

Stage 1

Identify Desired Results

Catchy Title: Villainy Inc. Mission Two

Theme/Topic of Lesson: math

Time Commitment: 4 90-minute blocks

Subject Area(s):

Mathematics - Number sense

Grade Level(s): 5,6,7,8

Standards Alignment:

Class Challenge Question:

Can you use mathematics to help save the world from the evil Dr. Wick I.D.?

Overview:

By completing this multi-day lesson, students will work through the various activities featured on the innovative mathematics web site, Villainy Inc. The site is divided into two missions. This lesson plan will address Mission 2: Drive Through Deceit. Carefully coordinated with national and state content standards, this mission contains activities that explore statistics and probability, algebra, geometry, decimals, percents, negative numbers, and more.

Villainy, Inc is an animated story about Dr. Eugene Wick, ID, and his sidekick Platypus. Wick and “Platy” have ridiculously goofy plans to take over the world. Your students will take on the role of an advisor to Dr. Wick’s company, Villainy, Inc. Outwardly, they seem to go along with Wick’s schemes. But, secretly, they are really working with the Anti-Villainy Unit (the AVU) as double agents, using their math skills to make sure Wick never succeeds.

Stage 2

Determine Acceptable Evidence

Knowledge of Number Relationships and Computation (6-8)	Maryland Content Standards Students will describe, represent, and apply numbers and their relationships and will estimate and compute using mental strategies and paper/pencil.	Maryland State Indicators 6.8.7 <i>a. select and apply strategies and mathematical properties to solve problems with rational numbers</i> <ul style="list-style-type: none">• use estimation to solve problems with rational numbers (MLO 4.4.)• <i>estimate powers and square roots to solve problems</i>
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		<ul style="list-style-type: none"> • estimate the value of radicals and numbers expressed with exponents to solve problems b. apply ratios, proportions, and percents to solve problems (MLO 4.5.) • determine equivalent ratios, decimals, and percents • determine ratios, rates, unit rates in the context of a problem • apply the concepts of ratios, rates, and percents to real-world problems including rate of increase/decrease, discount, commission, sales tax, simple interest
Knowledge of Number Relationships and Computation (6-8)	Maryland Content Standards Students will describe, represent, and apply numbers and their relationships and will estimate and compute using mental strategies and paper/pencil.	Maryland State Indicators 6.8.1 read, write, and represent rational numbers in a variety of forms, including exponents, scientific notation, and percents. (MLO 4.1.)
Knowledge of Number Relationships and Computation (4-5)	Maryland Content Standards Students will describe, represent, and apply numbers and their relationships and will estimate and compute using mental strategies and paper/pencil.	Maryland State Indicators 6.5.5 a. multiply and divide whole numbers and interpret remainders (MLO 4.5.) b. add and subtract fractions, <i>mixed numbers</i> and decimals <i>and express answers in simplest form</i> (MLO 4.6.) c. multiply and divide decimals by whole numbers (MLO 4.7.)
Knowledge of Number Relationships and Computation (4-5)	Maryland Content Standards Students will describe, represent, and apply numbers and their relationships and will estimate and compute using mental strategies and paper/pencil.	Maryland State Indicators 6.5.6 <i>use mathematical properties to solve problems</i> <ul style="list-style-type: none"> • explain and apply number relationships using the mathematical properties of operations, including associative (addition and multiplication) and multiplicative inverse. • simplify numerical expressions involving addition, subtraction, multiplication, division and parentheses

<p>Knowledge of Number Relationships and Computation (4-5)</p>	<p>Maryland Content Standards Students will describe, represent, and apply numbers and their relationships and will estimate and compute using mental strategies and paper/pencil.</p>	<p>Maryland State Indicators 6.5.1 read, write, and represent simple fractions, decimals, and percents using symbols, words, and <i>models</i>. (MLO 4.1.)</p> <ul style="list-style-type: none"> • <i>read and write standard form and expanded notation for numbers through millions</i>
<p>Knowledge of Number Relationships and Computation (4-5)</p>	<p>Maryland Content Standards Students will describe, represent, and apply numbers and their relationships and will estimate and compute using mental strategies and paper/pencil.</p>	<p>Maryland State Indicators 6.5.7 <i>apply strategies to solve problems with fractions and decimals</i></p> <ul style="list-style-type: none"> • use estimation to solve problems with fractions and decimals (MLO 4.8.) • identify and describe the relationship among fractions, decimals, and percents (MLO 4.9.) • represent fractions, decimals, and percents in equivalent forms (MLO 4.10.) • <i>compute percentages of 10, 20, 25, 50 and 100 percent of a number</i>
<p>Knowledge of Algebra, Patterns and Functions (6-8)</p>	<p>Maryland Content Standards Students will algebraically represent, model, analyze, and solve mathematical and real-world problems involving patterns and functional relationships.</p>	<p>Maryland State Indicators 1.8.3 a. evaluate algebraic expressions and apply formulas. (MLO 1.4.) b. solve linear equations and inequalities in one variable <i>using mathematical properties</i>. (MLO 1.5.) c. <i>describe a real-world situation represented by an algebraic expression or equation</i> d. <i>solve problems involving direct and inverse variation</i> e. <i>determine the slope of a linear function represented graphically, numerically, or algebraically</i></p>
<p>Knowledge of Statistics (9-12)</p>	<p>Maryland Content Standards Students will collect, organize, display, analyze, and interpret data to make decisions and predictions.</p>	<p>Maryland State Indicators 4.12.5 communicate the use and misuse of statistics (CLG 3.2.3.)</p> <ul style="list-style-type: none"> • <i>analyze the validity of conclusions</i>

		<i>drawn from statistics by looking at factors such as sampling procedures and curve fitting.</i>
Knowledge of Statistics (9-12)	Maryland Content Standards Students will collect, organize, display, analyze, and interpret data to make decisions and predictions.	Maryland State Indicators 4.12.4 use the measures of central tendency and/or variability (mean, median, mode, range, interquartile range, quartile) to make informed conclusions. (CLG 3.1.2.)

Learning Objectives:

The Students will:

- compute the percentage of a number.
- add and subtract positive and negative integers.
- Find the mean, median and mode of a set of data.
- use the four operations (addition, subtraction, multiplication and division) to solve mathematical problems.
- analyze data using statistics.

Assessment

Students will complete each of the four activities on the Villainy Inc. Mission Two Web site along with the companion "field log" worksheet.

Stage 3

Plan Learning Experiences

Resources

Internet Sites	<p>Villainy Inc.</p> <p>Check out the exciting online field trip dedicated to middle school mathematics! In James Bond fashion, students use their problem-solving acumen to foil the plans of the evil Dr. Wick in animated missions that require critical thinking and math calculations.</p> <p>http://villainyinc.thinkport.org/</p>
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Materials

Per student team/group of 3-4

- a box of colored pencils

Per Student

- a highlighter
- a straightedge or ruler
- a calculator (optional)
- *Training Mission: Shooting Star*

[\(View\)](#)

- *Training Mission: Shooting Star Answer Key*

[\(View\)](#)

- *Villainy Inc. Reflection Journal* handout [\(View\)](#)
- *Field Log: Design A Meal* [\(View\)](#)
- *Field Log: Design A Meal Answer Key* [\(View\)](#)
- *Mission Simulation: Diamonds are a Wick's Best Friend*

[\(View\)](#)

- *Mission Simulation: Diamonds are a Wick's Best Friend Answer Key*

[\(View\)](#)

- *Training Mission: Crushed Croissants*

[\(View\)](#)

- *Training Mission: Crushed Croissants Answer Key*

[\(View\)](#)

- *Field Log: Frantic Franchise* [\(View\)](#)
- *Field Log: Frantic Franchise Answer Key* [\(View\)](#)
- *Mission Simulation: Yummys to Gummys* [\(View\)](#)
- *Mission Simulation: Yummys to Gummys Key*

[\(View\)](#)

- *Training Mission: Old Turquoise*
[\(View\)](#)
- *Training Mission: Old Turquoise Answer Key*
[\(View\)](#)
- *Mission Simulation: Let's Make a Deal*
[\(View\)](#)
- *Mission Simulation: Let's Make a Deal Answer Key*
[\(View\)](#)
- *Training Mission: Clever Coach*
[\(View\)](#)
- *Training Mission: Clever Coach Answer Key*
[\(View\)](#)
- *Mission Simulation: Operation New Agent*
[\(View\)](#)
- *Mission Simulation: Operation New Agent Answer Key*
[\(View\)](#)

Vocabulary

- **Average** - The sum of all the items in a set of data, divided by the number of items in the set.
- **Box-and-Whisker Plot** - A visual display of statistical information, including the median, upper and lower extremes, and upper and lower quartiles of data.
- **Decimal** - A number system that uses base ten, dividing whole numbers and parts of a number using a decimal point
- **Estimate** - The process of finding an approximate answer to a problem.
- **Formula** - An equation that states a rule or a fact about a relationship.
- **Graph** - A drawing or diagram that shows information.
- **Line Graph** - A way of visually representing information, usually plotted using points on a grid with an X- and Y-axis.
- **Mean** - The average of a set of data

- **Median** - The middle item in a set of data.
- **Mode** - The most frequent item in a set of data.
- **Negative Number** - a number that is less than zero
- **Percentage** - A part of 100; an alternate way to express decimals or fractions.
- **Pie Chart (Circle Graph)** - A visual display, showing parts of the whole as sections of a circle.
- **Population** - In statistics, the entire group being considered from which a sample is drawn.
- **Sum** - The total that results when you add.

Procedures

The focus of this four-day set of lesson plans focuses on the completion of the mathematics activities in the highly interactive Web site, Villainy Inc. The teacher will begin by offering the students an overview of the Web site and having the students work in groups to explore the various AVU field agents. Each of the activities in a mission has a training mission activity that can be done prior to the online activity to introduce the mathematical concepts that will be covered in the activity. Each activity has a field log handout that can be used in conjunction with the online activity to record the solutions and each activity has a Mission-Simulation worksheet which reinforces and extends the mathematical concepts involved in the online activity. Each day, the students will complete one of the online activities after first completing the training mission and will conclude the day's activities by completing the Mission-Simulation.

The students will be completing the various activities individually and in groups. All of the activities accommodate students with various learning abilities by peer interaction either through teacher-led questioning or in the group activity. Additionally, students who need extra support can be assigned to work with a partner. Students should be grouped heterogeneously.

An Internet-connected computer lab with enough computers for each student is the most favorable technology configuration to complete this lesson. If this set-up is not feasible, the students can work in pairs or teams of four or the activities can be set up as a station that the teams rotate through.

Day One: Drive-Through Deceit - Activity A

Daily Challenge Question: Who is Dr. Wick I.D. and what is he trying to do?

90 Minutes

Set-up Directions:

Today, the students will complete the training mission, field log and mission-simulation assignments that accompany the first activity in the 2nd Mission of the Villainy Inc. Web site. Ideally, the teacher will secure an Internet-connected computer with a projection device in order to introduce the Web site and will also reserve the computer lab. Ideally, each student will have their own internet-connected computer to work on. The Villainy Inc. Web site can be found online (see Resources). The teacher should bookmark the Web site and have it ready prior to the

arrival of the students. The teacher should arrange the students into heterogeneous groups of about four students. These groups should remain constant for the duration of the four-day lesson.

If this technology configuration is not possible, the teacher can introduce the Web site using materials printed off of the Web site. Students can work in pairs or teams if there are not enough computers available for each student to work at one individually.

The teacher will need to duplicate copies of the following handouts for each student for today's lesson:

Training Mission: Shooting Star

Field Log: Design a Meal

Mission-Simulation Assignment: Diamonds are a Wick's Best Friend

The teacher should also duplicate one copy of each of the following answer keys:

Training Mission: Shooting Star Answer Key

Field Log: Design a Meal Answer Key

Mission-Simulation Assignment: Diamonds are a Wick's Best Friend Answer Key

Teacher Presentation & Motivation:

The teacher will tell the students that today they are going to learn about an evil man named Dr. Wick I.D. and that it is going to be their job over the next four days to save the world from chaos and bedlam by being savvy problem-solvers. The teacher will explain that they have each been hand-selected to become a member of the Anti-Villainy Unit, or AVU, and that their first mission involves designing a kid's meal for a fast food restaurant.

Activity 1 - Welcome to Villainy Inc.

(10 Minutes) Before your students log onto the computers, you will want to familiarize them with the world of Dr. Wick. The teacher will introduce the plot, characters, and setting. All of this information can be found in the About the Story section (<http://villainyinc.thinkport.org/default.asp>) Summarize the major points for your students. Hard copies of this page can be printed by using your browser's "Print" function. In Internet Explorer, this function is listed on the pull-down menu under "File." Next, assign each team of 3-4 students to a computer and have them explore one assigned AVU field agents as well as one Villainy Inc. member.

Focus for Media Interaction

Focus for Media Interaction: The focus for media interaction is a specific task to complete and/or information to identify during or after viewing of video segments, Web sites or other multimedia elements.

The students will be told that today's focus for media interaction is learn about their assigned Villainy Inc. member and their assigned AVU field agent.

Viewing Activities

What will your students be responsible for while viewing this piece of multi-media or video?

While viewing the Web site, the group will be responsible for taking notes on the strengths of the assigned AVU field agent as well as notes on the story of the assigned Villainy Inc. member.

Post Viewing Activities

How will students utilize the information they gathered while viewing the multi-media or video?

After the students have spent a few minutes online, have each team report the information that they found to the whole class.

Activity 2 - Training Mission: Shooting Star

(20 minutes) The teacher will list the following numbers on the board: 3, 1, 4, 5, 1, 2 and ask the students to select 2 to 3 numbers, using each only once, whose sum is 7. Teams will be asked to come up with as many possibilities as they can in one minute. Answers: 3&4, 5&2, 4&2&1, 5&1&1 Next, the teacher will list the following numbers on the board: -2, 4, -1, 5, -4, 3 and will ask the students to select between 2 to 3 numbers, using each only once, whose sum is 1. Teams will be asked to come up with as many possibilities as they can in one minute. Answers: -2 & 3, 5&-4, 4&-1&-2, 3&-2

Next, the teacher will distribute copies of the *Training Mission - Shooting Star* handout to each student. The teacher will have one student read through the instructions and will verify that the students all understand what is expected of them. The teacher will ask the students how many numbers they can select. The answer is from 4 to 7 numbers, using each number only once. Also, the teacher will point out that the target number is written on the left side of the paper and that they are expected to write down the numbers that they selected to hit the target number.

Game 1 - Some Possible Answers: 3,2,2,1 & 1,1,0,6 & 2,2,4,0 & 2,4,1,1

Game 2 - Some Possible Answers: 15, 2,-2, -5, 3 & 4, 4, 5, 2, -2

Game 3 - Some Possible Answers: 10, -12, 1, -1 & -8, 3, -3, 6 & -5, -3, 6, 0

After giving the students about 10 minutes to work on each game, the teacher should call students up to the chalkboard to share their answers. The students will offer additional solutions and will confirm the solutions that are shared by each student. Lastly, students will describe their

strategies for playing the Shooting Star game.

Activity 3 - Field Log: Desing-A-Meal

(20 minutes) The students will each need to be at a computer with internet access and with the Villainy Inc. Web site bookmarked. The students will pull the Web site up and click on the link "Begin Mission #2 Drive-Through Deceit." The students will view the short introduction and then type in their AVU agent name. The students will read through the letter from headquarters (HQ) while they listen to it being read by the computer. They will then be prompted to select 2 of the 5 field agents to comprise their team. The teacher will remind them to pick team members whose strengths will benefit them as they work on the activities throughout the mission. Next, the students will read the AVU agreement statement and click on the link that says, "I accept the mission." Next, the students will listen to and watch the discussion between Dr. Wick and Platypus which will set up the activity. The students will next listen to and read through the HQ e-mail which details the plan of how to thwart Dr. Wick's kid's meal plan. The teacher will make sure that all of the students understand what is expected, will distribute the handout entitled *Field Log: Design-A-Meal*. The students will work through the activity while writing down information on the Field Log handout.

Focus for Media Interaction

Focus for Media Interaction: The focus for media interaction is a specific task to complete and/or information to identify during or after viewing of video segments, Web sites or other multimedia elements.

The students will be told that today's focus for media interaction is to work through the first activity in Mission 2: Drive Through Deceit on the Villainy Inc. Web site. They will first focus on what they are being asked to do by Head Quarters in order to ruin Dr. Wick's plans.

Viewing Activities

What will your students be responsible for while viewing this piece of multi-media or video?

While viewing the Web site, the group will be responsible for completing the Field Log handout while they complete the four outlined steps on their To-Do list for the activity.

Post Viewing Activities

How will students utilize the information they gathered while viewing the multi-media or video?

After the students have completed the activity, several students will be asked to share the items that they selected for one of their kid's meals. While one student present an option, the rest of the

class will calculate Cost and the Coolness factor to make sure that the kid's meal falls within the correct range on each scale.

Activity 4 - Mission Simulation: Diamonds are a Wick's Best Friend

(20 minutes) For this activity, the students will work in teams of 3 to 4 students. The teacher will distribute the *Mission Simulation - Diamonds are a Wick's Best Friend* handout. The teacher will say, "Using what you learned about adding and subtracting integers today, you are going to help the Anti-Villainy Unit once again. It seems that Dr. Wick is intending to steal the Precious Diamond which is located on Mount Precious Diamond." The teacher will read the introduction and directions from the handout while the students follow along. The teacher will ask the students to share any questions that they have and will then tell the students to work as a team to monitor Dr. Wick's movements as he uses the Jatari 2010 to propell himself up and down the side of the mountain.

Wrap Up:

The teacher will end the lesson with praise for the AVU team who was able to thwart Dr. Wick's plans for at least one more day. The teacher will return to the daily challenge question which was, "Who is Dr. Wick I.D. and what is he trying to do?" The teacher will call on various students for responses and then will ask the students how they were able to foil his progress today.

Day 2: Drive-Through Deceit - Activity B

Daily Challenge Question: How can you find the percent of a number?

90 Minutes

Set-up Directions:

Today, the students will complete the training mission, field log and mission-simulation assignments that accompany the second activity in the 2nd Mission of the Villainy Inc. Web site. Ideally, the teacher will reserve the computer lab. Ideally, each student will have their own internet-connected computer to work on. The Villainy Inc. Web site can be found online (see Resources). The teacher should bookmark the Web site and have it ready prior to the arrival of the students.

If this technology configuration is not possible, students can work in pairs or teams if there are not enough computers available for each student to work at one individually. Alternatively, using one classroom computer, this lesson can be set up as a station that groups rotate through or the teacher can use a projection device and present the Web site to the whole class.

The teacher will need to duplicate copies of the following handouts for each student for today's

lesson:

Training Mission: Crushed Croissants

Field Log: Frantic Franchise

Mission-Simulation Assignment: Yummy's to Gummy's

One copy of each of the following answer keys should be printed out:

Mission: Crushed Croissants Answer Key

Franchise Answer Key

Mission-Simulation Assignment: Yummy's to Gummy's Answer Key

Training

Field Log: Frantic

Teacher Presentation & Motivation:

The teacher will tell the students that today they are going to use their knowledge of percents to thwart Dr. Wick's evil plans once again. The teacher will ask the students, "Who can tell me what the word percent means?" The teacher will call on students. A student or the teacher will share that the word percent means "per hundred." The teacher will then ask the students, "Does anyone know how to convert a percent into a fraction? For example, how could we write 97% as a fraction?" The teacher will call on students for responses and will confirm that 97% can be written as $97/100$ since percent means "per hundred." Next, the teacher will have the students try three more that have been written on the board: Convert the following percents to fractions: 1. 35% 2. 50% and 3. 75%. The teacher will point out or have a student point out that these fractions can be reduced to simplest terms. (Answers: 1. $35/100 = 7/20$ 2. $50/100 = 1/2$ 3. $75/100 = 3/4$) The teacher will then ask the students if they can take it one step further and convert each of those fractions into decimals. (Answers: 1. .35 2. .50 3. .75) After the correct answers have been shared, the teacher will ask the students what they noticed about converting a percent to a decimal. The students should offer that one need simply move the decimal two places to the left to convert a percent to a decimal.

Activity 1 - Training Mission: Crushed Croissants

(10 minutes) Students should work in teams of 3-4 students on this activity. The teacher will pass out one highlighter to each student. The teacher will distribute the Training Mission - *Crushed Croissants* handout to each student and read through the instructions while the students follow along. The teacher will have the students highlight the sentence in the instructions that reads "**Convert the percent to a fraction or decimal then multiply by the original number of pastries he made.**" The teacher will take the students through Step One on the worksheet. The students will go through the process of finding 20% of 400 by converting the 20% to a fraction and then again by converting 20% to a decimal. The teacher will have the students take an informal vote as to which method they prefer. Either method should be accepted for the next two problems. The teacher will answer any additional questions and then have the students complete the handout in teams.

After all groups have completed the worksheets, go through the answers using the *Training Mission - Crushed Croissants Answer Key* and have students share how they went about calculating each answer.

Activity 2 - Field Log - Frantic Franchise

(30 minutes) The students will each need to be at a computer with internet access and with the Villainy Inc. Web site bookmarked. The students will pull the Web site up and click on the link "Begin Mission #2 Drive-Through Deceit." The students will click the green right arrow to bypass the introduction, then type in their AVU agent name, use the green arrow again, then they will be prompted to select 2 of the 5 field agents to comprise their team. The teacher will remind them to pick team members whose strengths will benefit them as they work on the activities throughout the mission. Next, the students will read the AVU agreement statement and click on the link that says, "I accept the mission." Using the secret key stroke, holding down control, shift and the right arrow, the students will skip activity A and will get to the second activity. Next, the students will listen to and watch the discussion between Dr. Wick and Platypus which will set up the activity. The students will next listen to and read through the HQ e-mail which details the plan of how to thwart Dr. Wick's plan. The teacher will make sure that all of the students understand what is expected, will distribute the handout entitled *Field Log: Frantic Franchise*. The students will work through the activity while writing down information on the *Field Log* handout.

Focus for Media Interaction

Focus for Media Interaction: The focus for media interaction is a specific task to complete and/or information to identify during or after viewing of video segments, Web sites or other multimedia elements.

The students will be told that today's focus for media interaction is to work through the second activity in Mission 2: Drive Through Deceit on the Villainy Inc. Web site. They will first focus on what they are being asked to do by Head Quarters in order to ruin Dr. Wick's plans. Specifically, the students should read through the three steps they must follow to complete the to-do list.

Viewing Activities

What will your students be responsible for while viewing this piece of multi-media or video?

While viewing the Web site, the group will be responsible for completing the *Field Log - Frantic Franchise* handout while they complete the three outlined steps on their To-Do list for the activity.

Post Viewing Activities

How will students utilize the information they gathered while viewing the multi-media or video?

After the students have completed the activity, several students will be asked to share the math terms and or formulae that they used to find the number of children in each town. A list of terms and formulae will be written on the chalkboard.

Activity 3 - Mission Simulation: Yummys to Gummies

(30 minutes) For this activity, the students will work in teams of 3 to 4 students. The teacher will distribute the *Mission Simulation - Yummys to Gummies* handout. The teacher will say, "Using what you learned about finding the percent of a number, you are going to help the Anti-Villainy Unit once again. We are looking three years into the future and it seems that Dr. Wick has requested a recount of all of the children aged 1-9 in the towns of Springfield, Fictitious, Figment, Spurious and Counterfeit." The teacher will read the introduction and directions from the handout while the students follow along. The teacher will ask the students to share any questions that they have and will then tell the students to work as a team to calculate the new population of each town. The teams should notify the teacher when they have completed step one of the worksheet. Using the *Mission Simulation - Yummys to Gummies Answer Key*, the teacher will quickly check the answers to step one. If the answers are correct, the teacher will give the team straightedges and colored pencils for the students to use when completing the double bar graph in step two on the handout.

Wrap Up:

The teacher will end the lesson with praise for the AVU teams who were able to thwart Dr. Wick's plans for at least one more day. The teacher will return to the daily challenge question which was, "How can you find the percent of a number?" The teacher will call on various students for responses and then will ask the students how they were able to foil Dr. Wick's progress today.

Day 3: Drive-Through Deceit - Activity C

Daily Challenge Question: How can you determine if a deal is a good deal?

90 Minutes

Set-up Directions:

Today, the students will complete the training mission, field log and mission-simulation assignments that accompany the third activity in the 2nd Mission of the Villainy Inc. Web site. Ideally, the teacher will reserve the computer lab. Ideally, each student will have their own internet-connected computer to work on. The Villainy Inc. Web site can be found online (see Resources). The teacher should bookmark the Web site and have it ready prior to the arrival of the students.

If this technology configuration is not possible, students can work in pairs or teams if there are not enough computers available for each student to work at one individually. Alternatively, using one classroom computer, this lesson can be set up as a station that groups rotate through or the teacher can use a projection device and present the Web site to the whole class.

The teacher will need to duplicate copies of the following handouts for each student for today's lesson:

Training Mission: Old Turquoise

Mission-Simulation Assignment: Let's Make a Deal

The teacher will also need to make one copy of each of the following handouts::

Training Mission: Old Turquoise Answer Key

Field Log:

Mission-Simulation Assignment: Let's Make a Deal Answer Key

Teacher Presentation & Motivation:

The teacher will tell the students that today they are going to use their mathematics skills to hunt down a good deal and at the same time, foil Dr. Wick's evil plans.

Activity 1 - Training Mission: Old Turquoise

(20 minutes) The teacher will tell the students, "I am interested in purchasing a new overhead projector but I want to find a good deal. The Teacher store has an overhead projector for \$150 and I have a 10% off coupon. The Overhead Clearance Center has an overhead projector for \$165 and I have a coupon for \$25 off the purchase of an overhead projector. Which is the better deal?" The teacher will have the students work in groups to determine which store is offering the better deal on the overhead projector. The teacher will ask each group to share which store they believe has the better deal. (Answer: The Teacher Store - Discounted Price = \$135; The Overhead Clearance Center - Discounted Price = \$140, so The Teacher Store is the better deal.)

The teacher will distribute the *Training Mission - Old Turquoise* handout to each student. The teacher will explain that the store, Old Turquoise, is offering two specials and that it is their job to figure out which is the better deal. The teacher will point out the two deals on the handout and will make sure the students see the Old Turquoise Pricing chart. The teacher will have the students work individually to complete the activities on the handout. Students needing more assistance can be assigned a partner. When the students have completed the handout, take a poll to see which coupon offers the bigger savings.

Activity 2 - Mission Simulation: Let's Make a Deal

(25 minutes) For this activity, the students will work in teams of 3 to 4 students. The teacher will distribute the *Mission Simulation - Let's Make a Deal* handout. The teacher will say, "Using what you learned about calculating discounts, you are going to figure out the best way to determine whether or not a deal is a good deal. Sure, you may save \$5 if you buy 35 hamburgers, but who needs 35 hamburgers? The teacher will explain that a better way to determine if a deal is a good deal might be to calculate what percentage of the total price the discount is. The teacher will work through the example given at the top of the handout. The teacher will say, "Let's look at Save-A-Bunch. The Discount amount is \$1 and the amount you must spend is \$100. What percent is 1 of 100?" The students should readily see that this is a 1% discount. The teacher will continue, "At Cheap Store, you need only spend \$10 to get the \$1 discount. Is this a better deal or is it just the same because in both cases you save \$1?" Let students share their ideas about which, if either, is a better deal. Then have the students calculate the percent 1 is of 10. The students will find that this is a 10% discount and should determine that this is a much better deal. The students will go on to complete steps three and four on their own.

" The teacher will read the introduction and directions from the handout while the students follow along. The teacher will ask the students to share any questions that they have and will then tell the students to work as a team to monitor Dr. Wick's movements as he uses the Jatari 2010 to propel himself up and down the side of the mountain.

Wrap Up:

The students will share their responses to steps three and four on the handout. Next, the teacher will return their attention to the Daily Challenge Question which was, "How can you determine if a deal is a good deal?" The students have spent time today calculating discounts and comparing deals. The students will be asked to spend 3-5 minutes answering the Daily Challenge Question on a piece of paper. The students will then be asked to share which method of determining discount is most beneficial.

Day 4: Drive-Through Deceit - Activity D

Daily Challenge Question: What happens to the average of a set of data when one piece of data is counted more than once?

90 Minutes

Set-up Directions:

Today, the students will complete the training mission, field log and mission-simulation assignments that accompany the fourth activity in the 2nd Mission of the Villainy Inc. Web site. Ideally, the teacher will reserve the computer lab and each student will have their own internet-connected computer on which to work. The Villainy Inc. Web site can be found online (see Resources). The teacher should bookmark the Web site and have it ready prior to the arrival of

the students.

If this technology configuration is not possible, students can work in pairs or teams if there are not enough computers available for each student to work at one individually. Alternatively, using one classroom computer, this lesson can be set up as a station that groups rotate through or the teacher can use a projection device and present the Web site to the whole class.

The teacher will need to duplicate copies of the following handouts for each student for today's lesson:

Training Mission: Clever Coach

Mission-Simulation Assignment: Operation New Agent

Villainy Inc.

Reflection Journal

One copy of each of the following answer keys should be printed out:

Mission: Clever Coach Answer Key

Assignment: Operation New Agent Answer Key

Training

Mission-Simulation

Teacher Presentation & Motivation:

The teacher will say to the students, "Today you are going to utilize your statistical skills to help out the Anti-Villainy Unit in a variety of activities. First, you will help Coach judge a figure skating competition, next you will compute average scores of a variety of live acts that Dr. Wick would like to hire and lastly, you will help score an AVU agent trainee. Let's get started!"

Activity 1 - Training Mission: Clever Coach

(25 minutes) The teacher will say to the students, "I graded a group of quizzes from another class and the class average was an 88%. What does this mean?" The teacher will call on students to offer answers and will give appropriate feedback. The teacher will further prompt, "If I took three tests during one marking period and earned a 90, an 89 and a 97 what is my average quiz grade?" The teacher may need to review how to find the average, or mean, of a set of data which is to add up the data and divide by the number of pieces of data. The answer is 92. The teacher should ask the students if they were surprised that the average wasn't higher. The students should share that because two of the scores (89 and 90) were on the lower end the average should be closer to 89 and 90 than to 97.

The teacher will distribute the *Training Mission - Clever Coach* handout. The teacher will have one student read through the instructions and will verify that the students all understand what is expected of them. The teacher will work through the Step One example making sure to point out that the score for the Head Judge will be counted twice.

The teacher will give the students another 10 minutes or so to complete the handout. The teacher

will ask each group to confer and determine the winner of the skating competition. Each team will share their choice and the class will discuss it.

Activity 2 - Mission Simulation: Operation New Agent

(20 minutes) For this activity, the students will work in teams of 3 to 4 students. The teacher will distribute the *Mission Simulation - Operation New Agent* handout. The teacher will say, "Using what you learned about finding the average of a set of scores, you are going to help the Anti-Villainy Unit once again. It seems that there is a new agent trainee that has just completed a series of tests in order to graduate from AVU agent school. Your job is to help calculate a score for each of the various tests that the trainee took." The teacher will read the introduction and directions from the handout while the students follow along. The teacher will ask the students to share any questions that they have and will then tell the students to work as a team to calculate the Average Strength Score, the Average Wit Score, the Average Charm Score and the Average Jumping on One Foot Score.

Wrap Up:

First, the teacher will congratulate the students on putting a stop, at least for now, to Dr. Wick's evil plans. Next, the teacher will revisit the daily challenge question which was, "What happens to the average of a set of data when one piece of data is counted more than once?" Each team will be given 4 minutes to discuss the answer to the daily challenge question and prepare to report their answer to the class. The teacher will have several teams share their responses.

Lastly, since this is the final wrap-up of four days of Villainy Inc. activities, the teacher will have the students complete the Villainy Inc. Reflection Journal. The teacher will distribute the *Villainy Inc. Reflection Journal* handout. The students will be given about 7 minutes to respond to the journal prompt, then several students will be asked to share their responses.

Enrichment Options

Parent-Home Connection

Students can go home and share their experiences with Villainy Inc. with their family at home or at a computer at the library or community resource center.

Another family activity, would be to visit the Figure This! Web site (<http://www.figurethis.org/>) together as a family, paying particular attention to the **Family Corner** section of the Web site. Sponsored by the National Council of Teachers of Mathematics,

this portion of their site offers advice on working with school administrators and teachers, support for working through math homework, and other ;practical matters.

Cross-Curricular Extensions

Have students write a short story about another plan that Dr. Wick has to take over the world.

Stage 4

Teacher Reflection

As a reflective practitioner, note how this lesson could be adjusted after its initial implementation. How successful were the students? What did the assessment demonstrate about the students' learning? What skills do the students need to revisit? What instructional strategies worked and what made them successful? What will you change the next time you use this lesson? Why?

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