

# The Incredible Changing Price

Part 1

### A THINKLAW MATH LAB

OBJECTIVE	Thinkers will <b>create bar graphs</b> to analyze data about dynamic pricing.

### Lesson Outline

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- 1. In the thinkstarter, thinkers will analyze data from a lemonade stand. Should they increase the price of lemonade on hot days?
- 2. Thinkers are introduced to the concept of dynamic pricing. Thinkers will be asked to create bar graphs to represent 3 examples of dynamic pricing.
- 3. Thinkers will determine the best arguments why dynamic pricing is fair and why dynamic pricing is not fair. Thinkers will determine if dynamic pricing should be illegal.
- 4. In the thinkBigger, thinkers will examine a real-life legal case that involves dynamic pricing. Thinkers will apportion the fault and explain their ruling using the DRAAW+C framework.



# Indiana Academic Standards

**3.DA.1:** Collect, organize, and graph data from observations, surveys, and experiments using scaled bar graphs and pictographs. Solve real-world problems by analyzing and interpreting the data using grade-level computation and comparison strategies. (E)

**4.DA.1:** Formulate questions that can be addressed with data. Collect, organize, and graph data from observations, surveys, and experiments using line plots with whole number intervals, single- and scaled bar graphs, and frequency tables. Solve real-world problems by analyzing and interpreting the data using grade-level computation and comparison strategies. (E)

**5.DA.1:** Formulate questions that can be addressed with categorical and numerical data and make predictions about the data. Collect, organize, and graph data from observations, surveys, and experiments using line plots with fractional intervals, histograms, or other graphical representations that appropriately represent the data set. (E)

E: Essential IDOE standards

# Standards for Mathematical Practice

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<b>PS.1</b> Make sense of problems and persevere in solving them.	<b>PS.2</b> Reason abstractly and quantitatively.	<b>PS.3</b> Construct viable arguments and critique the reasoning of others	<b>PS.4</b> Model with mathematics.
<b>PS.5</b> Use appropriate tools strategically.	<b>PS.6</b> Attend to precision.	<b>PS.7</b> Look for and make use of structure.	<b>PS.8</b> Look for and express regularity in repeating reasoning.

### Lesson Materials



- thinkLaw Student Work pages
- Writing Utensils
- Colored Pencils or Crayons



structured to provide support and scaffold their learning.

In the slides provided, you'll find a designated prompt indicating where to incorporate the warm-up section with your students. The slide can also serve as an opportunity to review the answers to the warm-up problems together with your students before continueing on with the math lab.

For convenience, we recommend printing the warm-up and cool-down sections front to back on a single sheet of paper, facilitating easy access and organization during the Math Lab session.

#### **PowerPoint Presentation:** Name The Incredible Changing Price (Part 1) The Incredible A thinkl aw Math I ab Changing Price thinkStarter Imagine you have a lemonade stand. You decide to collect data about your sales. What do you notice about your **Outside Temperature** Glasses Sold data? Instructor's Note: 950 45 990 48 Thinkers should notice that on It is easy for thinkers to 70° 20 days the temperature is hot, understand the 65° 12 more lemonade is sold. 85° 30 importance of ELA for When the temperature drops 93° 35 communication. But we less lemonade is sold. 50° 5 use math to 80° 25 communicate as well. The Lemonades Sold by Temperature table and the graph show 50 the same data. 40 • Which is easier for you ilasses Sold (y axis) 30 to understand? The table or the graph? 20 When would you want 10 to use the table? When vou want exact 40° 60 80 numbers. ature (x axis) Do you think you should charge more for your lemonade when the When would you want temperature is hot? Why or why not? to use the graph? Some thinkers may say raising the price when the temperature is hot is a great When you want to

Some thinkers may say raising the price when the temperature is hot is a great idea. People will likely be willing to pay more money for the beverage when they are hot. Those days are the highest sale days already so you might be able to make a lot of money. Some thinkers might believe it is unfair to charge customers more when the temperature is hot.

### Probing Questions: Businesses often offer discounts to groups like senior citizens, students, kids, or members of the military. Would you offer anyone a discount on your lemonade? Why or why not?

- What is the best argument you should increase the cost of your lemonade on days that are hot? What is the best argument you should NOT increase the cost of your lemonade on days that are hot?
- Should you decrease the cost of your lemonade on days that are colder? Why or why not? Do you think the price cut would help you sell more lemonade on those days?
- How does looking at data help you make better decisions about your businesses?
- What would you say to a customer who was upset about the price increase on hot days?
- Does it matter how much you increase the price? How much is too much?

quickly see the

the numbers.

relationship between



#### Probing Questions:

- Have you ever heard of dynamic pricing before? Can you think of any examples of dynamic pricing?
- Why would a company want to use dynamic pricing?

#### Instructor's Note:

Go through the first example together. First, read what happened.

- Why do you think the price of a Disney ticket is not the same every day?
- Are there other businesses that charge different rates based on the day?

**Second**, the class should look at the ticket prices. They should label the bottom of the graph with the 3 different times the tickets are sold.

**Third**, ask thinkers what intervals they should use on the y-axis. Ask thinkers to suggest intervals and explain why they selected those numbers. After the class agrees on the best choice, have thinkers label the y-axis with the numbers.

**Fourth**, have thinkers color in the bars. Thinkers should then label the x and y axis and give the bar graph a title.

### **Probing Questions:**

- Does dynamic pricing make Disney World more or less affordable for families?
- Do you think dynamic pricing makes Disney World more or less crowded? Does the pricing encourage people to visit during the off-season?
- How can Disney World prevent guests from feeling like they are being overcharged for more expensive days?
- Are there times when they should offer discounted prices? Why or why not? What about on rainy days?

#### Instructor's Note:

There are 2 remaining examples. Thinkers may complete the examples on their own, with a partner, or in a small group. Ask thinkers to report back to the group.

#### Instructor's Note:

Have thinkers vote if they believe the price differences are reasonable or unreasonable. Be sure to have thinkers explain their reasoning.

#### **Probing Questions:**

- Should it matter why you are flying? Should someone who needs to fly for a family emergency pay the same amount as someone flying for vacation? Why or why not?
- How does dynamic?



pricing impact the way people look for flights?

- Do you think dynamic pricing encourages people to be more flexible with their travel plans? Why or why not?
- There are many instances where a person buys a plane ticket and then decides they want to add a second plane ticket for a family member or friend. Often the second plane ticket will be much more expensive than when they purchased the first ticket. What is your gut reaction? How would you feel in the circumstance? Why?
- Who can give you advice about the best time to book a vaction? How could that person help? What questions would you ask that person?



#### **Probing Questions:**

- What other events may cause the price of hotel rooms to increase?
- How do you think hotels decide how to charge for rooms during major events?
- What would you do if you had tickets for one of these events but could not afford to get a hotel room because of dynamic pricing?
- What other businesses would be impacted by dynamic pricing during major events?

### SEL Instructor's Note:

At thinkLaw we talk about the fact that doing right is more important than being right. Dynamic pricing is legal, but is it always right?

- People stay in hotels for many reasons. Sometimes people need to stay in a hotel because they are homeless or there was a disaster at their house. Some people are traveling because there was a death in their family or other type of emergency. How are these people impacted by dynamic prices?
- What could be done to ensure businesses can benefit from dynamic prices, but people in need are not taken advantage of by dynamic pricing?
- Do businesses have a responsibility to "do right?" Why or why not?
- If you owned a hotel, how would you decide how much to charge?

#### **Probing Questions:**

- How can consumers protect themselves from being taken advantage of by dynamic pricing?
- How can businesses ensure they are using dynamic pricing in a responsible way?
- Do you think dynamic pricing is necessary for businesses to be successful?
- How can dynamic pricing affect different groups of people differently?
- How can dynamic pricing affect the environment?
- If you could create a dynamic pricing algorithm, what factors would you consider?
- What rules would you write about dynamic pricing?
- Should dynamic

Dynamic pricing is legal. But is it fair?



What are the best arguments for both sides?

Dynamic pricing is fair.	Dynamic pricing is NOT fair.	
<ul> <li>Customers can pay less for products and services during less busy times.</li> <li>Businesses can set their prices. It would be unfair to businesses to restrict dynamic pricing.</li> </ul>	<ul> <li>It is unfair for some customers to need to pay more for a product or service simply because they are in a hurry or live in a popular area.</li> <li>It can lead to customers being overcharged</li> </ul>	

Should dynamic pricing be illegal? Why or why not?

Some thinkers may say that dynamic pricing should be legal. Customers

are not required to purchase from a business. Other thinkers might feel like

businesses use dynamic pricing to take advantage of customers and





Rapper Drake was scheduled to perform a concert in Montreal, Canada, on July 14, 2022. The tickets were sold through Ticketmaster. When the ticket sale began, there was high demand for the tickets. Ticketmaster used **dynamic pricing**, and the price for the tickets increased. A man paid \$789.54 for an "Official Platinum" ticket.

The next day Ticketmaster announced there would be a second concert the next day. There was less demand for tickets for the second show. "Official Platinum" tickets were \$350.

Use the ticket prices to make a bar graph.

pricing be permitted during natural disasters? Why or why not?

- Is the dynamic pricing example with the Drake concert different than the dynamic pricing examples earlier in the lesson? If yes, how so? How does that impact your thinking in this case?
- Do you think Ticketmaster knew that they would add a second show the next day? Why or why not? How could you prove that they knew? If they knew another concert would be added, how would that impact the case's outcome?

#### Instructor's Note:

Ticketmaster settled this lawsuit. They agreed to pay a total of about \$500,000 to 37,877 people who joined this lawsuit.

- How much money do you think each person received from this settlement? What the lawsuit worth it? Why or why not?
- Why would Ticketmaster settle this case instead of letting the court decide?

The man joined with other upset customers and sued Ticketmaster. The man said that Ticketmaster intentionally tricked fans by raising the prices and not announcing that there would be 2 shows.

#### Who should win this case?

Use the DRAAW+C Framework to write your decision.

	Who should win? The man or Ticketmaster?
	Thinkers may pick either option.
_	What is the rule?
I R	Dynamic pricing is not illegal, but also, businesses are not allowed
· · ·	to knowingly lie to consumers.
	What is the man's best argument?
IA	The man ended up paying double the ticket price. He would not
1	have paid that much if he knew that a second show would be
	added the next day. Ticketmaster knew they would add a show.
	By only adding one show, Ticketmaster drove up the prices.
	What is Tigleting set and any upper 12
	Ticketmaster always uses dynamic pricing. When there is a high
	demand for tickets, they cost more money. No one needs to buy
	a Drake ticket. It is not an essential item. If people are willing to
	pay more for tickets, they have a right to charge more for tickets.
1.47	Why is your decision the best decision for the world?
	If the man loses his case, Ticketmaster will continue to drive up the
· ·	cost of tickets. This is unfair to fans. If the man wins his case, it will
	restrict businesses from setting the prices they want to charge.
	Conclusion



#### Instructor's Note:

The DRAAW+C Framework is used throughout the thinkLaw program when thinkers are asked to determine who should win a lawsuit.

Many persuasive writing frameworks ask thinkers to pick one side. Thinkers are asked to explain why one side is right and one side is wrong. DRAAW+C is a little different.

Do most conflicts in life have one clear winner? Often both sides of a case have valid points. Thinkers are often asked to determine which side is "more right." It is important to acknowledge the best arguments from both sides and then decide based on the "world" component. Which decision is the best choice for the world? How will this

decision impact the world?

Asking thinkers to consider both sides and the impact on the world is significantly more rigorous than simply asking why one side is right and one side is wrong.

#### After the Lesson:

thinkLaw math labs include exit tickets for additional practice.

#### Instructor's Note:

thinkLaw math labs also include take-home student sheets that are available in English and Spanish. Encourage thinkers to try a mini version of the lesson at home with their families! Asking thinkers to reteach the lesson to their parents helps thinkers to practice synthesis and gives them additional practice with the material.

#### Name

#### The Incredible Changing Price (Part 1)

A thinkLaw Math Lab









#### Instructor's Note:

Within thinkLaw Math Labs, you'll find 5 Cool-down problems strategically integrated to serve as a demonstration of learning or a post-activity assessment.

The goal of a math lab is to help students redefine their math identity – reshaping how they perceive and interact with math.