Materials
- **BLM** Detective Successes

Math Vocabulary
ratio
proportion
equivalent ratios
variables

Literature Vocabulary
detective
victim
suspect
culprit
clue
evidence
motive

ELPS (*English Language Proficiency Standards)*
2B, 2C, 2D, 2I, 3A, 3C, 3H, 3J

CCRS *(College and Career Readiness Standards)*
I – BC
VIII – A1, A2, A3, A4, A5, B1, B2, C1, C2, C3
IX – A1, A2, A3, B1, B2, C1, C2, C3
X – B1

Unit 3, Lesson 2 — Grades 5-6

TV Lesson

Math Objectives:
- Give examples of ratios as multiplicative comparisons of two quantities describing the same attribute.
- Represent ratios and percents with concrete models, fractions, and decimals.

Language Objectives:
- Discuss problem solving strategies with peers.
- Write out solutions for solving problems.
- Justify their thinking and strategies.

Building Background
Mickey Rangel is quite a detective. His solution ratio is 10:10, which means he solves every mystery. But, his solution ratio is 7:10 without backup from Angel, which means he does need help from time to time to solve some mysteries. Like batting averages, this way of showing success is very helpful in predicting future success.

There are other great child detectives that you can read about. Today, we are going to investigate their solution ratios, find their percent of success, and predict future success.

Comprehensible Input
Let's use ratio and proportion to determine Mickey's success ratio as a percent. Tell your Classroom Teacher what proportion equation you would set up to find an equivalent proportion that you could easily represent as a percent. *(generous pause)*

Well, I already know his solution ratio, which is 7:10. I can express that as a fraction *(do so)*. If I want to represent that as a percent, I know that I can find an equivalent ratio with a denominator of 100. Let's use our friendly variable again – I'm going to use *x,* but you can use any letter you wish.

$$\frac{\textbf{7 solved mysteries without backup}}{\textbf{10 mysteries}} = \frac{\textbf{x solved w/o backup}}{\textbf{100 mysteries}}$$

You can cross multiply if you wish; but I think I will just multiply by a form of one because I know that 10 x 10 will give me the 100 in the equivalent ratio.

$$\frac{\textbf{10x}}{\textbf{10x}}\ \frac{\textbf{7 solved mysteries without backup}}{\textbf{10 mysteries}} = \frac{\textbf{x solved w/o backup}}{\textbf{100 mysteries}}$$

Multiplying 10 x 7 = 70; 10 x 10 = 100; so:

$$\frac{70}{100} = \frac{x}{100}$$

Obviously, $x = 70$

70 / 100 is in hundredths: 70 hundredths = 70 per 100 or 70%.

So Mickey Rangel's percent of mysteries solved without back up is 70%. We can fill in the percent of success column for Mickey Rangel *(do so).*

Let' jump down to Harris Burdick (*you want to make sure you do a problem which would be easier with cross multiplication*).

Harris Burdick solution ratio without backup is 10:15. I can write that as a fraction. Please do so with me *(do so).* Now, I don't know about you, but I can't think of a number quickly that I can multiply 15 by to get 100, so I'm going to cross multiply.

100 x 10 = 1000 $\frac{\text{10 success}}{\text{15 mysteries}} \times \frac{x}{100}$ $15(x) = 15x$

So I have 1000 on one side of the equal sign, and 15*x* on the other.

$$1000 = 15x$$

I need to get *x* by itself. How would you do that? Please quickly give your suggestions to your Classroom Teacher. *(pause)*

I see that I am multiplying *x* by 15 on the right side of the equation. If I divide 15*x* by 15, that will give me *x*.

But remember, you want to keep both sides of the equation in proportion. You must also divide the left side of the equation by 15. That would be 1000 divided by 15. Please divide that out with me *(do so)*.

x then equals 88.8

I replace *x* on the right with 88.8 which gives me 88.8/100, or 88.8 hundredths which is 88.8 percent or 88.8%. Let's fill in Harris Burdick's percent of success.

	Unit 3, Lesson 2 **Grades 5-6** **TV Lesson** - continued **----------** (*Solve as many as you have time to solve. It is suggested that you see the relationships of 5, 20, and 25 to 100 so you can model multiplying out by a form of one rather than cross multiplying. Only Cam Jansen would need cross multiplication as 12 is not as easy for the students to see.)* **Pirate's Corner** Tell us what your results were on your graph today, and how people explained their answers. **Objectives:** Read through the math and language objectives, making sure that students understand how they accomplished each.

Unit 3 Lesson 2 – TV Lesson
One per student

Detective Successes

Here are the names of young detectives and their solution ratios for mysteries they solved WITHOUT help from others. Which detective would you hire to help you and why?

Detective	Solution Ratio (without backup)	Percent of Success
Mickey Rangel	7:10	
Encyclopedia Brown	3:5	
Nate the Great	15:20	
Harris Burdick	10:15	
Trixie Belden	21:25	
Cam Jansen	9:12	

Which detective would you choose just by looking at these solution ratios?

_____

Use ratio and proportion to determine their percent of success.

Using the percent of success without back up, I would choose

_____

to solve a mystery for me because….

Unit 3 Lesson 2 – TV Lesson
One per student

Éxitos detectivescos

He aquí los nombres de detectives jóvenes y los cocientes que usaron para resolver los misterios que los ocupaban SIN ayuda de los demás. ¿Qué detective reclutarías para que te ayude y por qué?

Detective	Razón de solución (sin ayuda)	Porcentaje de éxito
Mickey Rangel	7:10	
Encyclopedia Brown	3:5	
Nate the Great	15:20	
Harris Burdick	10:15	
Trixie Belden	21:25	
Cam Jansen	9:12	

¿Qué detective escogerías con solo ver estos cocientes utilizados para resolver el problema?

_____

Utiliza cociente y proporción para determinar el porcentaje de éxito de los detectives.

Si usaras el porcentaje de éxito sin apoyo, escogería a

_____

para resolver un misterio para mí porque….