# Egad! It’s Excel – Part 2

Data Boot Camp

Lesson 1.2

# Quick Refresher

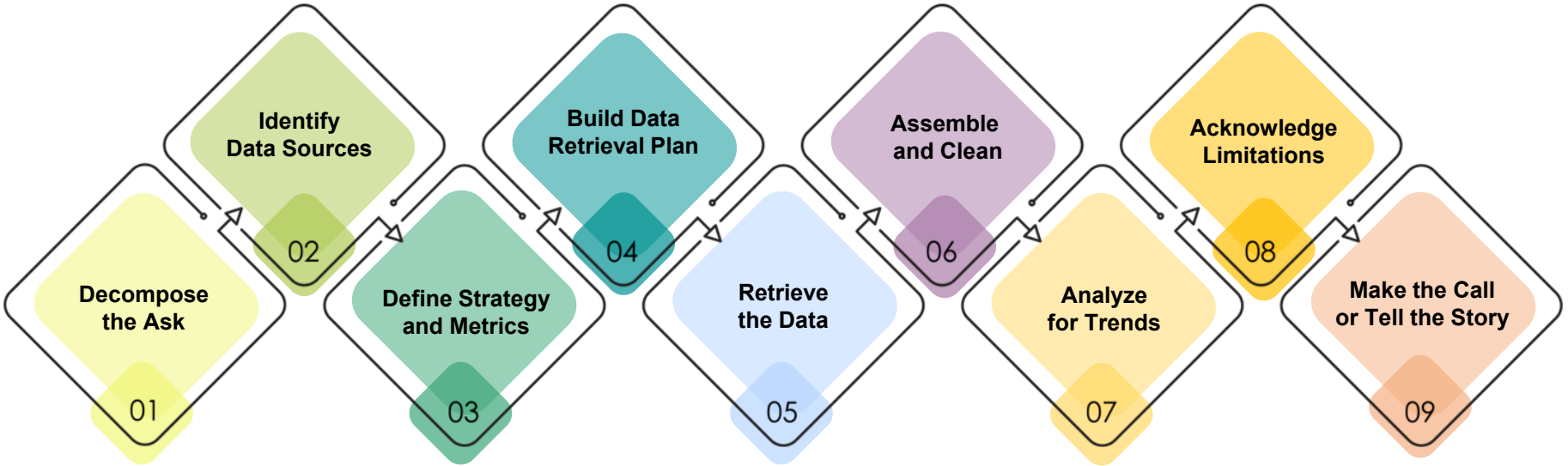
# Data analytics is about what **two** things?


Fundamentally, data analytics is about **storytelling** and **truth-telling.**

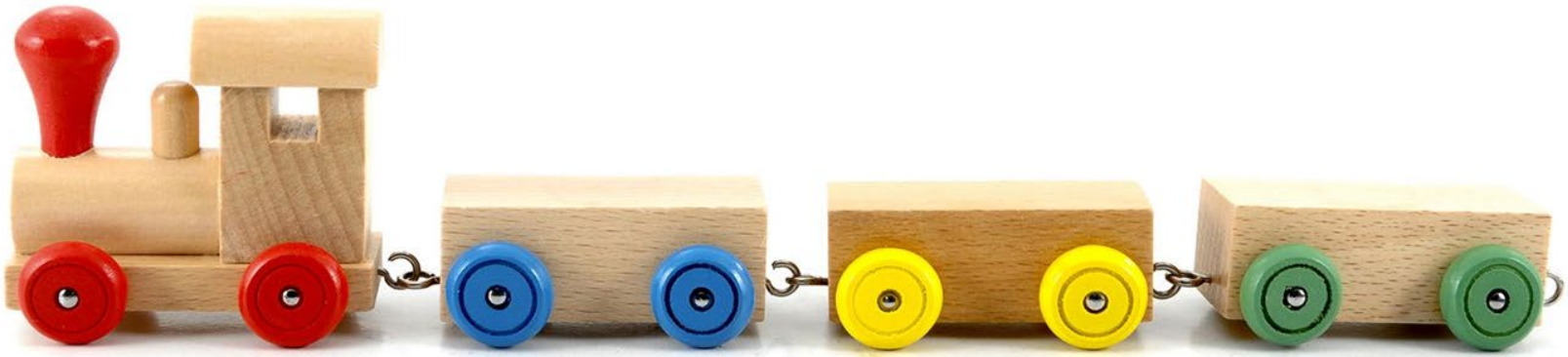
What are the steps in the **Analytics Paradigm**?

# Analytics Paradigm

Regardless of type or industry, this paradigm provides a repeatable pathway for effective data problem solving.



# Let’s Start with the Basics



# Formulas

# Ooh…Coding! (Sort Of)

Excel has introduced you to a sort of proto-programming. When you write scripts, you will rely on functions (methods) that do something to or with arguments.

# Ooh…Coding! (Sort Of)

When we reference a range or a set of ranges, Excel is given a set of variable inputs. Excel will determine the actual values of these inputs prior to executing the function.

# Ooh…Coding! (Sort Of)

**What about this example?**

Which is the function?

Which are the arguments?

```
= SUM( AVG(F4:F6), AVG(G4:G6) )
```

# Ooh…Coding! (Sort Of)


**What about this example?**
Which is the function?
Which are the arguments?


**It depends.**

```
= SUM( AVG(F4:F6), AVG(G4:G6) )
```

# Ooh…Coding! (Sort Of)


**What about this example?**
Which is the function?
Which are the arguments?


The **AVG functions** take the provided ranges as their arguments.

```
= SUM( AVG(F4:F6) , AVG(G4:G6) )
```

# Ooh…Coding! (Sort Of)

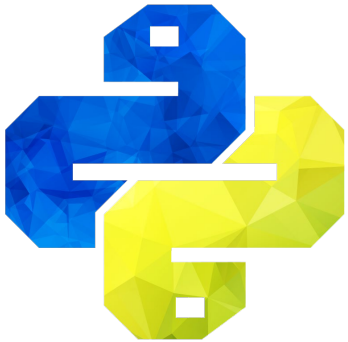

**What about this example?**
Which is the function?
Which are the arguments?


This is a **nested function**. We'll be doing plenty of complex nests in this class.

```
= SUM( AVG(F4:F6), AVG(G4:G6) )
```

# You Can Code Too!

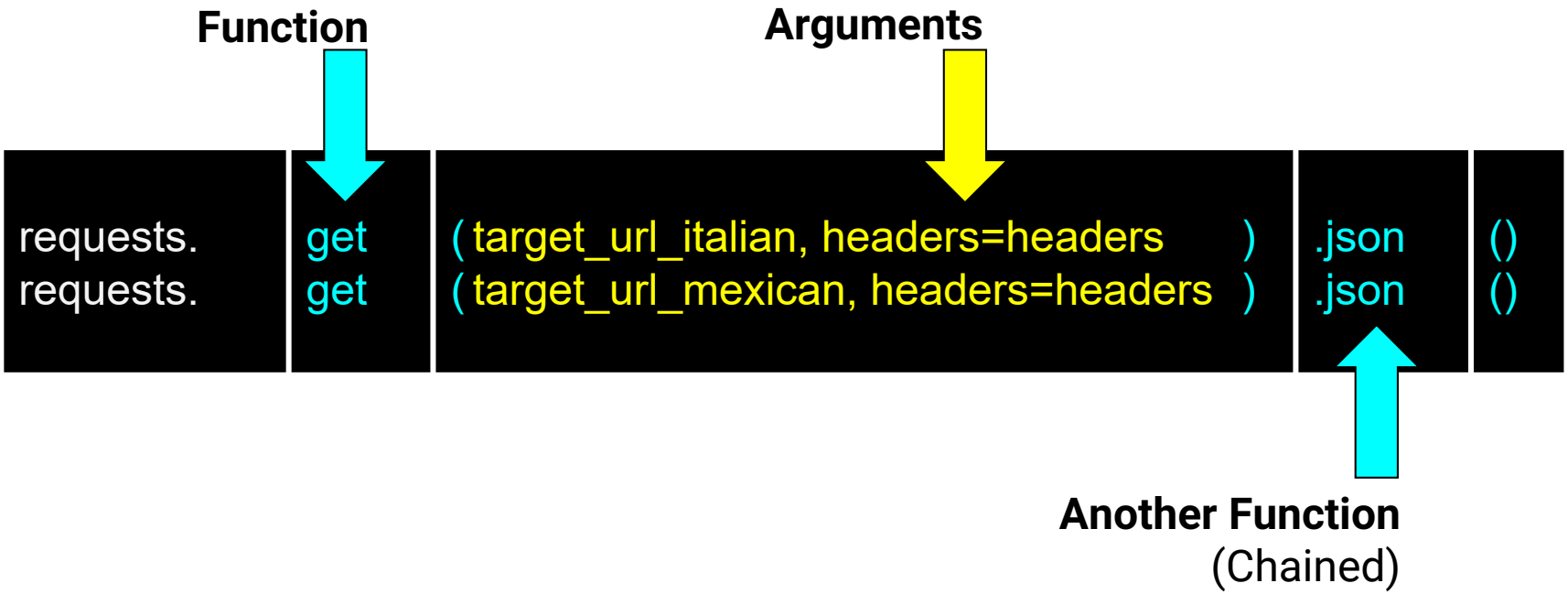
Here’s a Python snippet from the last slide deck.

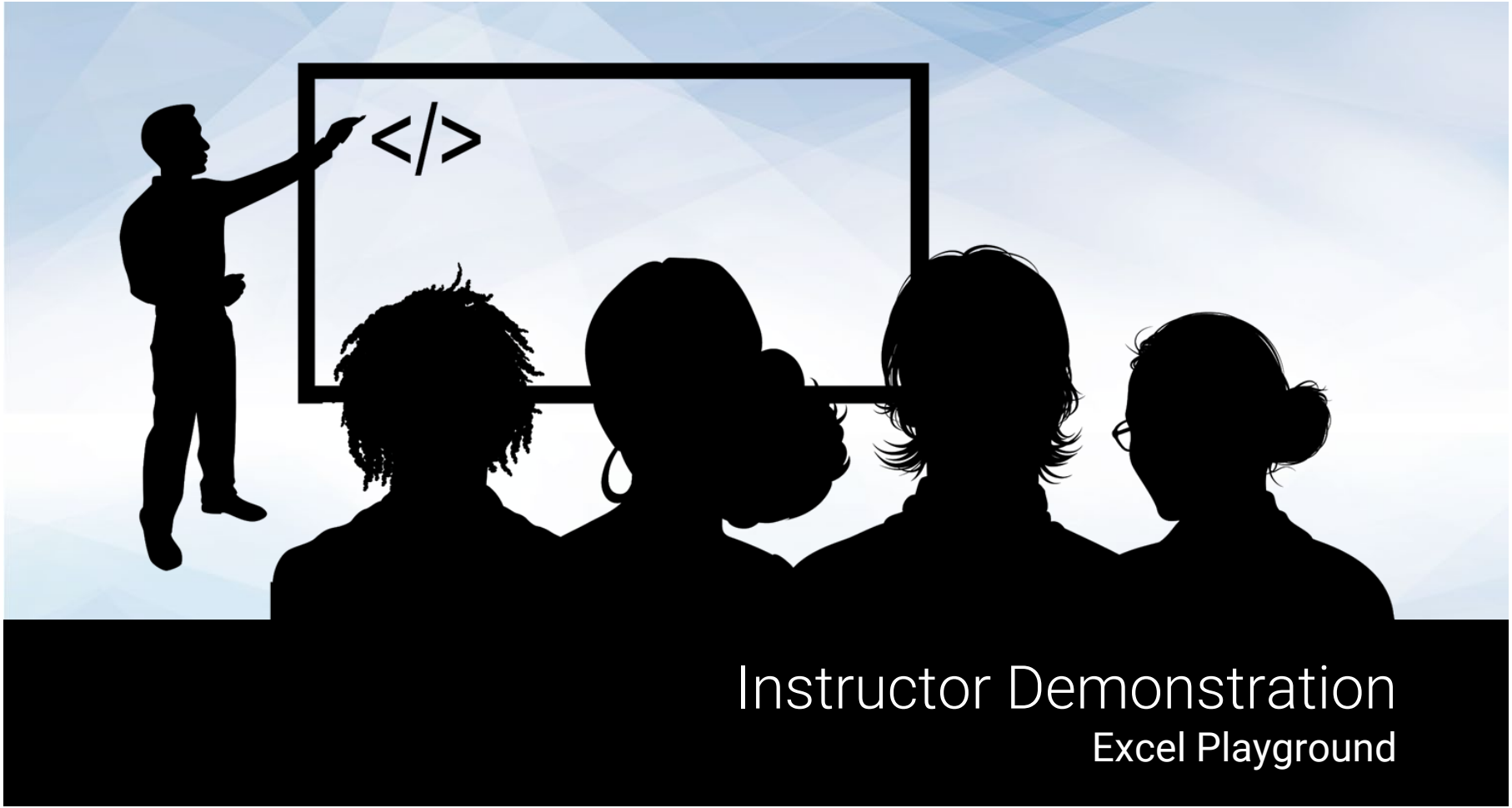


```
requests.get(target_url_italian,      headers=headers).json()
requests.get(target_url_mexican,      headers=headers).json()
```

# You Can Code Too!

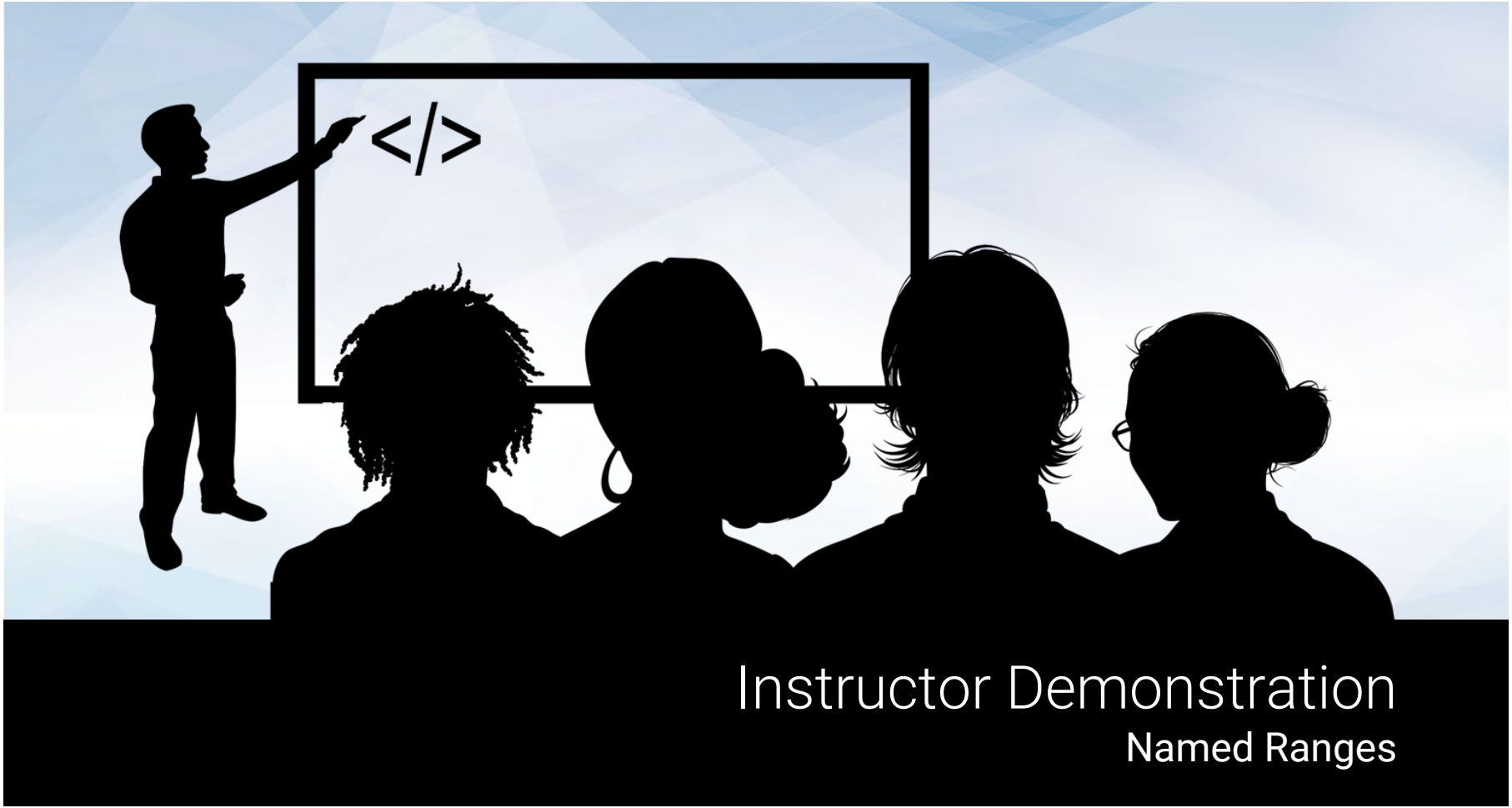
Syntax and capabilities may differ across technologies and platforms, but fundamental concepts remain the same.






# Instructor Demonstration

## Excel Playground

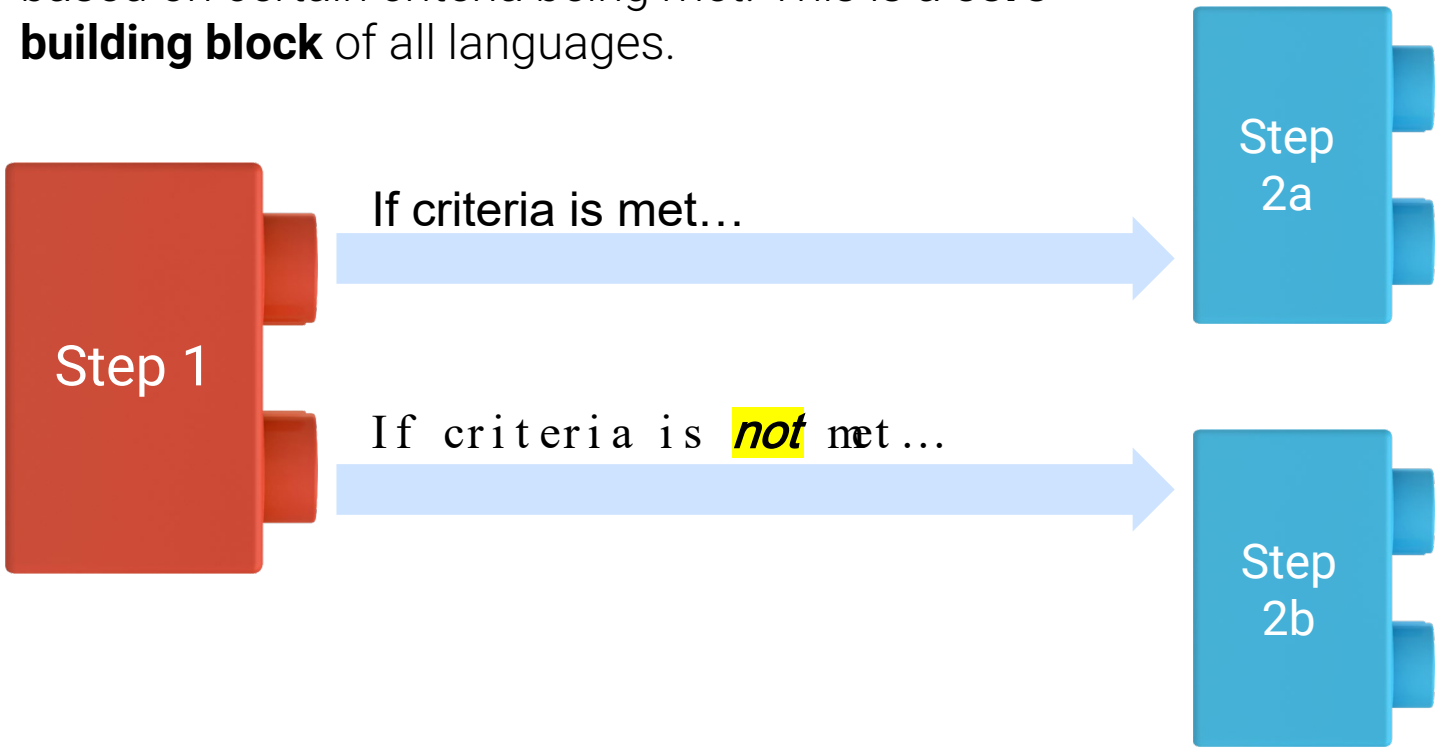



# Instructor Demonstration

## Named Ranges

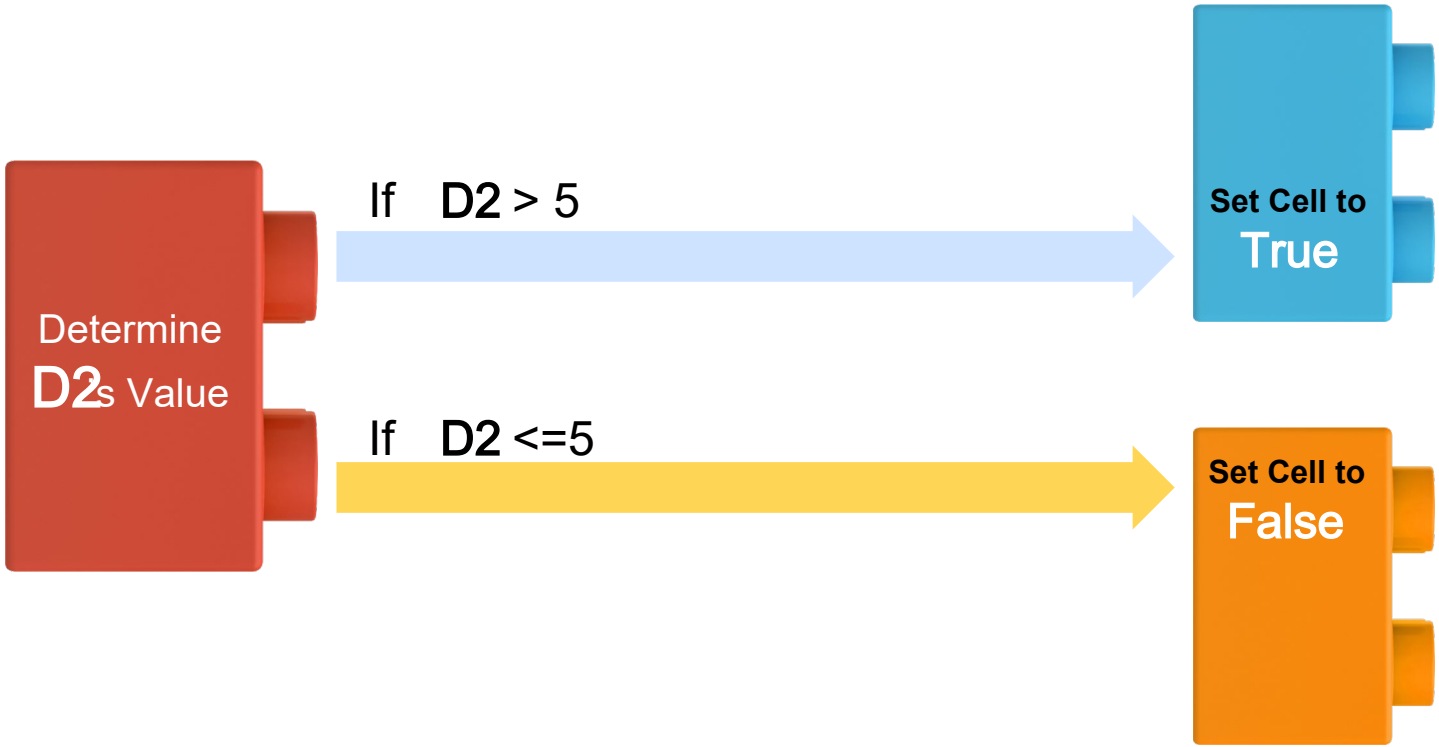
# Conditionals: If This, Then That

Conditionals present a way to control the flow of logic based on certain criteria being met. This is a **core building block** of all languages.



# Conditionals: If This, Then That

=IF(D2>5, TRUE, FALSE)



But what if we want to **combine** conditions?


# AND, NOT, OR

# Ooh…Coding! (Sort Of)

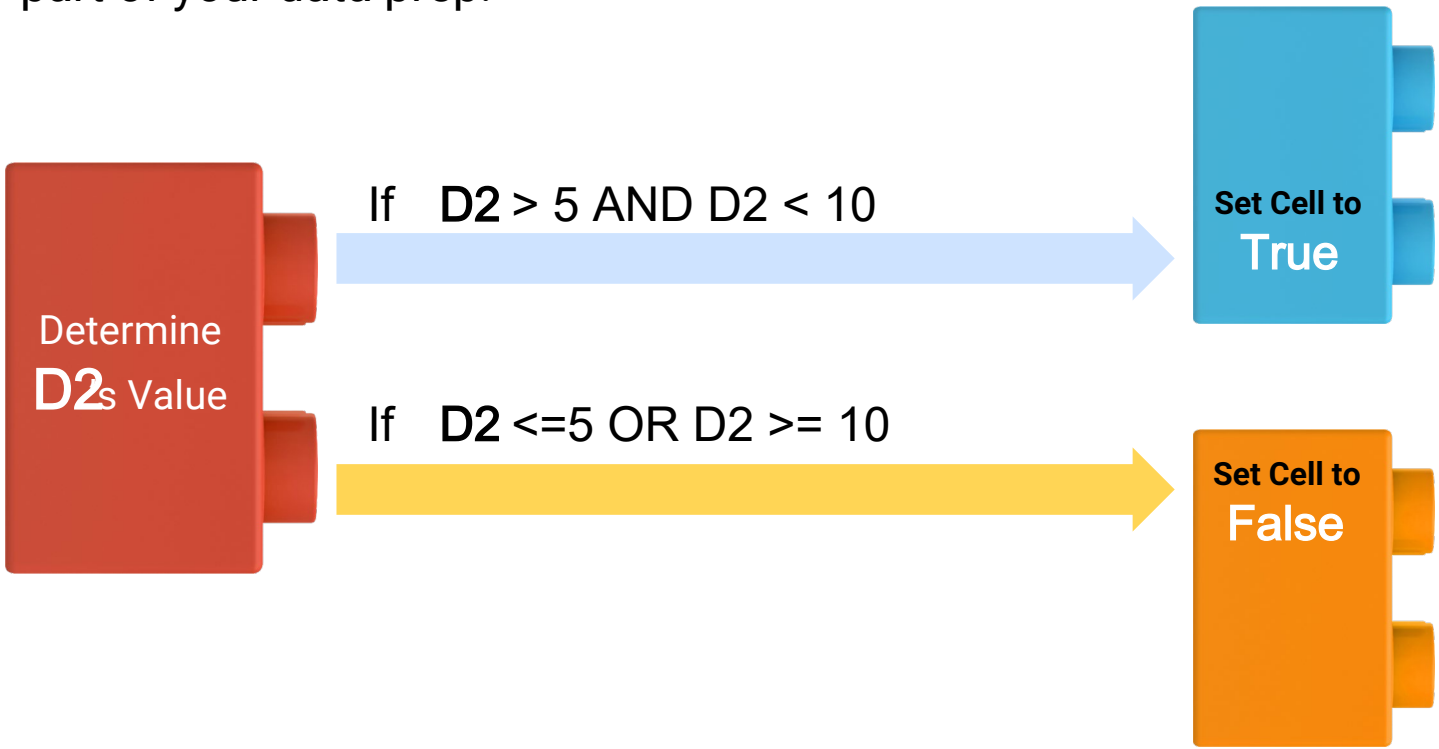

But what if we want
to **combine** conditions?

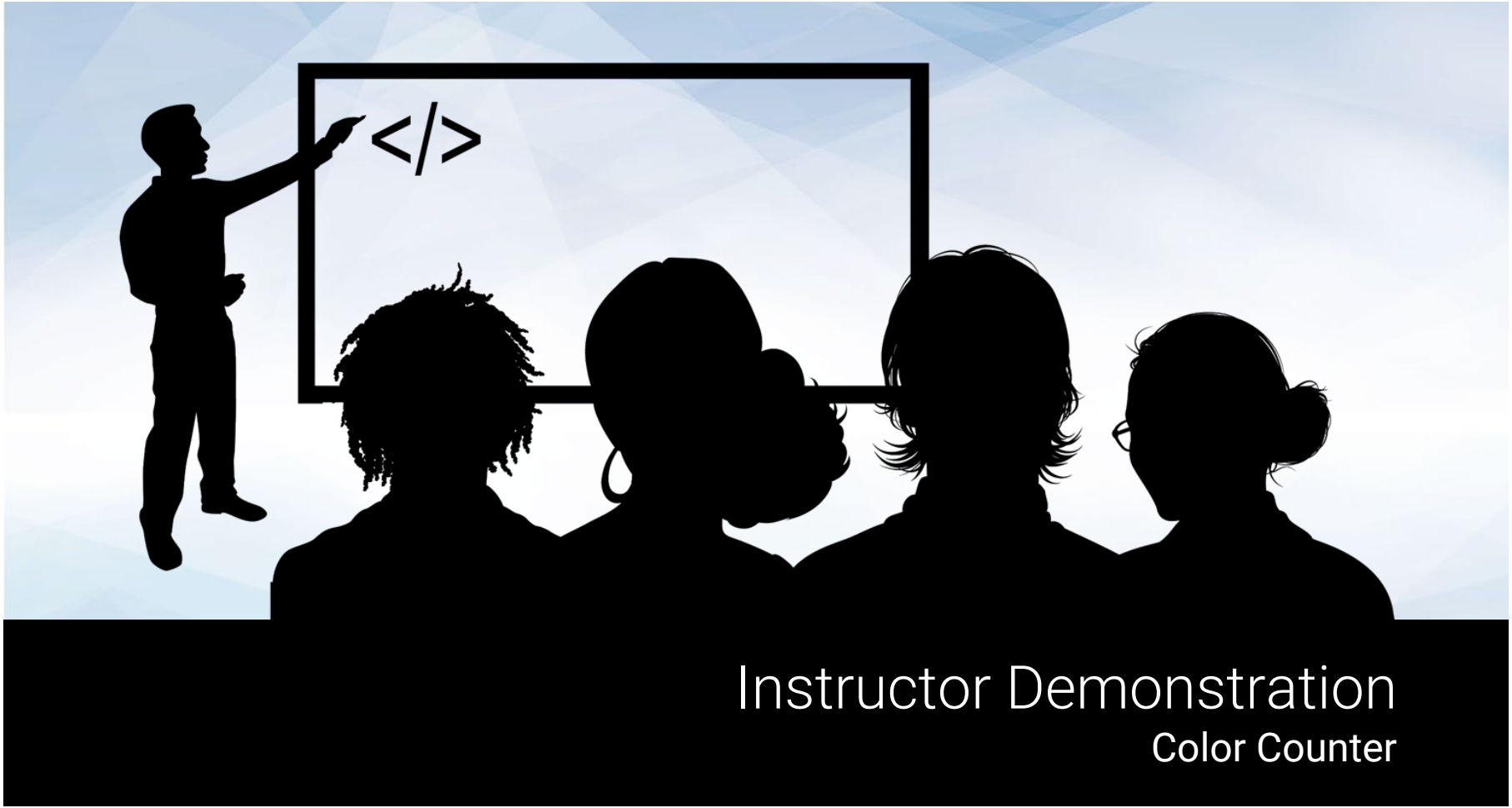

AND, NOT, OR

```
=IF( AND(D2>5, D2<10),TRUE,FALSE)
```

# Conditionals: If This, Then That

Nesting conditionals can quickly become a very convoluted (but necessary) part of your data prep.






# Instructor Demonstration

## Color Counter

# **Everybody Do:** Gradebook

Create a formula that calculates the final grade for a student based on their previous exams and papers.

**Suggested Time:**
7 minutes

# **Activity:** Gradebook

**When making this calculation:**

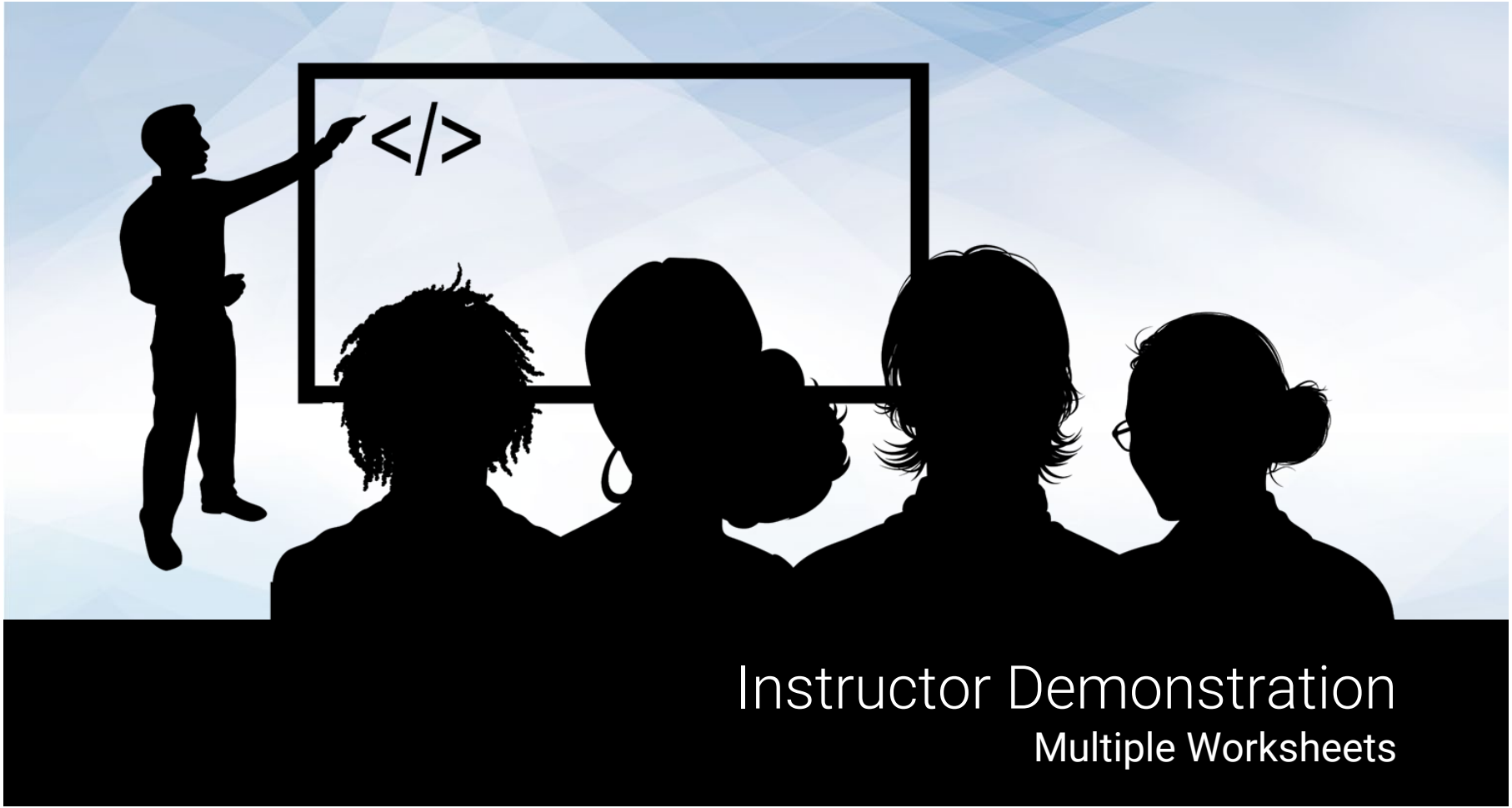
- Consider every paper and exam to be equal in weight; each should comprise one-fourth of the overall grade.
- Round the result to the nearest integer.
- Using conditionals, create a formula that returns `PAS` if a student's final grade is greater than or equal to 60. If a student's final grade is below 60, the formula should return `FAIL`.

**Bonus:**

Create a nested `IF()` formula that returns a letter grade based on a student's final grade.

- Greater than or equal to 90 = A
- Greater than or equal to 80 and less than 90 = B
- Greater than or equal to 70 and less than 80 = C
- Greater than or equal to 60 and less than 70 = D
- Anything less than 60 = F

Suggested Time: 7 minutes




# Instructor Demonstration

## Multiple Worksheets

# **Everybody Do:**
# Apples and Oranges

Apples and oranges are two completely different fruits whose data sets are being stored on two completely different worksheets. In this activity, you will take two sheets of data and compare their values against each other to determine which is the ultimate fruit!

**Suggested Time:**
7 minutes

# **Activity:** Apples and Oranges

**Instructions:**

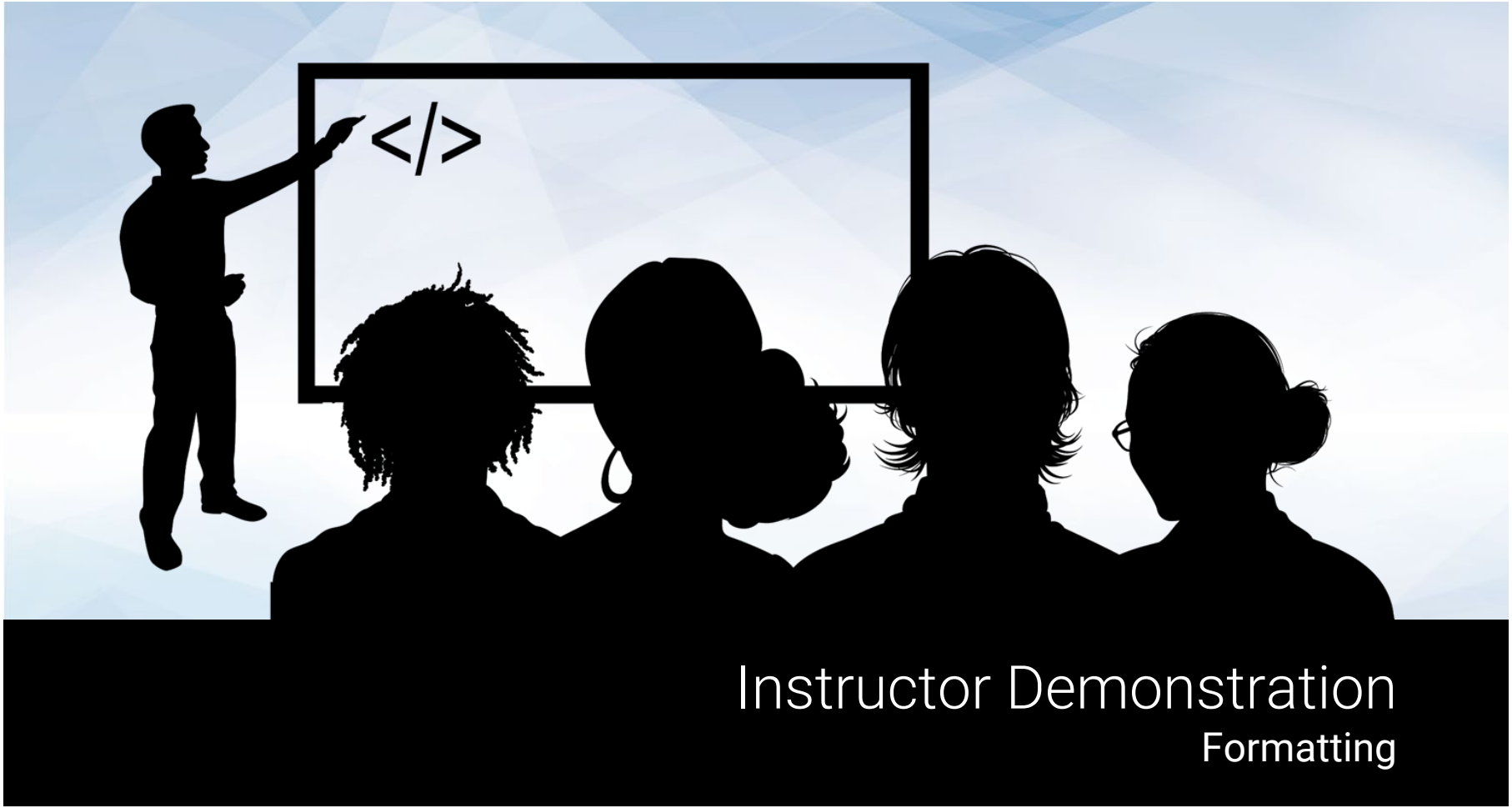
- In each Apples and Oranges worksheet, calculate the average values of the data contained in each column.
- Create a new worksheet that will be used to compare characteristics of apples and oranges against each other.
- Create 5 columns with the headers *Durability, Ease of Use, Taste, Juiciness,* and *Aerodynamics*.
- Create 3 rows with the headers *Apples, Oranges,* and *Winner*.
- Pull in the averages data from the Apples and Oranges worksheets, placing them in their respective cells in the new worksheet.
- Using a conditional formula, determine whether Apples or Oranges hold the greater average value per column and print the winner in the *Winner* row.

**Bonus (only if time permits):**

- Write a formula to determine the overall winner by counting which has the most wins.
- Make another worksheet that calculates the averages. These averages should be populated in the new worksheet without referencing the averages calculated in the original worksheets.

Suggested Time: 7 minutes

# **Time’s Up!** Let’s Review.




# Instructor Demonstration

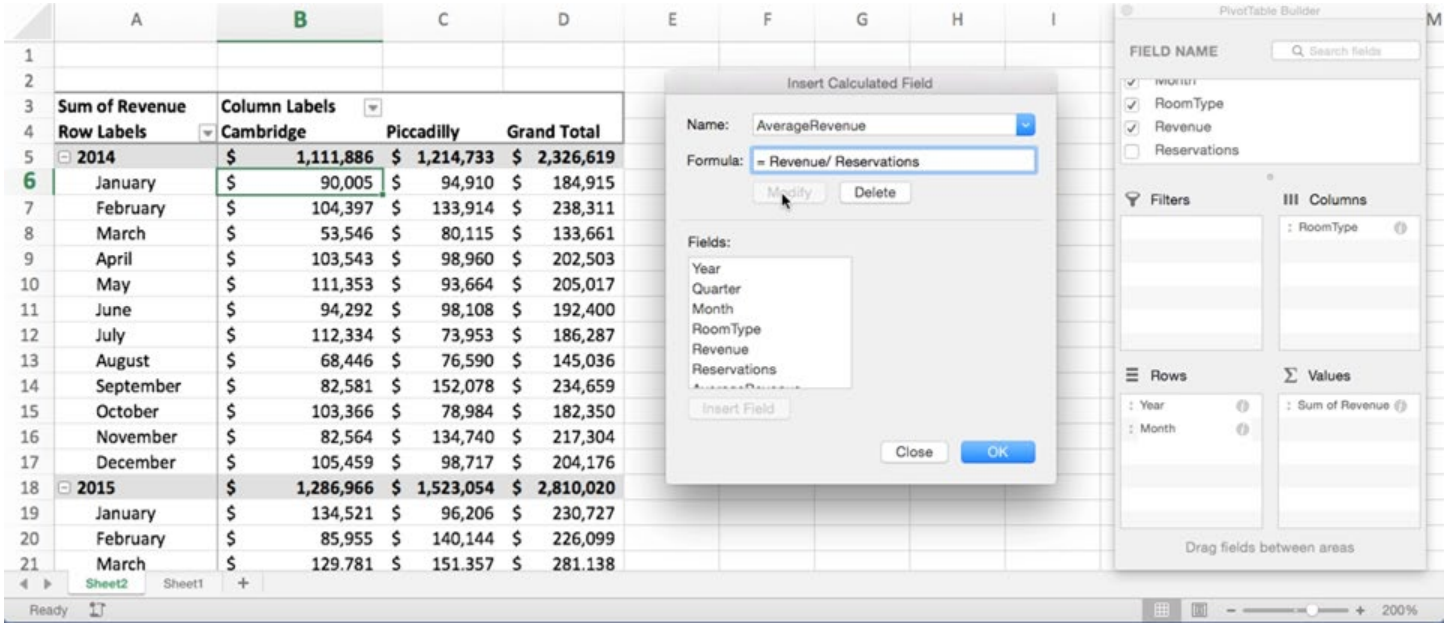
## Formatting

# Take a Break!

# Pivot Tables

# Get Pivot With It

Pivot tables are one of the most important data visualization concepts to master in this class. (Don’t worry. They are a cinch to deal with.)



# Get Pivot With It

In essence, a pivot table is a **summative** analytic tool that allows us to perform aggregate functions that allow any combination of fields. (The term *pivot table* comes from the fact that we are pivoting along a data axis).

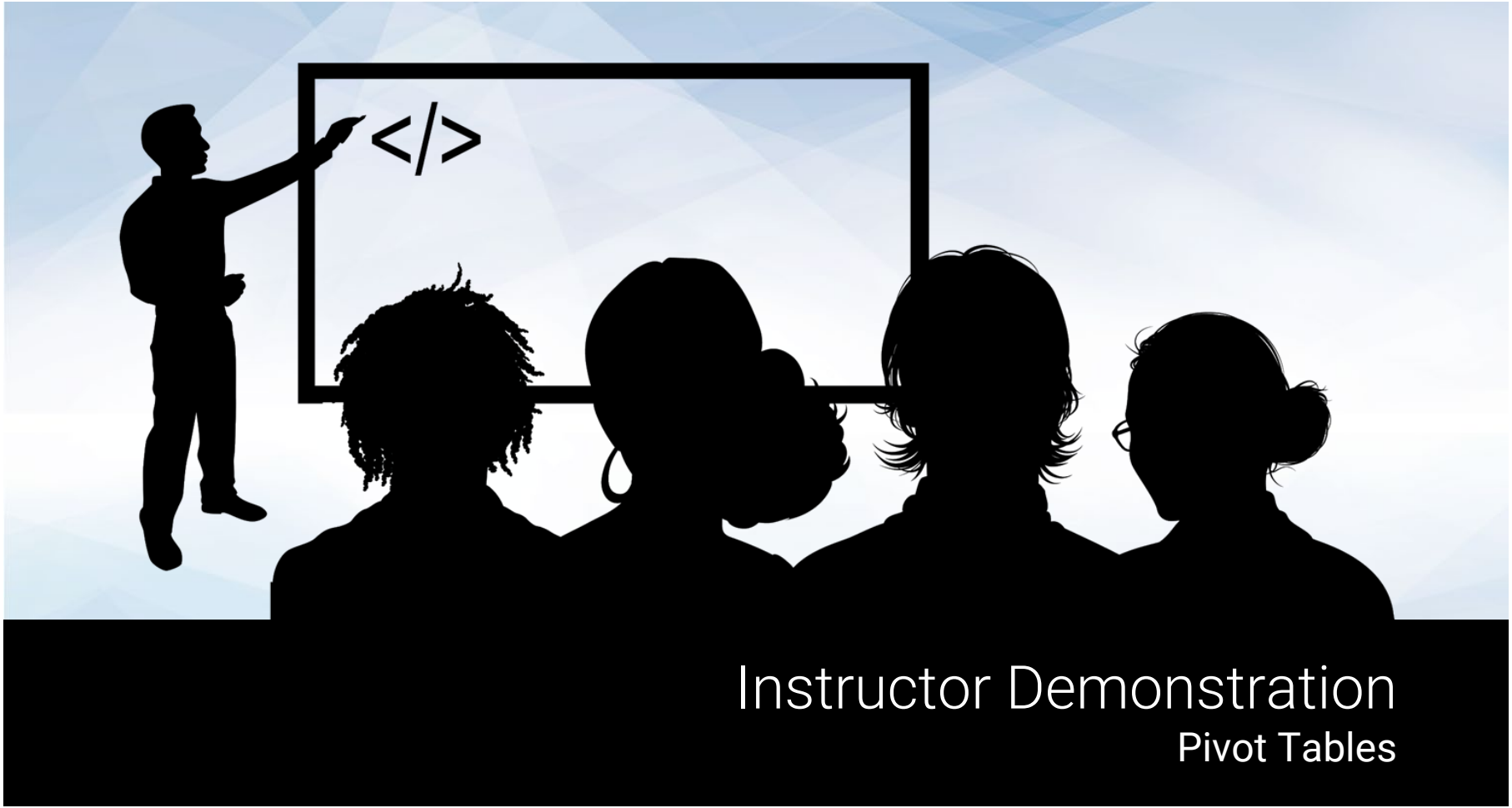
| Seller | Qty. Sold | Date |
|---|---|---|
| Joseph | $42.50 | 1/1/17 |
| Jacob | $65.00 | 1/3/17 |
| Jacob | $5.25 | 1/6/17 |
| Joseph | $125.00 | 1/6/17 |
| Jacob | $3.50 | 1/7/17 |
| Matt | $32.00 | 1/9/17 |

| Seller | Total Sold |
|---|---|
| Joseph | $167.50 |
| Jacob | $73.75 |
| Matt | $32.00 |

# Word to the Wise: Keep It Flat!

Modern Business Intelligence (BI) tools like Tableau, Sisense, and Salesforce work best if data is stored in flat CSVs—meaning column headers represent fields (vertically) on the spreadsheet. This is largely because all of these technologies heavily utilize pivot tables as a tool for their visualizations. **Don't try to confuse this simplicity. "Spreadsheet magic" is a nightmare to analyze.**

| B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|
| DateTime | Week # | Section? | Pace | Academic Support | Self-Mastery | Instructor Er |
| 2016-09-11T04:00:00.000Z | 18 | RCB0503FSF - CCC | 3 | 5 | 5 | 4 |
| 2016-09-11T05:00:00.000Z | 6 | UT0726FSF | 3 | 5 | 3 | 4 |
| 2016-09-12T04:00:00.000Z | 11 | UCF062016FSF | 4 | 4 | 3 | 5 |
| 2016-09-12T04:00:00.000Z | 23 | UCF0329FSF | 2 | 4 | 5 | 1 |
| 2016-09-12T04:00:00.000Z | 9 | UNC0712FSF | 3 | 4 | 4 | 3 |
| 2016-09-12T04:00:00.000Z | 23 | UCF0328FSF | 4 | 3 | 2 | 3 |
| 2016-09-12T04:00:00.000Z | 6 | RUT0725FSF-NB | 5 | 4 | 4 | 5 |
| 2016-09-12T04:00:00.000Z | 6 | RUT0725FSF-NB | 5 | 5 | 4 | 5 |
| 2016-09-12T04:00:00.000Z | 6 | RUT0725FSF-NB | 2 | 4 | 4 | 4 |
| 2016-09-12T04:00:00.000Z | 11 | UCF062016FSF | 4 | 5 | 4 | 5 |
| 2016-09-12T04:00:00.000Z | 13 | UCF061416FSF | 4 | 5 | 1 | 5 |




# Instructor Demonstration

## Pivot Tables

# Lookups

# Look It Up with Lookups

Assume this table is gigantic. How would we **retrieve** the population of a specific planet for use in another formula?

| Planet | Population |
|---|---|
| Zeelo | 5020 |
| Merinoa | 380 |
| Cardboard Box | 2 |
| … | … |
| Asteroid 9 | 95 |

# Look It Up with Lookups


Assume this table is gigantic. How would we **retrieve** the population of a specific planet for use in another formula?


=vlookup( <value>, <full table>,
<column to retrieve>,<match parameter>)

| Planet | Population |
|---|---|
| Zeelo | 5020 |
| Merinoa | 380 |
| Cardboard Box | 2 |
| … | … |
| Asteroid 9 | 95 |

# Look It Up with Lookups

What will this yield?
=vlookup( “Asteroid 9”, Planets, 3, FALSE)

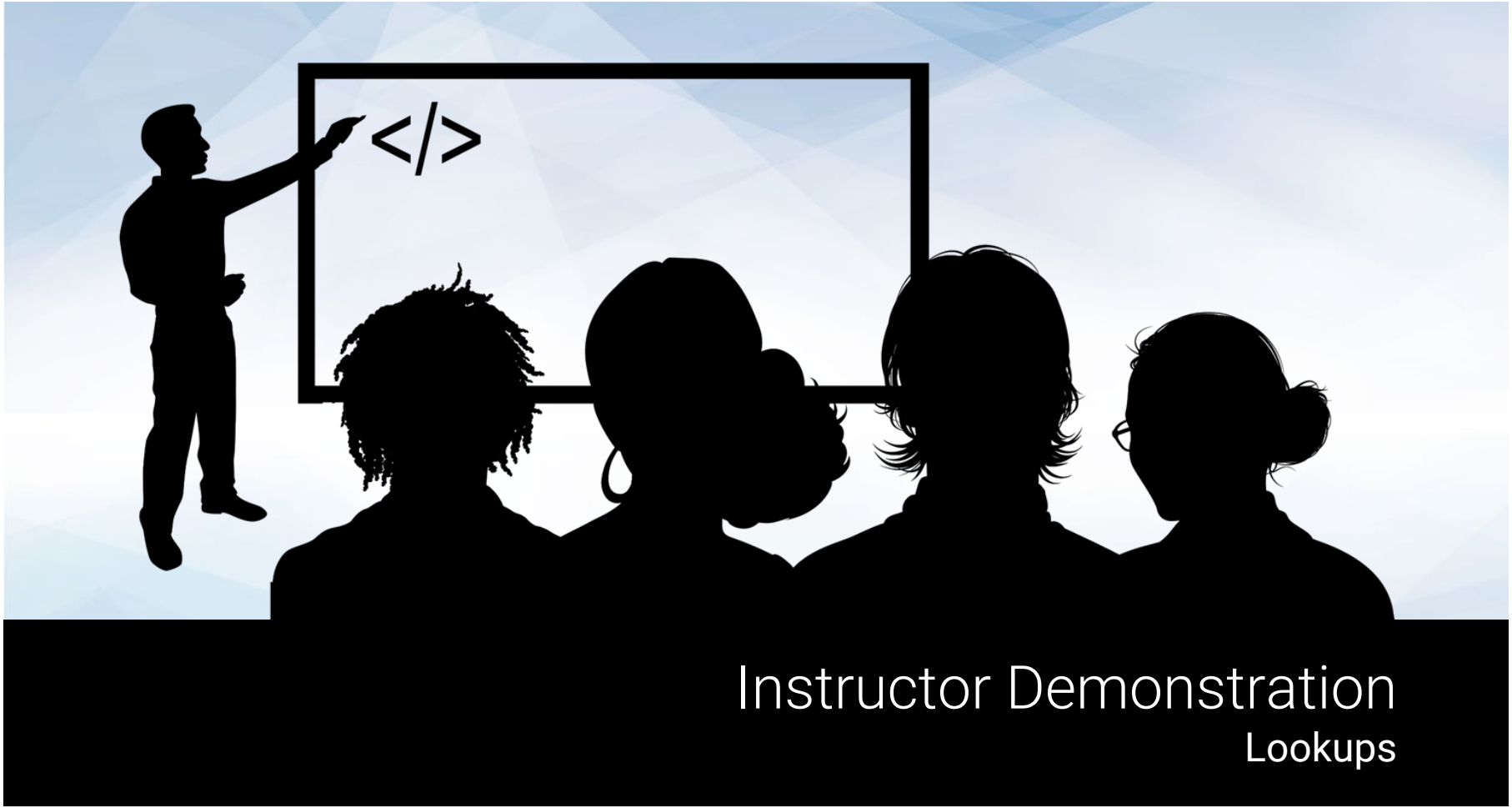
| Planet | Population | Species |
|---|---|---|
| Zeelo | 5020 | Zoltans |
| Merinoa | 380 | Murphies |
| Cardboard Box | 2 | Hambones |
| … | … | |
| Asteroid 9 | 95 | Asterisks |

# Look It Up with Lookups


What will this yield?
=vlookup( “Asteroid 9”, Planets, 3, FALSE)

| Planet | Population | Species |
|---|---|---|
| Zeelo | 5020 | Zoltans |
| Merinoa | 380 | Murphies |
| Cardboard Box | 2 | Hambones |
| … | … | |
| Asteroid 9 | 95 | Asterisks |


Asterisks




# Instructor Demonstration

## Lookups

# **Partner Activity:** Product Pivot

A small company selling electronics and electronic media has asked our class to create a table that visualizes the cost of their recent orders. Using lookups, create a pivot table that serves this purpose.

**Suggested Time:**
10 minutes

# **Activity:** Product Pivot

- Determine the Product Price of each row in the Orders sheet by using a VLOOKUP that references each row's Product ID. (The Product Price of a row does not include shipping.)
- Determine the Shipping Price of each row in the Orders sheet by using a VLOOKUP that references each row's Product ID.
- Select all data on the Orders sheet and create a new pivot table that calculates the sum of both Product Price and Shipping Price for each Order Number and Product ID.

Suggested Time: 10 minutes

# **Time’s Up!** Let’s Review.

# **Extra Challenge:**
## Top Songs Pivot Table

In this activity, you will use a 5000 row spreadsheet containing data for the top 5000 songs from 1901 onward. Using pivot tables, you will uncover which artists have the most songs in the top 5000, the song titles, and the year each song was released.

**Suggested Time:**
10 minutes

# **Challenge:** Top Songs Pivot Table

**Instructions:**

- Select all of the data in your worksheet and create a new pivot table.
- Make a pivot table that can be filtered by year and contains two rows: *Artist* and *Name*.
- All of an artist's songs should be listed below their name.
- Update your pivot table to contain values for:
    - How many songs an artist has in the top 5000
    - The sum of the final_score of their songs.
- Sort your pivot table by descending sum of the final_score.

Suggested Time: 10 minutes

# **Extra Challenge:** McDonald's Formatting

Despite attempts to convince people otherwise, the McDonald's menu is not well known for having the healthiest food options of all time. Looking at a massive table filled with nutrition facts is a pretty daunting task, though, so it's up to the class to make this spreadsheet just a little bit easier to understand.

**Suggested Time:**
10 minutes

# **Extra Challenge:** McDonald's Formatting

**Instructions:**

- Apply conditional formatting to all values in columns C and D that formats cells based on their values, and modifies the color of cells so that lighter shades occur for low values, while darker shades occur for high values.
- Apply conditional formatting to columns F, H, K, M, O, Q, T, U, V, and W that turns a cell green when its value is less than 50, and red when it is greater than or equal to 50.
- Add a thin-line border to all values in the table.
- Add a thick horizontal border that underscores the top row of the table.
- Add a thick vertical border down the right side of column A, and apply text wrapping to all values in that column.

Suggested Time: 10 minutes

# Questions?