

## Application of the Critical Mathematics Pedagogical Framework: Four Lessons for the Adult Basic Education Mathematics Classroom

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### Abstract

Too often in mathematics classrooms, including in Adult Basic Education mathematics classrooms, mathematics is taught as a standalone subject; mathematics is stripped of context and divorced from application. In reality, mathematics is embedded in and a part of the natural world. Mathematics is used in society to: (1) facilitate exchanges of goods and services, (2) explain the world around us, and (3) promote various interests. It is within this third application of mathematics where the line between objective mathematics and subjective mathematics blurs. In this gray area lies a space in which mathematics is wielded as a weapon instead of a tool. Therefore, it is imperative that mathematics and mathematical concepts be taught within the context of societal weaponization and manipulation. One such way to teach mathematics is through lessons tied to the Critical Mathematics Pedagogical Framework. Acknowledging that all mathematics classrooms are not identical (tenet 1), mathematics teachers can create lessons with intent (tenet 3). Such lessons will show students that mathematics is not neutral (tenet 2) and that a critical critique of mathematical presentations is necessary (tenet 4).

**Keywords:** Adult Basic Education, The Critical Mathematics Pedagogical Framework, critical mathematics.

### Introduction

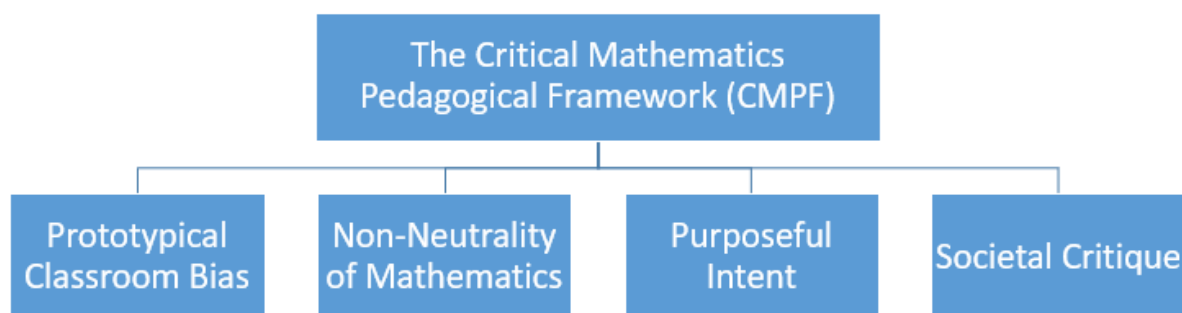
Science and mathematics were born from people's need to question the world around them. Early scientists and mathematicians set out to prove or disprove theories about how the world functions. However, current mathematical practices have numbed the learning process to consist of purely didactic teaching and learning (Darvin, 2007). This practice has made students believe the only way to learn mathematics is by memorization and repetition.

Critical pedagogical research suggests that this "banking" approach to mathematics education limits students by requiring compliance instead of questioning (Freire, 1970). Instead of implementing the traditional "banking" model, new leaders in the mathematics education field have identified the need for more critical pedagogy in the mathematics classroom (Darvin, 2007; Frankenstein, 1983; Gromlich, 2021; Janks et al., 2014; Skovsmose, 1994). This article utilizes the Critical Mathematics Pedagogical Framework (CMPF; Gromlich, 2021) to create

authentic lessons that can be implemented in the Adult Basic Education (ABE) mathematics classroom.

### Theoretical Framework

Critical mathematics pedagogy is a modification of Paulo Freire's critical literacy pedagogy (1970) to fit the field of mathematics education (Frankenstein, 1983; Skovsmose, 1994). While the term *critical mathematics pedagogy* has been used in modern literature, a framework had not been developed that unified the ideologies expressed in critical mathematics literature until 2021 (Gromlich, 2021). Gromlich (2021) synthesized the writings of Paulo Freire (1970; 1974), Marilyn Frankenstein (1982; 1983; 1984; 1998; 2009), Ole Skovsmose (1994; 2010; 2011; 2014), Hilary Janks et al. (2014), and others into a formalized framework through which curricula can be developed and implemented in Adult Basic Education (ABE) mathematics classrooms. The Critical Mathematics Pedagogical Framework (CMPF; Gromlich, 2021), shown in Figure 1, relies on four fundamental tenets.



**Figure 1:** The Critical Mathematics Pedagogical Framework (CMPF; Gromlich, 2021)

### **Tenet 1: All Mathematics Classrooms Are Not Identical**

While we like to assume that all students have access to quality education, technology, and fundamental resources (Skovsmose, 2010), this is not true in actuality; every classroom, every student, and every environment is unique. When building a mathematics curriculum based on the CMPF, it is imperative to create lessons that push back against the prototypical classroom bias often observed in educational literature and research.

### **Tenet 2: Mathematics is Not Neutral**

The second tenet of the CMPF is that mathematics is not neutral. All semiotic resources, including in mathematics, have a socio-cultural orientation that establishes power, displays power relationships, and produces identity positions (Janks et al., 2014). Curricula built around the CMPF, thus, must acknowledge the non-neutrality of mathematics in its conception and delivery.

### **Tenet 3: Mathematical Concepts Must Be Taught with Intent**

The CMPF is not just a framework through which to teach mathematics; it is a framework that also calls students to action. While the application and implementation of the CMPF on a day-to-day basis may look like other pedagogical methodologies and frameworks, CMPF goes beyond the basic methods of teaching in its *intent*. The pedagogical and curricular techniques used are not the end result, but a tool used to “develop new social relations in the struggle for humanization” (Frankenstein, 1983, p. 332).

### **Tenet 4: Critical Critique of Mathematics Presentations is Necessary**

Not only is it necessary to be critical thinkers of mathematics, it is also necessary to be critical thinkers in the world around us. The final tenet of the CMPF is to utilize mathematics and mathematical knowledge to first understand the politics of knowledge, the mathematics of political knowledge, and the politics of mathematical knowledge (Frankenstein, 1998, p. 306). It is then that students can take these concepts and make positive societal changes and fight back against social injustices.

### **The Critical Mathematics Pedagogical Framework vs. Basic Numeracy**

The Critical Mathematics Pedagogical Framework (CMPF; Gromlich, 2021) goes beyond basic numeracy principles. Basic numeracy can be described as the mirror image of literacy, “the minimum knowledge of mathematics and scientific subjects which any person should possess in order to be considered educated” (Withnall, 1994, p. 11). Critical mathematics pedagogy, on the other hand, teaches mathematics in ways to

highlight how numbers are portrayed, projected, and discussed to reveal power motives.

Mathematics is often taught in classrooms that attribute neutrality to mathematical applications. However, when used in society, numbers are not neutral. Information is always morally and politically loaded – with texts and discourses highlighting or masking the power relationships of everyday life (Luke et al., 1994; Stoessiger, 2002).

Therefore, it is not enough for one to be numerate. Instead, students need to learn mathematics content within the context of societal manipulation and interests. The CMPF (Gromlich, 2021) takes the concept of numeracy and adds the societal critique components often missing in traditional mathematics classrooms.

### **Adult Basic Education**

Critical mathematics pedagogical practices are necessary at all educational levels, including in the *Adult Basic Education (ABE)* classroom. ABE programs serve adult populations by providing students educational opportunities that either lead to a standard high school diploma or a High School Equivalency (HSE) certificate (Tighe et al., 2013). While many view ABE programs as “extensions of the elementary and secondary settings,” differences exist between ABE and K-12 student populations (Tighe et al., 2013, p. 417). It is necessary to recognize the barriers that ABE students face, and the pedagogical nuisances required to effectively teach ABE populations (Van Horn & Kassab, 2011).

### **Critical Mathematics Pedagogical Framework-Based Lessons**

After creating the Critical Mathematics Pedagogical Framework (CMPF; Gromlich, 2021), I then created one-hour lessons that aligned with the core tenets of the CMPF to be taught in an Adult Basic Education (ABE) mathematics classroom. The first four CMPF lessons are provided in this manuscript. Each lesson aligned to at least one College and Career Readiness Standard (CCRS; Pimentel, 2013) and all four of the CMPF tenets (Gromlich, 2021).

### **CMPF Lesson 1: Why Do Prices (Typically) End in .99?**

Throughout CMPF Lesson 1, students will reflect on how numbers and number positioning are strategically utilized to cause specific emotions and encourage buying behaviors. The time breakdown for each part of the activity, the activity components, and questions to ask students are all provided in Table 1.

**Table 1:** CMPF Lesson 1: Why Do Prices Typically End in 99?

#### **CCRS Standards:**

- 3.OA.8 – Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
- 7.RP.3 – Use proportional relationships to solve multistep ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.*

#### **4 Components of a CMPF Lesson:**

- Tenet 1: All Mathematics Classrooms are Not Identical
- Tenet 2: Mathematics is Not Neutral
- Tenet 3: Mathematical Concepts Must be Taught with Intent
- Tenet 4: Critical Critique of Mathematics Presentations is Necessary

Time Allotment	Directions for Students	Directions for Teachers and Questions to ask Students
5 minutes	The students will look through provided images and draw conclusions individually.	The teacher will show pictures of various price tags ending in 99 or .99 (collected during lesson preparation time).  The teacher will ask students to write down (silently, individually) what they see/notice.  Note: Do not tell the students what the topic is, let them look at the pictures as you go through.
10 minutes	The students will discuss the images and their individual observations as a group, led by the teacher.	The teacher will ask the following questions: <ul style="list-style-type: none"> <li>• <i>What patterns did you see?</i></li> <li>• <i>How familiar were you with the items and images shown?</i></li> <li>• <i>How did the pictures make you feel?</i></li> <li>• <i>Why might I be showing you these pictures?</i></li> </ul> Note: Be sure to discuss rounding. Have examples prepared.
15 minutes	Students will read the article titled “Why Do Most Prices End in .99?” either individually or in small groups (Appendix A).  Each student will highlight 3 sentences that resonate with them.	The teacher will walk around and see which sentences students are highlighting.  The teacher will take mental notes to bring up these sentences in the whole-group discussion.
5 minutes	The students will listen as the teacher reads the same article out loud to the whole class.	The teacher will read the article out loud to the whole class. This provides access for those who may have lower reading abilities.  As the teacher is reading, the teacher will highlight some of the sentences that students identified during their silent reading.
15 minutes	The students will discuss the article as a group, led by the teacher.	The teacher will ask the following questions: <ul style="list-style-type: none"> <li>• <i>Who is the author of this passage?</i></li> <li>• <i>What is the author’s main goal?</i></li> <li>• <i>Is the author and/or the website credible?</i></li> <li>• <i>Do you agree with the passage? Why or why not?</i></li> <li>• <i>What were some of your 3 highlighted sentences? Why did you highlight those specific sentences?</i></li> <li>• <i>How does this topic affect you, your family, and your community?</i></li> </ul> Note: Be sure to discuss sales tax at this point.
10 minutes	Each student will write a reflection (~3-5 sentences) answering one, some, or all the following questions: <ul style="list-style-type: none"> <li>• <i>Did today’s lesson make you think differently about sales prices and marketing practices? Why or why not?</i></li> <li>• <i>How might you use this information in the future?</i></li> <li>• <i>What implications does this have for your family and friends?</i></li> <li>• <i>What implications does this have for society as a whole?</i></li> </ul>	

To prepare for this lesson, the teacher will need to find images of various price tags ending in 99 or .99. Images can include price tags of clothes, jewelry, cars, and furniture. Pictures can be printed, drawn, or digital depending on technology and access within the classroom setting. Gas station marquee signs could also be used to then discuss fractions of cents. Additionally, the teacher should prepare some examples of rounding, as rounding should be discussed in this lesson. The article used in this lesson titled “Why Do Most Prices End in .99?” (Melina, 2011) is provided in Appendix A.

### **CMPF Lesson 2: What is a 0% Introductory APR and can 0% Ever be Bad?**

CMPF Lesson 2 allows students to explore 0% annual percentage rates and discuss potential real-world pitfalls of interest. The time breakdown for each part of the activity, the activity components, and questions to ask students are all provided in Table 2.

To prepare for this lesson, the teacher will need to create or identify examples of simple and compound interest problems. Part of this lesson includes describing interest and understanding the underlying mathematical calculations involved in interest accumulation. The accompanying Credit Cards and APR Scavenger Hunt Worksheet can be found in Appendix B.

**Table 2:** CMPF Lesson 2: What is a 0% Introductory APR and can 0% Ever be Bad?

<p><b>CCRS Standards:</b></p> <ul style="list-style-type: none"> <li>7.RP.3 – Use proportional relationships to solve multistep ratio and percent problems. <i>Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.</i></li> <li>7.EE.3 – Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.</li> </ul> <p><b>4 Components of a CMPF Lesson:</b></p> <ul style="list-style-type: none"> <li>Tenet 1: All Mathematics Classrooms are Not Identical</li> <li>Tenet 2: Mathematics is Not Neutral</li> <li>Tenet 3: Mathematical Concepts Must be Taught with Intent</li> <li>Tenet 4: Critical Critique of Mathematics Presentations is Necessary</li> </ul>		
<b>Time Allotment</b>	<b>Directions for Students</b>	<b>Directions for Teachers and Questions to ask Students</b>
<b>10 minutes</b>	The students will discuss credit cards, introductory offers, and APR as a whole class, led by the teacher.	<p>The teacher will lead a discussion on credit cards, introductory offers, and APR by asking the following questions:</p> <p><i>What is a credit card?</i>  <i>Do you use credit cards? Why or why not?</i>  <i>What is APR?</i>  <i>Have you ever heard of 0% APR?</i>  <i>How does a company make money off of a 0% APR offer?</i>  <i>What happens if you do not pay off a 0% APR loan in the 0% time period?</i></p> <p>Note: Be prepared to discuss simple and compound interest mathematically. Have examples prepared.</p>
<b>30 minutes</b>	The students will work in groups of 3. Each group will complete the Credit Cards and APR Scavenger Hunt Worksheet (Appendix B).	<p>The teacher will divide the class into groups of 3.</p> <p>The teacher will provide the Credit Cards and APR Scavenger Hunt Worksheet to each group.</p> <p>As students are working on the Credit Cards and APR Scavenger Hunt Worksheet, the teacher will walk around the classroom, listen to student conversation, and observe student activity.</p>
<b>10 minutes</b>	Each student group will present a brief overview of their findings to the rest of the class.	
<b>10 minutes</b>	<p>Each student will write a reflection (~3-5 sentences) answering one, some, or all the following questions:</p> <p><i>Who typically uses 0% APR offers in our society?</i>  <i>Knowing what we learned today, would you still use 0% APRs in the future? Why or why not?</i>  <i>Do you think this is an issue in our society? Why or why not?</i></p>	

**CMPF Lesson 3: What are all these Payday Loan Stores Doing Here?**

CMPF Lesson 3 asks students to research payday loan stores and their policies. The time breakdown for each part of the activity, the activity components, and questions to ask students are all provided in Table 3.

To prepare for this lesson, the teacher will need to remind students about simple interest and simple interest calculations. Students will use this information in Part 4 of the Payday Loan Scavenger Hunt Worksheet (Appendix C).

**Table 3:** CMPF Lesson 3: What are all these Payday Loan Stores Doing Here?

<p><b>CCRS Standards:</b></p> <ul style="list-style-type: none"> <li>• 7.RP.3 – Use proportional relationships to solve multistep ratio and percent problems. <i>Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.</i></li> <li>• 7.EE.3 – Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.</li> </ul> <p><b>4 Components of a CMPF Lesson:</b></p> <ul style="list-style-type: none"> <li>• Tenet 1: All Mathematics Classrooms are Not Identical</li> <li>• Tenet 2: Mathematics is Not Neutral</li> <li>• Tenet 3: Mathematical Concepts Must be Taught with Intent</li> <li>• Tenet 4: Critical Critique of Mathematics Presentations is Necessary</li> </ul>		
<b>Time Allotment</b>	<b>Directions for Students</b>	<b>Directions for Teachers and Questions to ask Students</b>
<b>10 minutes</b>	The students will discuss payday loan centers as a whole class, led by the teacher.	<p>The teacher will lead a discussion on payday loan centers by asking the following questions:</p> <ul style="list-style-type: none"> <li>• <i>What is a payday loan center? Do you know of any examples off the top of your head?</i></li> <li>• <i>Has anyone ever used a payday loan center? How was your experience?</i></li> <li>• <i>How do payday loan centers make money?</i></li> </ul> <p>Note: Remind students about simple interest and compound interest calculations.</p>
<b>30 minutes</b>	The students will work in groups of 3. Each group will complete the Payday Loan Scavenger Hunt Worksheet (Appendix C).	<p>The teacher will divide the class into groups of 3.</p> <p>The teacher will provide the Payday Loan Scavenger Hunt Worksheet to each group.</p> <p>As students are working on the Payday Loan Scavenger Hunt Worksheet, the teacher will walk around the classroom, listen to student conversation, and observe student activity.</p>
<b>10 minutes</b>	Each student group will present a brief overview of their findings to the rest of the class.	
<b>10 minutes</b>	<p>Each student will write a reflection (~3-5 sentences) answering the following question:</p> <ul style="list-style-type: none"> <li>• <i>Based on your research, are payday loans more helpful or harmful? Why? (Remember to choose a side and support it with details and examples).</i></li> </ul>	

**CMPF Lesson 4: Why is it so Hard to Buy Airplane Tickets?**

CMPF Lesson 4 asked students to explore the hidden costs associated with purchasing airline tickets. The time breakdown for each part of the activity, the activity components, and questions to ask students are all provided in Table 4.

To prepare for this lesson, the teacher will need to provide examples of calculating taxes on final total costs. The teacher should create or identify examples prior to the lesson that they can use to show how tax is calculated. The accompanying Airplane Tickets’ Hidden Costs Scavenger Hunt Worksheet can be found in Appendix D.



**Table 4:** CMPF Lesson 4: Why is it so Hard to Buy Airplane Tickets?

<p><b>CCRS Standards:</b></p> <ul style="list-style-type: none"> <li>5.NBT.7 – Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. [Note from panel: Applications involving financial literacy should be used.]</li> <li>7.RP.3 – Use proportional relationships to solve multistep ratio and percent problems. <i>Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.</i></li> <li>7.EE.3 – Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.</li> </ul> <p><b>4 Components of a CMPF Lesson:</b></p> <ul style="list-style-type: none"> <li>Tenet 1: All Mathematics Classrooms are Not Identical</li> <li>Tenet 2: Mathematics is Not Neutral</li> <li>Tenet 3: Mathematical Concepts Must be Taught with Intent</li> <li>Tenet 4: Critical Critique of Mathematics Presentations is Necessary</li> </ul>		
Time Allotment	Directions for Students	Directions for Teachers and Questions to ask Students
10 minutes	The students will discuss purchasing airline tickets as a whole class, led by the teacher.	<p>The teacher will lead a discussion on purchasing airplane tickets by asking the following questions:</p> <ul style="list-style-type: none"> <li><i>Who has purchased an airplane ticket in the past?</i></li> <li><i>How was the experience?</i></li> <li><i>How do you select your airplane tickets? Cheapest base price? Favorite airline?</i></li> <li><i>What do you notice about the cost presented? Are some costs not shown initially?</i></li> </ul> <p>Note: Be sure to discuss tax calculations. Have examples prepared.</p>
30 minutes	The students will work in groups of 3. Each group will complete the Airplane Tickets’ Hidden Costs Scavenger Hunt Worksheet (Appendix D).	<p>The teacher will divide the class into groups of 3.</p> <p>The teacher will provide the Airplane Tickets’ Hidden Costs Scavenger Hunt Worksheet to each group.</p> <p>As students are working on the Airplane Tickets’ Hidden Costs Scavenger Hunt Worksheet, the teacher will walk around the classroom, listen to student conversation, and observe student activity.</p>
10 minutes	Each student group will present a brief overview of their findings to the rest of the class.	
10 minutes	<p>Each student will write a reflection (~3-5 sentences) answering one, some, or all the following questions:</p> <ul style="list-style-type: none"> <li><i>How do airlines use numbers to make people feel a certain way?</i></li> <li><i>Are there any tactics/strategies that airlines use to artificially make the fares seem lower than they actually are?</i></li> <li><i>What do you think about these practices? Is it ok that they do this? Should these practices be changed?</i></li> </ul>	

**Summary**

The goal of this article was to showcase four lessons based on the Critical Mathematics Pedagogical Framework (Gromlich, 2021) that can be implemented in the Adult Basic Education (ABE) mathematics classroom. Future research will utilize these four lessons to assess ABE students’ understanding of mathematics and their relationship to mathematics. Finally, these lessons will be used to promote a critical understanding of mathematics in society and provide opportunities for students to be critical consumers of mathematics and forces for change in the world.

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## Appendix A: CMPF Lesson 1 Article “Why Do Most Prices End in .99?”

February 17, 2011 by Remy Melina

<https://www.livescience.com/33045-why-do-most-prices-end-in-99-cents-.html>

Many stores will be discounting their items and changing price tags to end in .99 during this long weekend's Presidents Day sales. But seeing a price end in this number is so common that shoppers hardly notice the extremely effective sales tactic.

It may seem silly to price items one cent short of a solid dollar especially when taxes will make the overall cost more than a dollar anyway but the pricing tactic has been around for at least a century, according to Lee E. Hibbett, an associate professor of marketing at Freed-Hardeman University in Henderson, Tenn. Historians can't pinpoint who established the trick, but consumer behavior experts can definitely explain why it helps move more goods.

Ending a price in .99 is based on the theory that, because we read from left to right, the first digit of the price resonates with us the most, Hibbett explained. That's why shoppers are more likely to buy a product for \$4.99 than an identical one for \$5 the item that starts with a 4 just seems like a better deal than the one that starts with 5.

"We also tend to attempt to reduce the amount of effort expended on making product decisions, especially with lower-cost items," Hibbett told *Life's Little Mysteries*. "So we may not really process the numbers after the dollar amount."

Additionally, the .99 alone serves to make an item appear to be on sale, according to the article "Mind Your Pricing Cues," published in the September 2003 issue of the *Harvard Business Review*. Price-conscious consumers have become conditioned to believe that they are getting a good deal when they buy something with a price ending in .99 even if the markdown is minimal.

"Some retailers do reserve prices that end in 9 for their discounted items. Comparisons of prices at major department stores reveal that this is common, particularly for apparel," wrote Eric Anderson, professor of marketing at Northwestern University's Kellogg School of Management, and Duncan Simester, professor of management science at M.I.T.'s Sloan School of Management, in their article.

For instance, the clothing stores J. Crew and Ralph Lauren typically price regular merchandise in whole dollar amounts and stick 99-cent endings on discounted items. These retailers purposely avoid ending their regular prices in .99 so that consumers won't associate the items with cheap deals. By contrast, stores attempting to project an image of selling underpriced goods will make it a point to end all their items' tags regularly priced and discounted alike in .99.

The power of "9" isn't restricted to the cents column, as Anderson and Simester illustrated by asking a national clothing catalog to increase the price of one of its dresses. "You'd generally expect demand for an item to go down as the price goes up," Anderson and Simester wrote. "Yet in our study involving the women's clothing catalog, we were able to increase demand by a third by raising the price of a dress from \$34 to \$39. By comparison, changing the price from \$34 to \$44 yielded no difference in demand."

**Appendix B: CMPF Lesson 2 “Credit Cards and APR Scavenger Hunt Worksheet”**

**Part 1.** Fill in the table below by researching five different credit cards.

	Card #1	Card #2	Card #3	Card #4	Card #5
<b>Credit Card Name</b>					
<b>Banking/Credit Issuing Institution</b>					
<b>Introductory Percentage Rate</b>					
<b>Non-Introductory Percentage Rate</b>					
<b>Annual Fees</b>					
<b>Other Valuable Information</b>					

**Part 2.** After filling in the table, answer the following questions:

- What are common interest rates that you found?
- Was there a difference between introductory rates and long-term rates?
- Why might companies have different introductory and non-introductory rates?
- Which card had the “best” rates? How did you determine “best”?
- Did many cards have annual fees?

**Appendix C: CMPF Lesson 3 “Payday Loan Scavenger Hunt Worksheet”**

**Part 1.** Answer the following questions using previous knowledge and/or using search engine tools:

- What is a payday loan center?
- What is a payday loan?
- Do you know any payday loan centers in [insert local city here] (think commercials, ads)?
- Have you or anyone you know ever used a payday loan center? If so, what was your/their experience?
- How do payday loan centers make money?
- What are some common interest rates on payday loans?

**Part 2.** Do a Google Maps search for Payday Loan Centers in [insert local city here]. Take a screenshot and add this to your document.

**Part 3.** Answer the following questions.

- In which part of town did you find payday loan centers?
- Why might these payday loan centers be in this location?

**Part 4.** Solve the following problems. Show your work by using formulas or by adding pictures of hand-written work.

- Savannah takes out a \$2,500 payday loan. The payday loan center says that they charge 10% interest **per month**. How much will she pay in interest in one year? (Use the simple interest formula).
- George borrows \$3,000 at a payday loan center. He pays \$4,500 in interest. What was his annual interest rate? (Use the simple interest formula).

**Appendix D: CMPF Lesson 4 “Airplane Tickets’ Hidden Costs Scavenger Hunt Worksheet”**

**Part 1.** Answer the following questions using your previous knowledge and/or using search engine tools.

- Have you ever purchased an airplane ticket online? If so, how was your experience?
- How did you select your ticket? (Cheapest base price? Favorite airline? Direct flight vs. layover?)
- What did you notice about the initial cost vs. the price you actually paid for the ticket?
- Are there some costs that are not shown?

**Part 2.** Use an airline search engine (your choice) to fly from [insert local city here] to [insert a different city here]. You will depart between March 23 and March 27 and return between March 30 and April 3. The dates you choose to depart and return are up to you. Choose two different airlines to use. Take a screenshot of the two flights’ departure and return dates/times.

**Part 3.** Compare these two flights’ costs. Calculate the total cost for each flight including:

- base cost
- cost for baggage check
- cost for seat selection
- cost for taxes
- cost for insurance

**Part 4.** Read the following scenario and determine which flight has the lowest total cost.

*Flight A has a base cost of \$250. It costs \$50 per checked bag and \$12 to select a standard seat. The airline charges \$75 in airline fees and the total tax is 7% after all costs and fees are calculated.*

*Flight B has a base cost of \$325. The first checked bag is free, and each additional checked bag is \$25. It does not cost anything to select a standard seat. The airline charges a \$50 airline fee and the total tax is 6% after all costs and fees are calculated.*

*Amy has two bags that she needs to check on her trip. Which flight will have the lowest total cost after all taxes and fees are applied?*