CONTENT ENHANCEMENT: Research Methods and Results

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Question Exploration Guide

Text Reference _____ **Name:** Marie Henson

Course _____
Unit _____ **Critical**
Lesson _____ **Question #:** _____ **Title** _____ **Date:** _____

1 What is the Critical Question?

Why would a nation develop chemical weapons?

2 What are the Key Terms and explanations?

Chemical	A non-living substance
Chemical weapon	A liquid, gaseous, or solid chemical that can cause harm

3 What are the Supporting Questions and answers?

1) What are some types of chemical weapons?	1) Some types of chemical weapons are tear gas, mustard gas, blood gas, and nerve gas.
2) How are chemical weapons made?	2) They are made from common chemicals that have other uses.
3) How can people protect themselves against chemical weapons?	3) Other than taking shelter, there are few defenses against most chemical weapons.

4 What is the main Idea answer?

Chemical weapons are made from common chemicals and have few defenses.

5 How can we use the main idea?

What are some common chemicals used to make chemical weapons?

6 Is there an Overall Idea? Is there a real-world use?

What could you do for protection after an attack with nerve gas?

Figure 2. Example Question Exploration Guide for the critical question, "Why would a nation develop chemical weapons?"

Results

Enhanced QER with chemical weapons group:

F(1,114)=37.12, p=.000; eta square effect size .345 (very large)

Enhanced QER with biological weapons group:

F(1,9.78)=29.36, p=. 000; eta square effect size .246 (large)

Question Exploration Routine: Chemical Warfare Condition

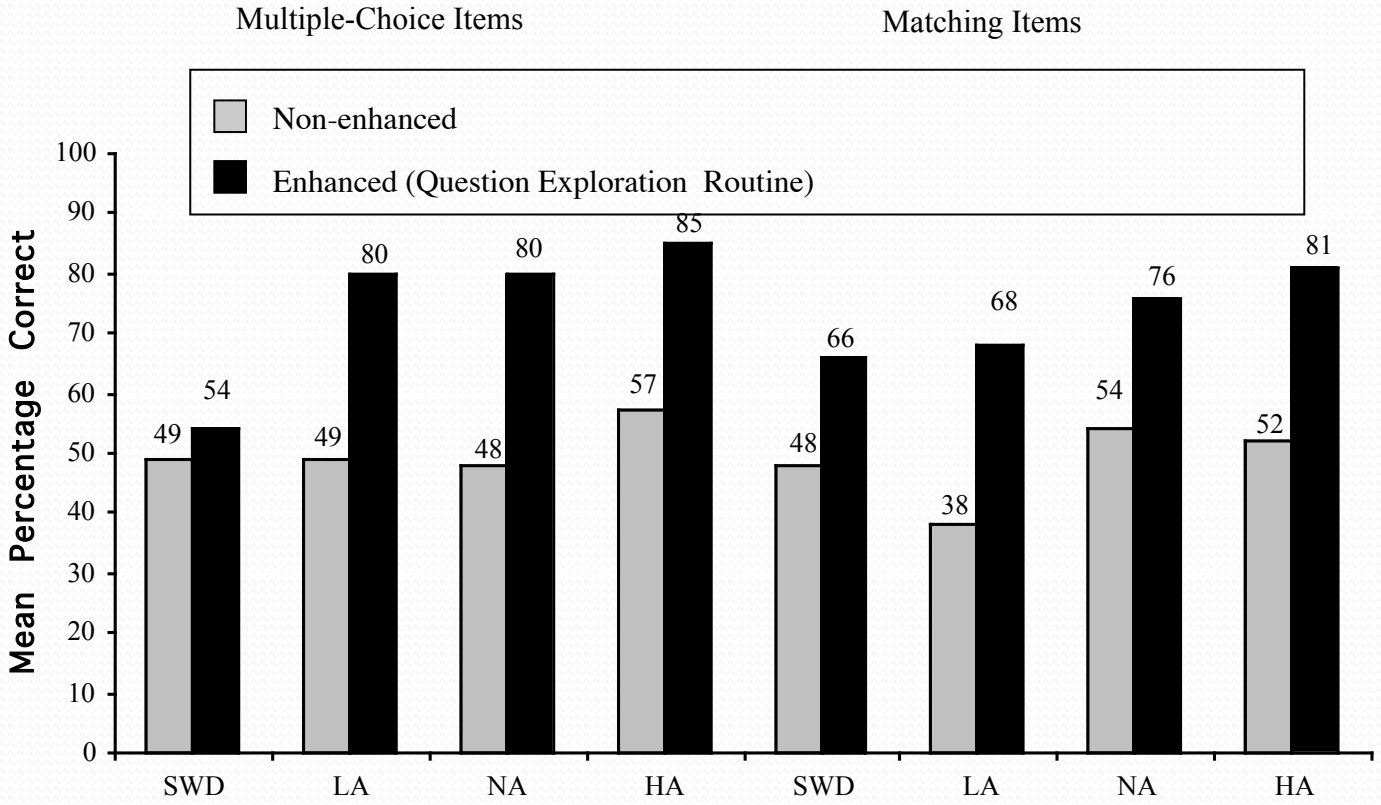

Figure 3. Mean percentage scores earned by students in enhanced and nonenhanced instruction on test items to elicit understanding related to chemical warfare. SWD = Students with disabilities; LA = Low achieving; NA = Normally achieving; HA = High achieving

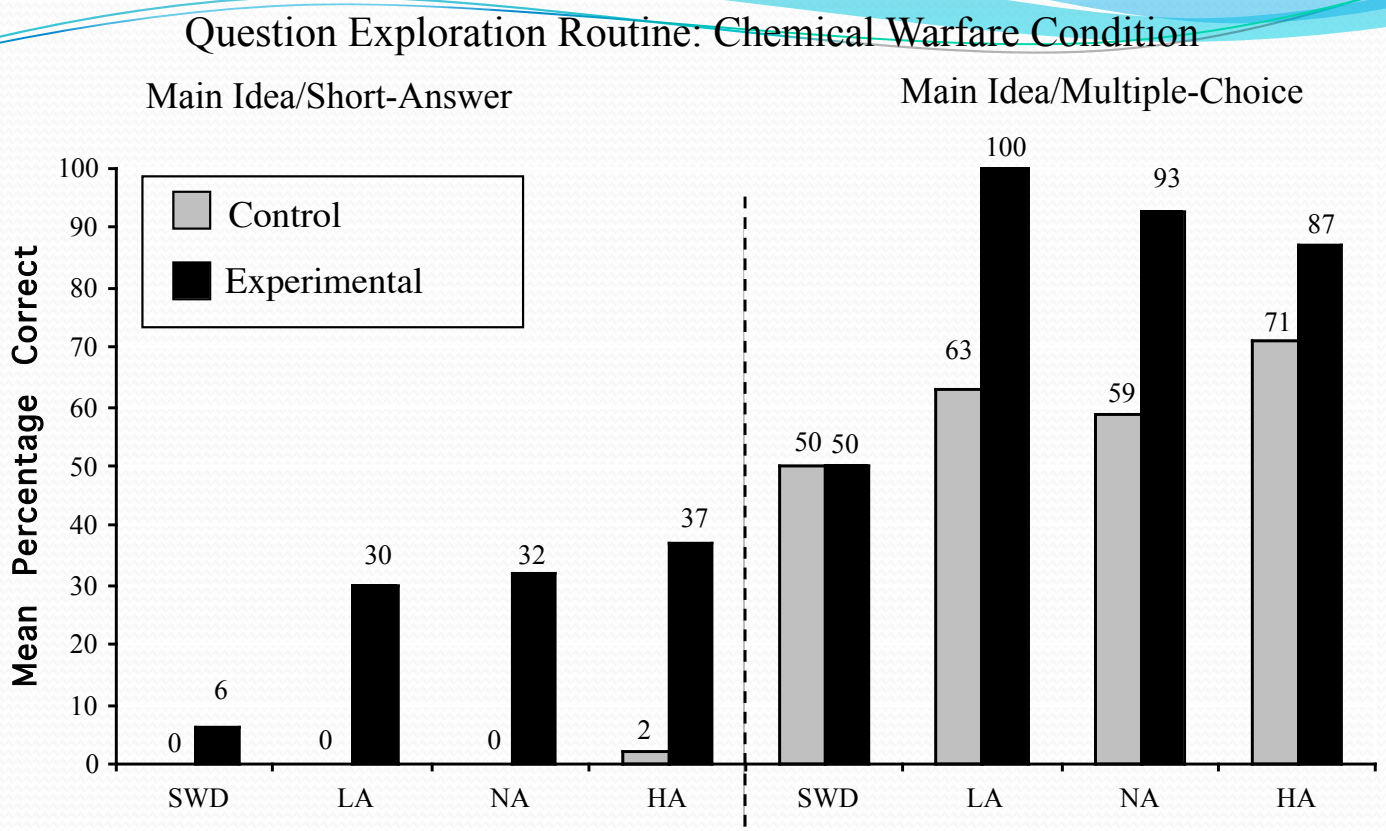

Figure 4. Mean percentage scores earned by students in enhanced and nonenhanced instruction on test items to elicit understanding of a main idea related to chemical warfare. SWD = Students with disabilities; LA = Low achieving; NA = Normally achieving; HA = High achieving.

Question Exploration Routine: Biological Warfare Condition

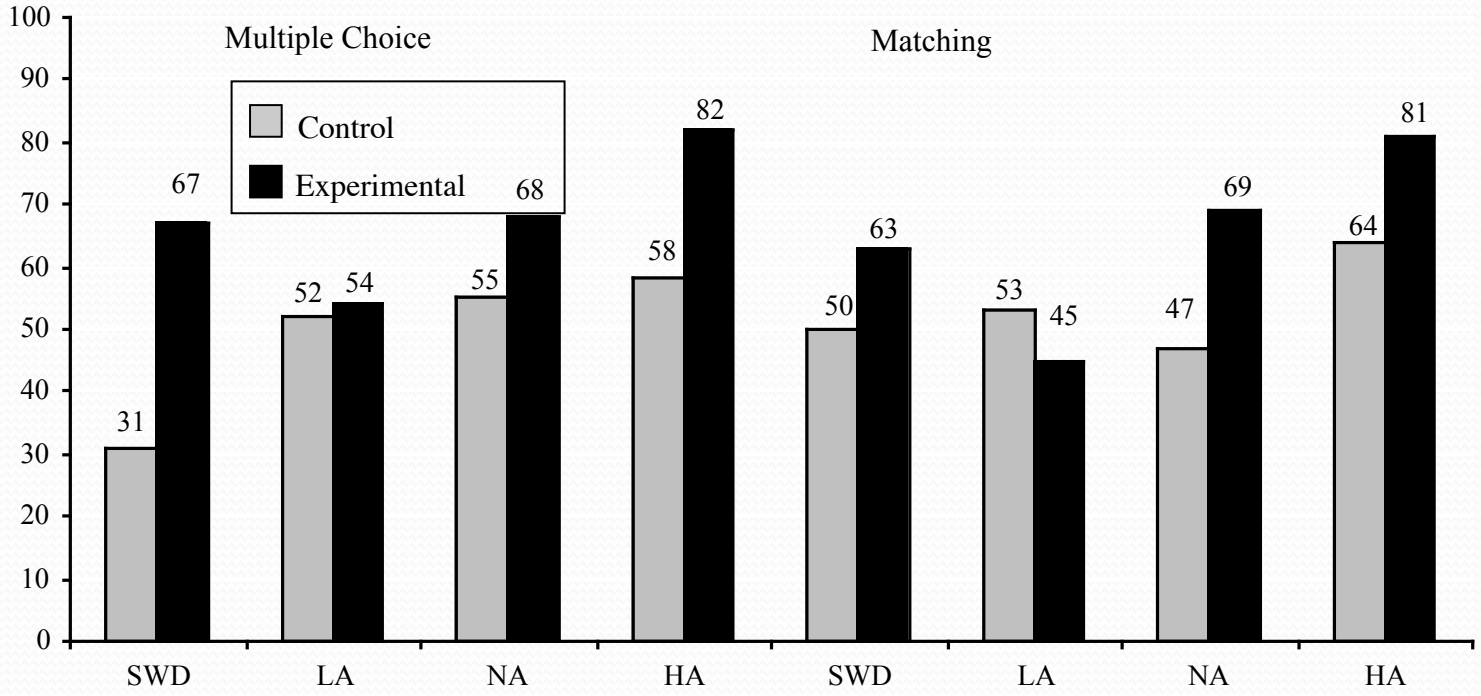

Figure 5. Mean percentage scores earned by students in enhanced and nonenhanced instruction on test items to elicit understanding related to biological warfare. SWD = Students with disabilities; LA = Low achieving; NA = Normally achieving; HA = High achieving.

Question Exploration Routine: Biological Warfare Condition

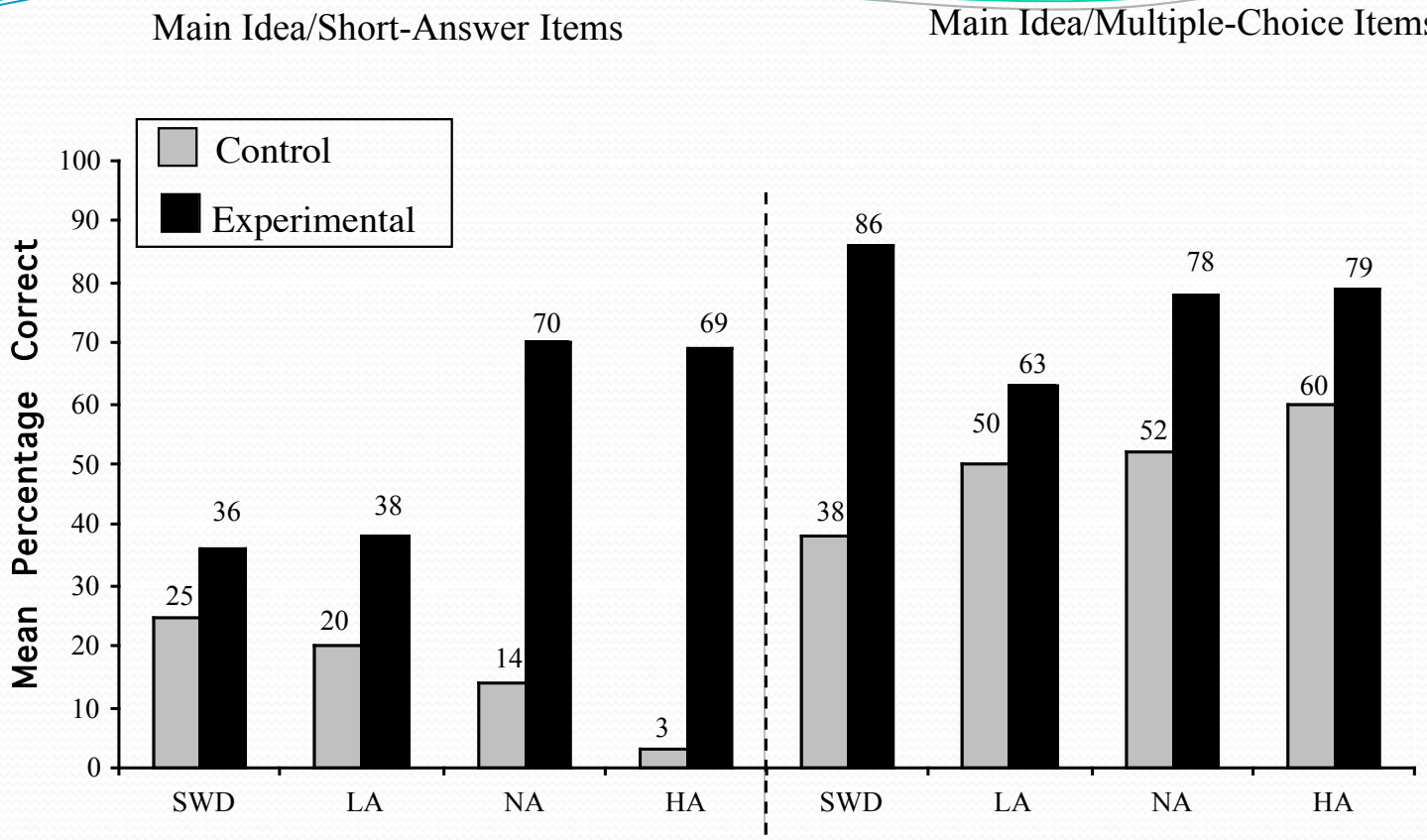

Figure 6. Mean percentage scores earned by students in enhanced and nonenhanced instruction on test items to elicit understanding of a main idea related to biological warfare. SWD = Students with disabilities; LA = Low achieving; NA = Normally achieving; HA = High achieving.

Classroom Validation Study

"What is the effect of use of QEGs in classrooms relative to performance (including application and generalization of knowledge) for students with and without disabilities?"

Design & Analysis

Random assignment of 9th grade language arts classes to experimental or control conditions for instruction in Shakespeare's *Romeo and Juliet*.

134 students in classes of 6 teachers.

Experimental-control group design. General linear mixed-model approach (HLM).

Example of overall total test results (impetuous behavior)

$F(1,9.32)=24.27$, $p=.0007$

Question Exploration Guide

Text Reference _____ Name: _____

Course _____

Unit _____ Critical Question #: 1 Title Shakespeare's Romeo and Juliet

Lesson _____ Date: _____

① What is the critical question?

What is Shakespeare's message about prejudice in Romeo and Juliet?

② What are the key terms and explanations?

What is prejudice?	Prejudice is a negative opinion made without looking at facts.

③ What are the supporting questions and answers?

What behaviors go with prejudice?	Behaviors include negative attitudes, negative words, or physical fights.
Give examples of each from R & J.	Attitude: Lord Capulet and Lord Montague have long hated each other. (1.1.87-93) Words: Montague accuses Capulet of being a "villain." (1.1.75) Fights: Capulet calls for his long sword to kill old Montague. (1.1.72)
What are the effects on younger people?	Attitude: Young Tybalt has learned to hate all Montagues "as he hates hell." (1.1.68) Words: Even the servants insult each other as "dogs". (1.1.10) Fights: Mercutio and Tybalt are killed in sword fights. (3.1.65-135)

④ What is the main Idea answer?

Prejudice can last from one generation to another.

⑤ Explore and use the main idea. How do the citizens in Act 1 feel about the fighting and prejudice?

The citizens are able to see the harm caused by long-term prejudice and end up hating both families.

⑥ Extend the main idea to your world. Describe an event in which prejudice hurts people over a long period of time.

The Protestants and Catholics in Northern Ireland have fought from generation to generation.

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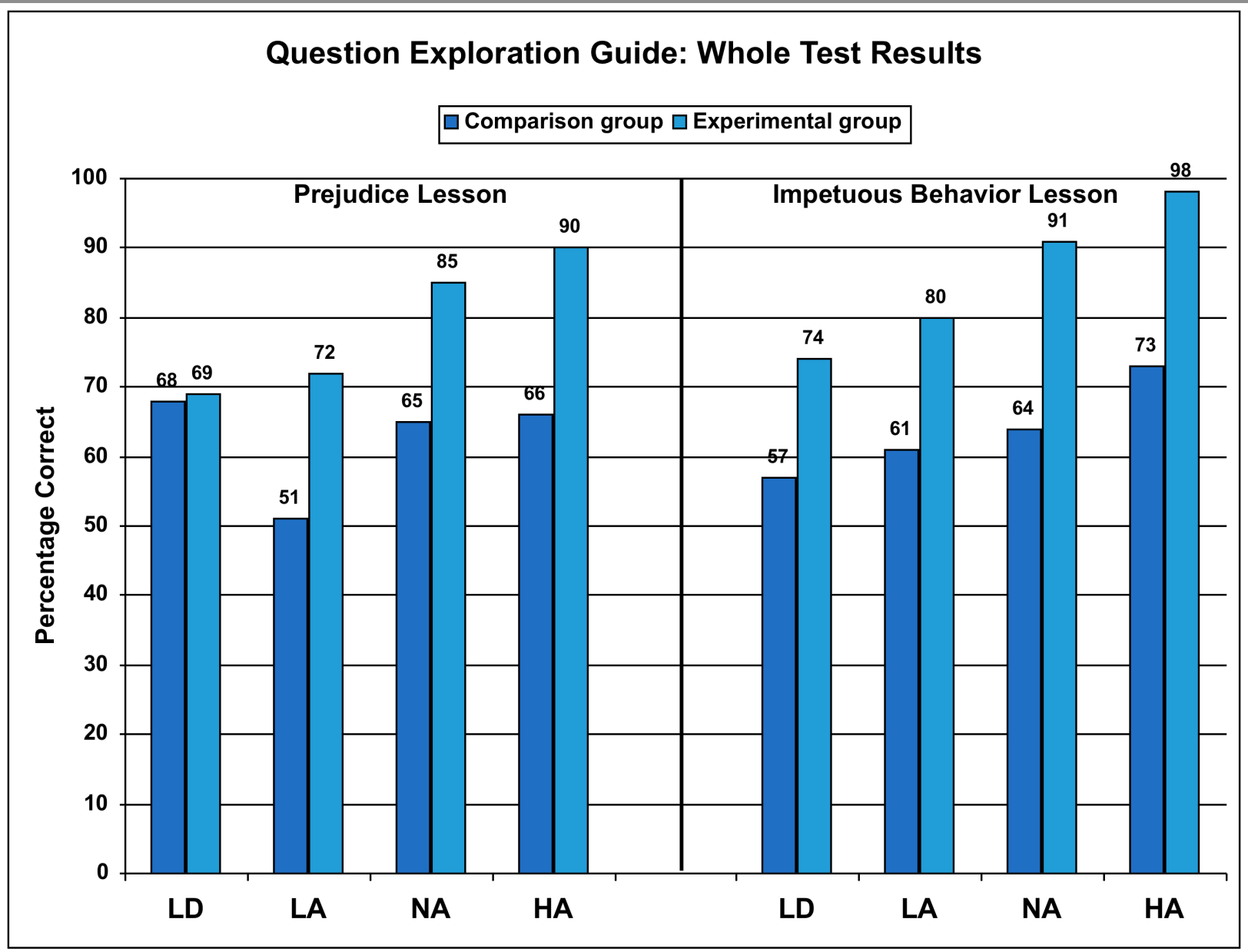
Figure 1


Question Exploration Guide: Whole Test Results
Comparison group
Experimental group
Prejudice Lesson
Impetuous Behavior Lesson
Percentage Correct
100
90
80
70
60
50
40
30
20
10
0
68
69
51
72
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85
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98
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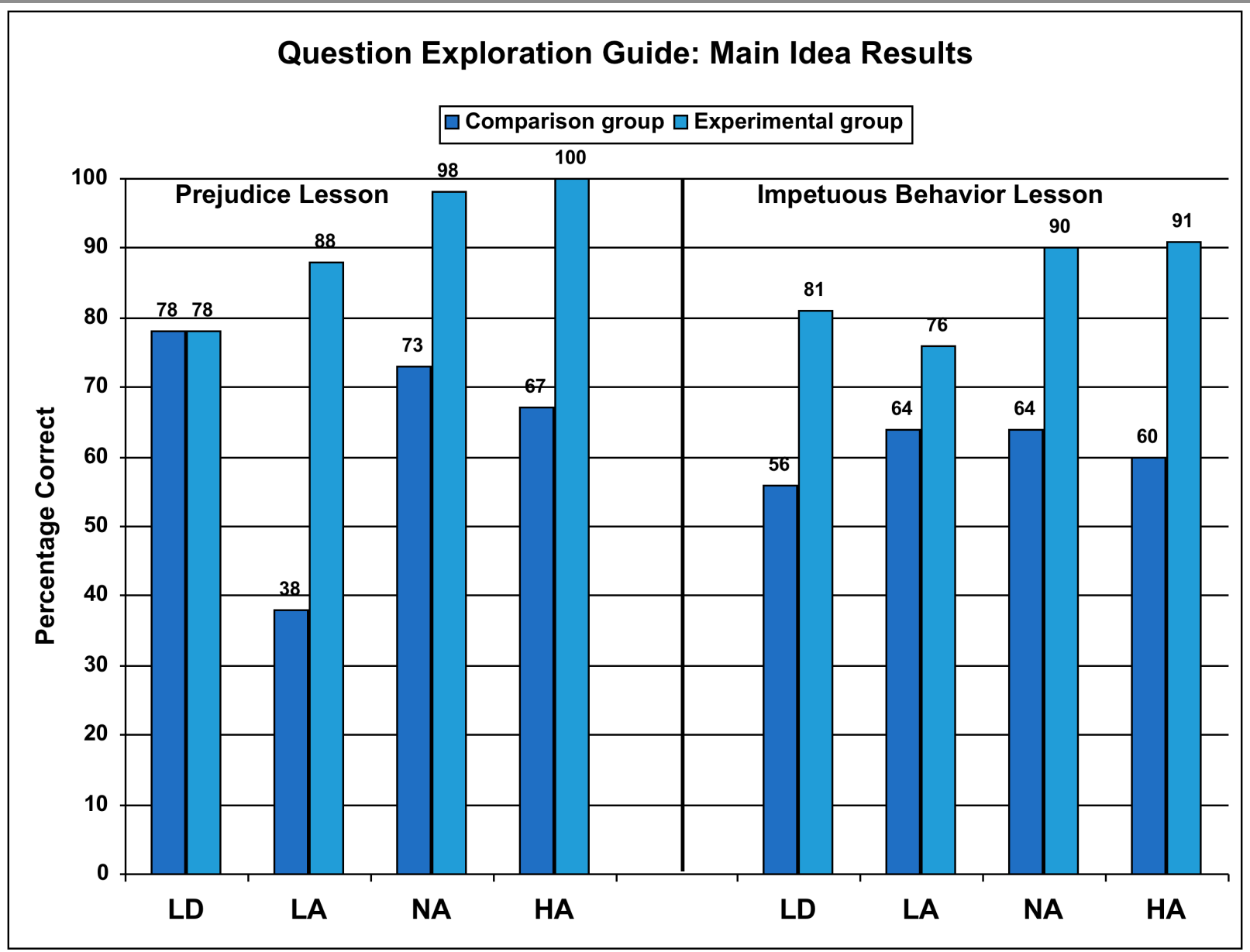
Question Exploration Guide: Main Idea Results
Comparison group
Experimental group
Prejudice Lesson
Impetuous Behavior Lesson
Percentage Correct
100
90
80
70
60
50
40
30
20
10
0
78 78
38
88
73
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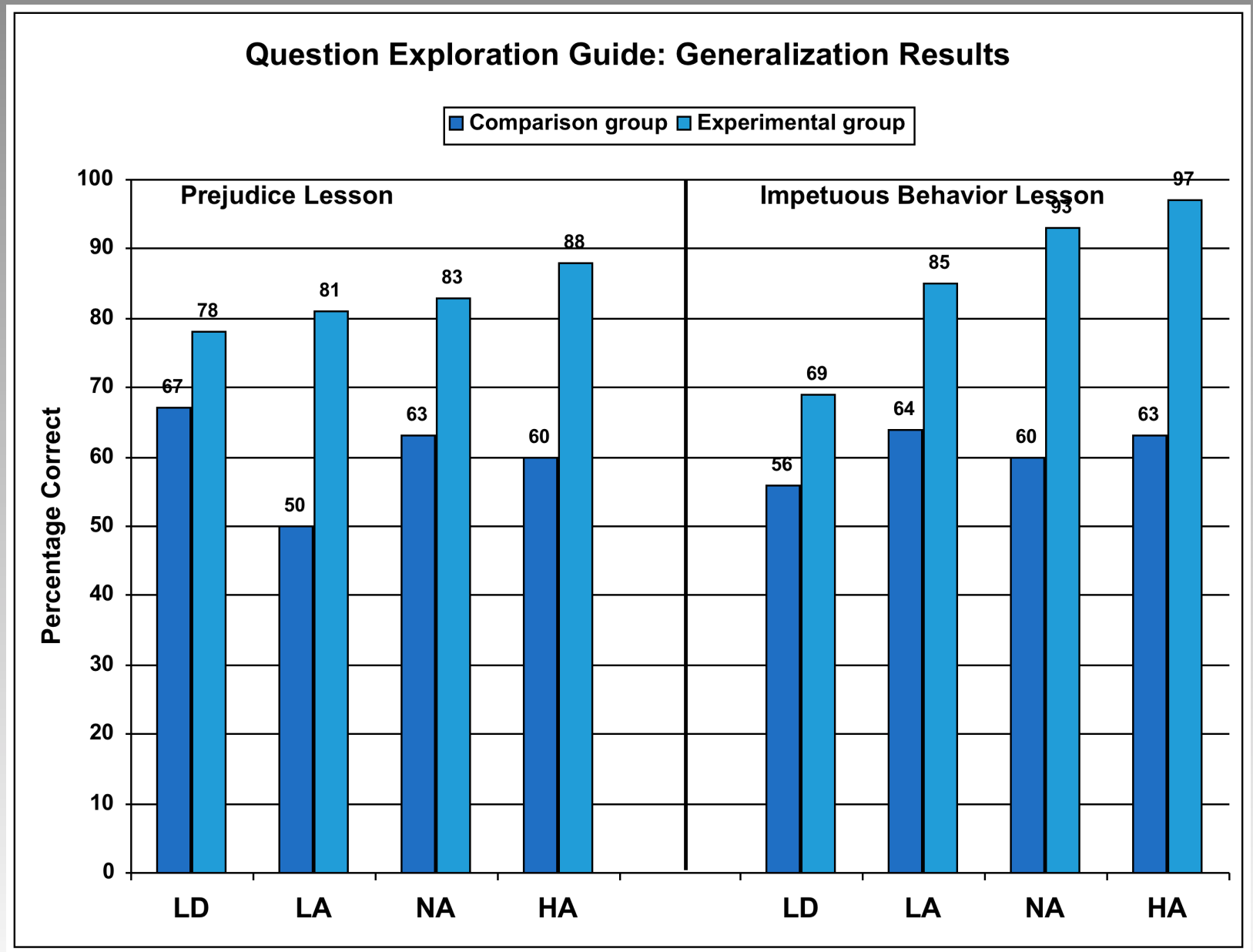
HA


Question Exploration Guide: Generalization Results
Comparison group
Experimental group
Prejudice Lesson
Impetuous Behavior Lesson
Percentage Correct
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30
20
10
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67
78
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97
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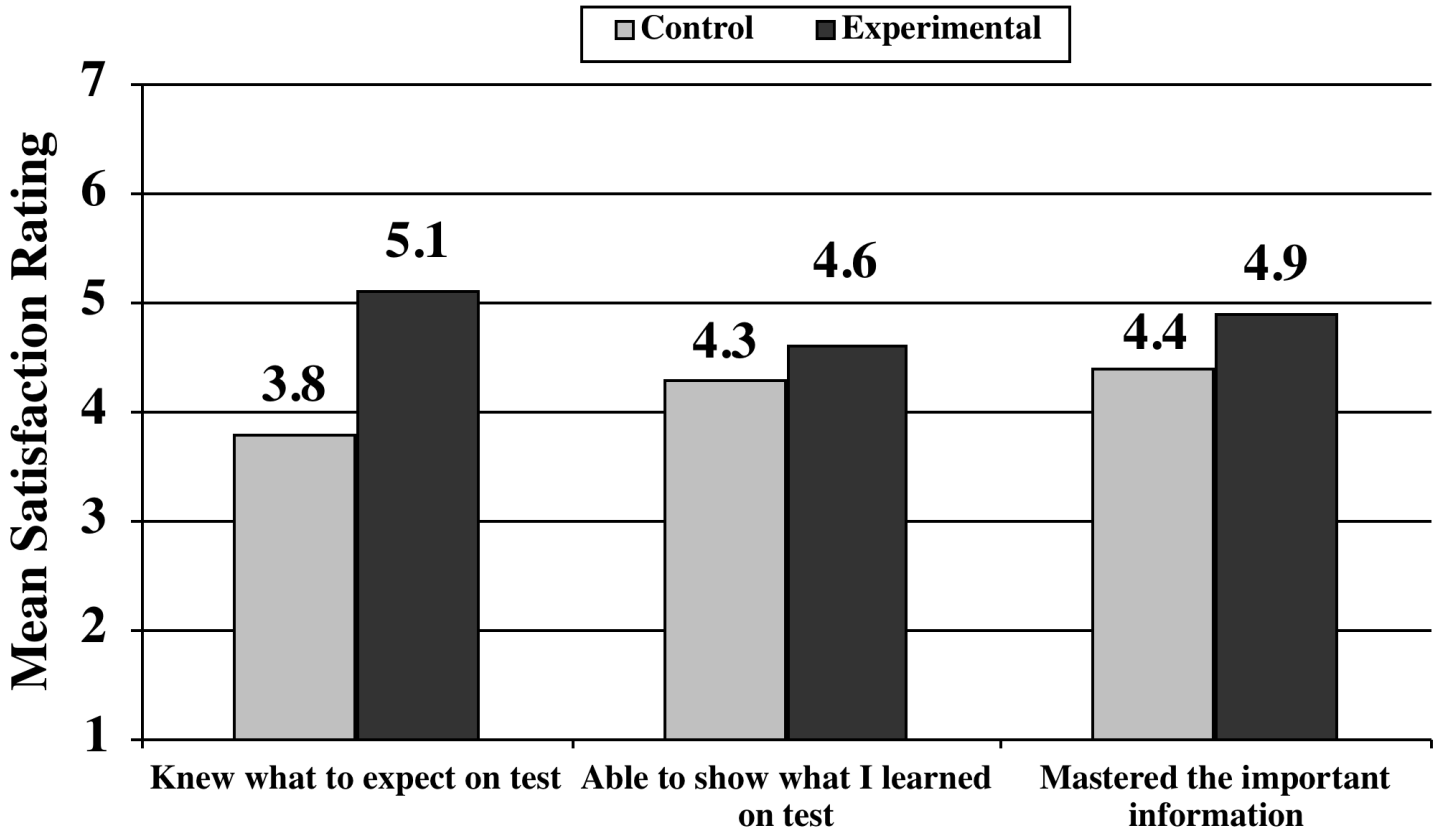
Student Confidence with use of the Question



Results of use of the Question Exploration Guide as Essay-writing Support

36 students 9-12 grade from special education or general education Language Arts classes in urban setting randomly assigned to experimental or control conditions.

Analysis of covariance with pretest and posttest data.

$F(1,33) = 15.90$, $p<.001$

Effect size, .74, moderately large (Cohen's *d*)

Question Exploration Guide

Text Reference American Literature Name:
Course
Unit Critical Title Our Environment
Lesson Question #: 1 Date: 1-25-01

1 What is the critical question?

How do problems with the ozone layer teach us about our effects on our environment?

2 What are the key terms and explanations?

What is our environment	All the things surrounding us - air, land, living things
What is the ozone layer?	Invisible layer of gas that shields us from UV radiation or harmful rays from the sun.
What is an effect?	A change one thing has on another such as ozone problems & environment

3 What are the supporting questions and answers?

What are problems with the ozone layer?	The protective ozone layer around the earth is being destroyed by CFCs. (Chlorofluorocarbons) - chemicals in products we use cleaning products , foam-type plastic containers, refrigerator coolants and spray cans)
How does the destruction happen?	NORMALLY 1 : Oxygen is hit by UV rays. 2 .Oxygen undergoes a change. 3. Protective ozone forms. BUT NOW: Chlorine in CFCs disrupt the ozone-oxygen balance. (One chlorine atom destroys hundreds of the protective ozone molecules.)
What is the effect?	Four effects: 1) physical harm such as skin cancer and cataracts, 2. environmental harm to crops and ocean plants. 3. Change in weather patterns, 4) Greenhouse warming of the earth

4 What is the main Idea answer?

What are solutions?

1. Voluntary cutbacks of foam products (MacDonalds) & coolants
2. alternatives (HCFCs)
3. World conferences to cut CFCs .

People can harm the environment without intending it or even believing it.

5 Explore and use the main idea.

How can we explore the facts ourselves?

But some still don't think it's a problem.

Experiments that students can do with construction paper show that darker colors absorb more UV rays and with balloons show that oxygen can be changed to ozone.

6 Extend the main idea to your world.

How can an individual who thinks there is a problem with ozone help?

An individual can decide not to use products that cause damage to ozone layer and can let their representatives know that they are concerned.

QEG Support for Essay-Writing

CONTENT

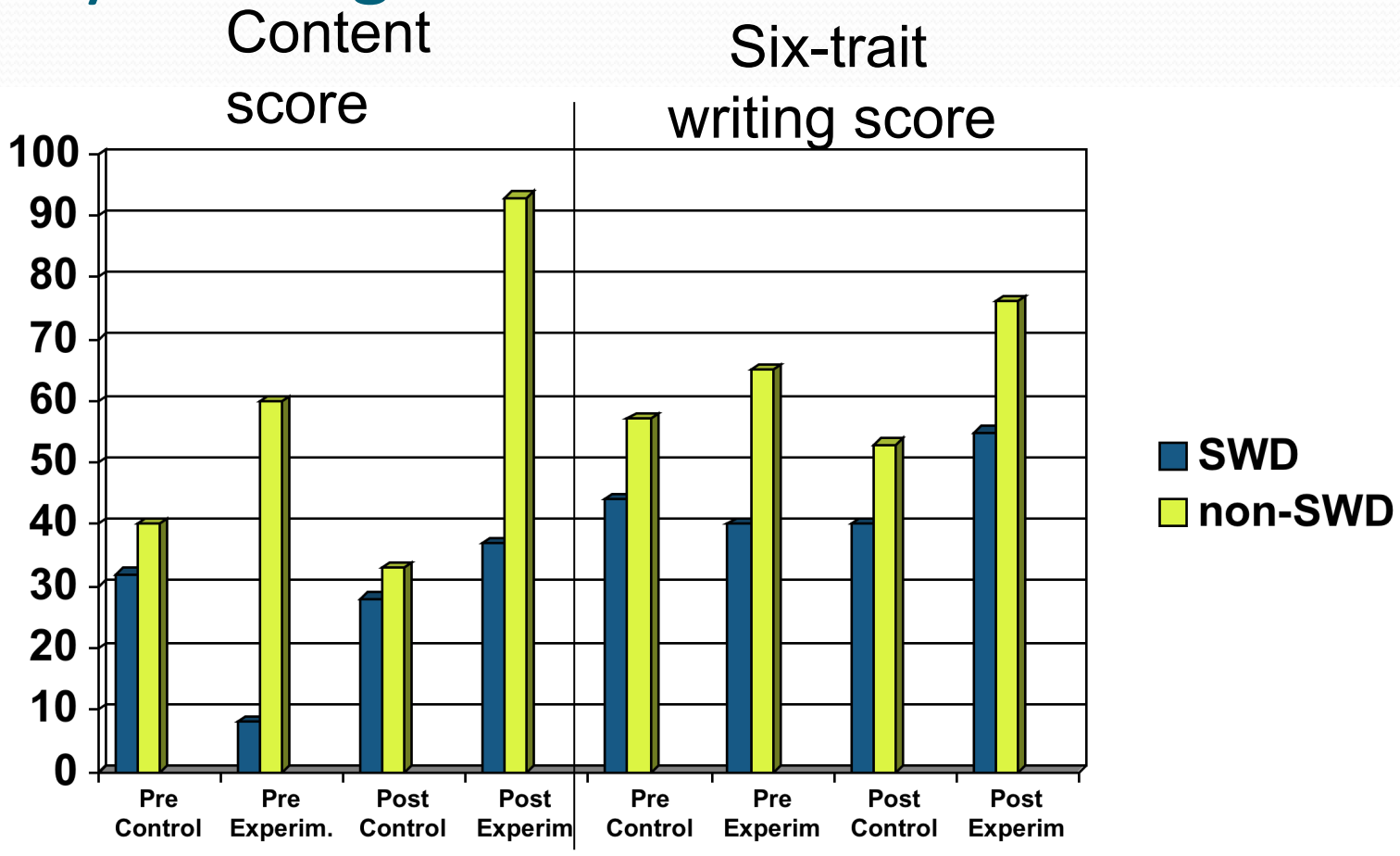
	Pre	Post
Control	35%	30 %
Experimental	29%	60%

6-Trait Writing Analysis

	Pre	Post
Control	52%	49 %
Experimental	51%	65%

*SWD: Woodcock Johnson Mean Reading Score, 12%

Essay Writing



Argumentation & Evaluation Guide

Topic_____ Name: _____
Title_____ Class: _____
Source_____ Date: _____

(1) What is the **Claim**, including any **Qualifiers**? Are there qualifiers? **Yes/No**. (If yes, underline them.)

(2) What **Evidence** is presented? In column 3, identify the type of evidence with the letter: **D**ata (D), **F**act (F), **O**pinion (O), **T**heory (T).

(3)

(5) What chain of **reasoning (warrant)** connects the evidence to the claim? In column 6, identify type of reasoning with the letter(s): for **A**UTHORITY (A), **T**HEORY (T), or type of LOGIC: **An**alogy (AN), **C**orrelation (C), **C**ause-**E**ffect (CE), **G**eneralization (G)

(6)

(4) **Evaluate** the quality of the evidence as poor, average or good. **Explain** your evaluation.

Reliable

Valid

Objective (no bias)

Controlled Experiment

(7) **Evaluate** the quality of the chain of reasoning as poor, average or good. **Explain** your evaluation.

Strength of Authority

Application of Theory

Type of Logic

(8) What are your concerns about the believability of the claim? (your counterarguments, rebuttals or new questions)?

(9) Accept, reject, or withhold judgment about the claim. **Explain** your judgment.

C Bulgren revised 10/1//2008

Total test scores. Results from the pilot study involving 158 students in the experimental group and 124 students in the comparison group across grades 6, 7, 8 and 9 indicate that no differences were found between performance on the pretest assessment by students in the experimental and comparison groups. Table 1 presents the results of the HLM analysis. Table 2 is a report of the means and Standard deviations for each of the 10 items on the pre and post tests on science argumentation. In addition, we combined the items into subscales to look for patterns in the results. In the analysis of post-test differences, using HLM analysis, highly significant differences were found for results of total test scores, $F(1,13)=140.9$, $p<.0001$; for the subscale score on students' ability to identify evidence, type of evidence and quality of evidence, $F(1,13)=60.1$, $p<.0001$; for students' ability to identify reasoning, type of reasoning, and quality of reasoning , $F(1,13)=156.3$, $p<.0001$; and for students ability to arrive at and explain a conclusion , $F(1,13)=27.4$, $p<.0002$.. The only subscale for which significant differences were not found was for the subscale that identified students' abilities to identify a claim and associated qualifiers, $F(1.13)=2.94$, $p=.11$.

From secondary analysis of the data, statistically significant results were also found between the experimental and control groups for the students with learning disabilities, $F(1,20)=6.16$, $p=.022$. For the gifted students, the results were also statistically significant, $F(1,20)=10.96$, $p=.003$. No differences were found between students in the different grades.