are the three states along the west coast of the United States in order from north to south?

1. _____
2. _____
3. _____

Working with your shoulder partner, take turns sharing how you knew what order to place the countries and states in. Explain how you determined if you placed the countries and states in the correct order. Finally, explain to your shoulder partner how you would sequence items such as states, countries or regions in order?

Transition to first activity:

1. Do you think you have the countries in order? Explain why, how do you know?
2. How do you know you have the three western states in order, could you place the east coast states in order from north to south? Why or why not?
3. Do you think you could put the seasons, states, regions or countries in an analytical order?

Activity One

Mix-Up

Teaching Strategy for First Activity:

1. Pass out *Seasons* cards to each pair or team of students.
 - a. The students can either stand and place the topics in the logical order or work at their desk/table to place the topics in the correct order.
2. Teacher reads the first clue to the problem.
3. Teams move cards to correct order – either standing or on their table/desk.
4. Check for agreement. Students will agree or explain why they disagree about the logical order.
5. The teacher either congratulates the teams or provides correction opportunity. Other teams listen and either celebrate or correct their order.
6. Teacher reads the second clue to the problem; checks for correct order; corrects if needed and teams celebrate.
7. Repeat steps 2 through 5 for Season problems 3 to 6.
8. Pass out *Western States* cards to each pair or team of students, repeat steps 2 through 5 for the six *Western States* problems.
9. Pass out *Midwest States* cards to each pair or team of students, repeat steps 2 through 5 for the six *Midwest States* problems.
10. Pass out *Regions* cards to each pair or team of students, repeat steps 2 through 5 for the six *Regions* problems.

11. Pass out the *Continents* cards to each pair or team of students, repeat steps 2 through 5 for the six *Continents* problems.

Transition to the second activity:

1. How did you know how to put the seasons in the correct order?
2. If you never visited Minnesota or Iowa how would you know what order to place them in? What could you look at to help you determine the order of the *Midwestern States*?
3. How did you do with putting the continents in order? What clues gave the order away?

Activity Two

Geography Line-Ups

Teaching Strategy for Second Activity:

1. Explain to the student that they are going to create their own problem and are going to try to stump their classmates.
2. Pass out *How to Make Your Own Problems*, explain to the students that with four states, rivers or counties that there are 24 ways to sequence the four items.
3. Further explain to the students that there are spatial vocabulary words that can help them stump their classmates, such as *on one end, first, last, or in the middle*. Pass out *Some Spatial Vocabulary* handout.
4. Have students brainstorm ideas about our state for their *My Geography Line-Up*.

Transition to the assessment:

1. What other words can you think of for on the end? How about last?
2. Why did you select the geographic region or features that you did? What do you think is challenging about it?
3. What are some reasons why *Geography Line-Ups* is fun and challenging?

Assessment

Now that we have learned about the seasons, states, regions and countries and utilized analytical skills to correctly place things in logical order, it is your turn to create *My Geography Line-Up*. You may want to think about our state's physical and cultural features for your line-up.

Continuing the Inquiry

With an ever-changing world with interconnections between cultures, regions and economies, it is imperative that students be able to construct and build their own learning. Students *must be* actively involved in making sense of the world for themselves. To aid the students in a constructivist approach, the teacher must frame the unit of study with a central guiding question.

An inquiry approach to learning puts an emphasis on the question(s) and encourages curiosity. Students need to be challenged and provided the opportunities to make sense of the information. To build the inquiry, *time* is needed for students to make *the connections* between what they know and what they have learned. The inquiry loop is not complete without you and the students *reexamining* the essential question to determine if that question has been answered. You as the teacher need to understand what the students were thinking and what connections were made. This will result in unanticipated rather than predicted outcomes.

Seasons

(Use with first Activity)

Problem One: The seasons are in chorological order beginning with winter.

Problem Two:

1. Winter and Fall are not in the second half.
2. Summer is before Spring.
3. Either Spring or Fall is first.

Problem Three:

1. December is after July.
2. October is before January.
3. April is after February.
4. Either August or March is first.

Problem Four:

1. Summer is after fall.
2. Winter is after Spring.
3. Summer is either first or second.

Problem Five:

1. There is one season between Spring and Summer.
2. There is one season between Fall and Winter.
3. There are two seasons between Spring and Winter.
4. Fall is beside Spring.
5. There are no seasons after winter.

Problem Six:

1. Fall is next to Spring.
2. Summer is next to Winter.
3. Spring is next to Summer.
4. Fall is not first.

Answers:

1. Winter, Spring, Summer, Fall.
2. Fall, Winter, Summer, Spring.
3. Summer, Fall, Winter, Spring.
4. Fall, Summer, Spring, Winter.
5. Spring, Fall, Summer, Winter.
6. Winter, Summer, Spring, Fall.

Western States

(Use with first Activity)

Problem One: The states are in alphabetical order.

Problem Two:

1. Arizona is not last or in the middle.
2. Colorado is not between New Mexico and Utah.
3. Utah is to the right of New Mexico.

Problem Three:

1. New Mexico is not second or third.
2. Arizona is between Utah and New Colorado.
3. Colorado is last.
4. Utah is on an end with New Mexico

Problem Four:

1. Salt Lake City is either first or last.
2. Santa Fe is not between Phoenix and Denver.
3. Phoenix is not third.
4. Denver is not first or last.

Problem Five:

1. The state with the Grand Canyon is as far away as possible from the Rocky Mountain National Park.
2. Carlsbad Cavern is not first or second.
3. Great Salt Lake is second or third.
4. The Rocky Mountain National Park is in the second half.

Problem Six:

1. The state with the second highest population is first.
2. The second state has about half of the population of the third and most populated state.
3. The last state is the least populated of any of the four states.

Answers:

1. Arizona, Colorado, New Mexico, Utah
2. Colorado, New Mexico, Utah, Arizona
3. New Mexico, Utah, Arizona, Colorado
4. Utah, Arizona, Colorado, New Mexico
5. Arizona, Utah, New Mexico, Colorado
6. Colorado, Utah, Arizona, New Mexico

Midwestern States

(Use with first Activity)

Problem One: Place the states are in order from north to south.

Problem Two:

1. Illinois is to the left of Minnesota.
2. Iowa is as far away as possible from Illinois.
3. Wisconsin is second or third.
4. Minnesota is not before Wisconsin

Problem Three:

1. Madison is on an end.
2. St. Paul is not first or last.
3. Springfield is as far away from Madison as possible.
4. Des Moines is next to St. Paul.

Problem Four:

1. Minnesota is not second or third.
2. Illinois is before Wisconsin.
3. Iowa is not first or in the middle.
4. Wisconsin is to the left of Iowa.

Problem Five:

1. A state west of the Mississippi River is first.
2. The state with the headwaters of the Mississippi River is in the middle.
3. A state that borders Lake Michigan is third.
4. The state with Door County is last.

Problem Six:

1. The Badger state is only next to the Land of 10,000 Lakes.
2. The Land of Lincoln is in not first or fourth.
3. The heart of the Corn Belt is on the far right.
4. The Land of Lincoln is nest to the Land of 10,000 Lakes.

Answers:

1. Minnesota, Wisconsin, Iowa, Illinois
2. Illinois, Wisconsin, Minnesota, Iowa
3. Wisconsin, Iowa, Minnesota, Illinois
4. Minnesota, Illinois, Wisconsin, Iowa
5. Iowa, Minnesota, Illinois, Wisconsin
6. Wisconsin, Minnesota, Illinois, Iowa

Regions

(Use with first Activity)

Problem One: Place the regions in order from east to west.

Problem Two:

1. The Southwest is neither on the left or right.
2. The West is after the Northeast and before the Midwest.
3. Two regions are between the West and Southeast.
4. The Northeast is not last or in the middle.
5. The Midwest is to the left of the Southeast.

Problem Three:

1. The Midwest is on an end but the Northeast is not.
2. The Northeast is next to the Southwest, but not to Southeast.
3. The West is to the right of the Northeast.
4. The Southeast is fifth.

Problem Four:

1. The region with the most populous city is first.
2. The region where Hollywood is found is not last.
3. The region where the Alamo is located is in the middle.
4. The region where the Windy City is located is on an end.
5. The region where the Magic Kingdom is to the left of the Midwest.

Problem Five:

1. The Mississippi River starts in this region in the middle.
2. Hurricanes affect this region to the left of the Northeast.
3. Cape Cod is before the desert.
4. This region bordering the Pacific Ocean is on the far left.
5. The region with the Great Lakes is second.

Problem Six:

1. Boston is to the right of Dallas.
2. Chicago is not first or in the middle.
3. Two regions are before Seattle.
4. Orlando is before Minneapolis.
5. Oklahoma City is not last or in the middle.

Answers:

1. Northeast, Southeast, Midwest, Southwest, West
2. Northeast, West, Southwest, Midwest, Southeast
3. Midwest, Southwest, Northeast, West, Southeast
4. Northeast, West, Southwest, Southeast, Midwest
5. West, Midwest, Southeast, Northeast, Southwest
6. Southwest, Northeast, West, Southeast, Midwest

Continents

(Use with first Activity)

Problem One: Place the continents in alphabetical order.

Problem Two:

1. Europe and Asia are not on an end.
2. Antarctica and South America are not in the middle.
3. Two continents are between Europe and Africa.
4. North America is before Africa and Antarctica.
5. Europe is after South America but before Asia.

Problem Three:

1. These two continents south of the equator are in the first half.
2. These two continents north of the equator are on the right side.
3. These three continents found along the equator are in the middle.
4. North America is before Europe.
5. Australia is second and Africa is not third.
6. Africa is between South America and Asia.

Problem Four:

1. Two eastern hemisphere continents are to the right of Australia.
2. Two western hemisphere continents are not last or in the middle.
3. Two continents that straddle both hemispheres are to the left of Antarctica.
4. North America is to the left of South America and Australia.
5. Antarctica is not besides Europe but to the right of Africa.
6. Asia and Europe follow Australia.

Answers:

1. Africa, Antarctica, Asia, Australia, Europe, North America, South America
2. South America, Europe, Asia, North America, Africa, Australia, Antarctica
3. Antarctica, Australia, South America, Africa, Asia, North America, Europe
4. North America, South America, Australia, Asia, Europe, Africa, Antarctica

Geography Line-Up Answers

(Use with first Activity)

Cut out for students to solve the line-ups individually or in pairs

Seasons			
Winter	Spring	Fall	Summer

Western States			
Arizona	Colorado	New Mexico	Utah

Midwestern States			
Minnesota	Wisconsin	Iowa	Illinois

Regions				
Northeast	Southeast	West	Midwest	Southwest

Continents			
Africa	Antarctica	Asia	Australia
Europe	North America	South America	

How to Make Your Own Problems

(Use with second Activity)

1. Write down the answer first.
2. Write a clue and draw out the possibilities. Use the spatial vocabulary to write your clues.
3. Continue writing clues and drawing out the possibilities until only the correct answer is possible.
4. Check your clues by solving the problem.

----- **Example** -----

Ham	Apple	Cheese	Bread
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Write the answer first:

H A C B

1. The apple is in the first half:

The apple is either first or second

A A

2. The ham is not in the second half:

Either the apple or the ham is first or second

AH AH

3. The cheese is next to the apple:

The apple must be second, because if it was first, it would only be next to the ham. The cheese must be third since it can't be on the other side of the apple. That's where the ham is. Therefore, the bread must be last.

H A C B

Some Spatial Vocabulary

(Use with second Activity)

Here are some different ways to describe the location of items. You or your students may use this spatial vocabulary to come up with the new problems. Can you think of other ways to describe the locations?

On the End	More Vocabulary
only one next to	neither
not in the middle	either
on an end	first half
not second or third	second half
as far away as possible	to the right of
	to the left of
First	not next to
first	next to
not last or in the middle	before
far left	not before
	after
last or fourth	beside
is not first or in the middle	not beside
far right	not between
	between
second or third	two __ are before
not first or last	one __ is before
not first or fourth	one __ is after
not on an end	

The 24 Ways to Sequence Four Items

(Use with second Activity)

To help yourself or your students, it may be helpful to know that there are 24 possible ways to sequence four items. If you're not careful, there may be more correct answers than you think! (Or maybe you want more than one correct answer.)

Statistically speaking, the way to calculate the possible sequence for four items is as follows: $1 \times 2 \times 3 \times 4 = 24$. For five: $1 \times 2 \times 3 \times 4 \times 5 = 120$. Let your students calculate the possibilities for 2, 3, 4, 5, and more...

Below is a table of all 24 possible sequences for the numbers 1, 2, 3, 4.

One First	Two First	Three First	Four First
1234	2134	3124	4123
1243	2143	3142	4132
1324	2314	3214	4213
1342	2341	3241	4231
1423	2413	3412	4321
1432	2431	3421	4312

My Geography Line-Up

(Use with the Assessment)

Before you write your own geography line-up about our state, you must brainstorm at least five physical or cultural features of our state.

- a. A physical feature can be thought of as the natural features of the land such as oceans, rivers, forests, prairies, mountains, or deserts.
- b. Cultural features can be thought of as landscape features that were created or shaped by humans; for example towns and cities, transportation systems - road, rail, sea and air, or industry - mining and agriculture.
- i. Since cultural features have often been constructed by humans using resources from the physical environment, it is not always easy to distinguish between the two.

Five physical or cultural features				

To write your *My Geography Line-Up* think of the answer first. My answer is:

My Answer				

Now you need to write your clues, remember to use the spatial vocabulary. What are the possible answers? Write at least three clues. Explain how you determined the final answer (see the example if you need help).

First Clue: (Possible answers below)				

Second Clue: (Possible answers below)				

Third Clue: (Possible answers Below)				

On the back, explain how you determined the final answer.

My Geography Line-Up - Rubric

Explain how you determined your final answer here: _____

Objective	0	1	2	3	Earned Points
Five physical or cultural features about our state	0 points Student did not complete the features	1 point Only one physical or cultural feature	2 points Two or three physical or cultural features	3 points Five physical or cultural features	
Provided answer	0 points Student did not give an answer	1 point Only one answer is given	2 points Two or three answers are given	3 points Answer is complete with all four features	
First Clue	0 points Student did not a clue	1 point Student gave clue, or no possible answer	2 points Student gave clue and partial possible answer	3 points Student gave clue and all possible answers	
Second Clue	0 points Student did not a clue	1 point Student gave clue, or no possible answer	2 points Student gave clue and partial possible answer	3 points Student gave clue and all possible answers	
Third Clue	0 points Student did not a clue	1 point Student gave clue, or no possible answer	2 points Student gave clue and partial possible answer	3 points Student gave clue and all possible answers	
Explanation on how to determine final answer	0 points No explanation is given	1 point Explanation is partially given, no evidence.	2 points Explanation is given and has supporting evidence.	3 points Explanation is detailed and has supporting evidence. Justifies answer	
Correct spelling and punctuation	0 points More than three spelling or punctuation errors	1 point Less than three spelling or punctuation errors	2 points No spelling or punctuation errors		
				Score out of 20:	/20