

LESSON: Types of Division		Time: 45 minutes
<p>Overview:</p> <p>This lesson is a supplemental lesson for the AP concept of different types of division. Students will discover the difference between decimal (or real number) division and integer division. Then they will learn about modulo division and its applications.</p>		<p>Objectives:</p> <ul style="list-style-type: none"> I can evaluate expressions that use decimal division, integer division and modulo division I can determine possible answers for modulo division I can give applications for modulo and integer division
<p>Standards:</p>	<p>CSP Framework:</p> <p>Big Idea 3: Algorithms and Programming</p> <p>AAP-2.C Evaluate expressions that use arithmetic operators</p> <p>AAP-2.C.1 AAP-2.C.2 AAP-2.C.3</p>	<p>Key Concepts:</p> <ul style="list-style-type: none"> Real number or decimal division is what students learned in math class. Integer division is the whole number found from long division – the number of times the divisor goes into the dividend. Modulo division is the remainder, or leftover, from long division.
<p>Preparation:</p> <p>Make a copy of the assignment or put it in the LMS (can be printed)</p> <p>Print the group work examples if not using the slides</p>	<p>Links:</p> <ul style="list-style-type: none"> Assignment (for review) Slides for instructions Document for printing examples (if needed) Kahoot review 	<p>Agenda:</p> <ul style="list-style-type: none"> Part 1 (10 minutes) Part 2 (10 minutes) Part 3 (10 minutes) Assignment (10 minutes) Review Kahoot (5 minutes)
<p>Vocabulary:</p> <ul style="list-style-type: none"> Decimal (or real number) division: A regular mathematical division problem, where the answer is always a decimal (or real number) even when the divisor goes into the dividend evenly Integer division: The whole number from a long division problem – the number of times a divisor goes evenly into a dividend Modulo (or modulus) division: The remainder of a long division problem – the amount leftover from a divisor and a dividend 		
<p>Assessment:</p> <ul style="list-style-type: none"> Daily reflection journal or form Demonstrate in a group evaluating expressions with decimal, integer and modulo division Assignment completion (review) Exit ticket or group review Kahoot! 		

Teaching Guide

Part 1 (10 minutes)

Randomly group students in groups of three and have them work at vertical non-permanent surfaces (white boards).

Part 1 is exploratory. Students are given math problems with an answer, and they need to determine the operator to get the answer. The first one is decimal division. The second problem is integer division. They will not know the operator for this, but they should be able to determine it is integer division, or the number of times the divisor goes into the dividend evenly (no remainder).

Teaching tip – Part 1 – “[Types of Division](#)” slide #2

- You can either print the problems for the groups, or use the slide show to display the problems.
- If the students need a hint, you can show the next slide. But try to get them to come up with the solution on their own.

Teaching tip – Part 1 – “[Types of Division](#)” slide #3

- After the students come up with the solution, then show the next slide, which consolidates their learning with a summary of the two types of division.
- Reinforce the operator ($//$) for integer division.

Part 2 (10 minutes)

Continue the random groups at the white boards. Students should NOT erase their boards, but add to the problems.

Part 2 is also exploratory. Students are given another math problem with an answer, and they need to determine the operator to get the answer. This one is modulo division (the remainder). They will not know the operator for this, but they should be able to determine it is the remainder. Hopefully getting through Part 1 will help trigger their brains to come up with the remainder.

Teaching tip – Part 2 – “[Types of Division](#)” slide #4

- You can either print the problems for the groups, or use the slide show to display the problems.
- If the students need a hint, you can show the next slide. But try to get them to come up with the solution on their own.

Teaching tip – Part 2 – “[Types of Division](#)” slide #5, #6

- After the students come up with the solution, then show the next slide, which consolidates their learning with a summary of modulo division
- Then show #6, which gives applications of modulo division.

Part 3 - Check your understanding (10 minutes)

Continue the random groups at the white boards. Students can erase their boards, or leave their math problems. Either way works fine.

Part 3 is a check your understanding, which will give you and the students a chance to gauge their understanding of the different types of division. This part should be completed in their groups, kind of like note-making.

Teaching tip – Part 3 – “[Types of Division](#)” slide #7, #8

- You can print the problems, or use the slides. The first set of problems ask students to determine possible answers. If you use the slides, the problems are on #7, and the solutions are on #8. The best

way for students to check their work is to look at other groups and compare answers and discuss. Then rework problems they aren't sure about. However, you can use the slides if time is short.


 **Teaching tip – Part 3 – “[Types of Division](#)” slide #9, #10**

- The second set of problems ask students to evaluate expressions with integer and modulo division. If you use the slides, the problems are on #9, and the solutions are on #10. The best way for students to check their work is to look at other groups and compare answers and discuss. Then rework problems they aren't sure about. However, you can use the slides if time is short.

 **Teaching tip – Part 3 – “[Types of Division](#)” slide #11, #12**

- The third set of problems ask students to evaluate expressions with integer and modulo division, but special circumstances. If you use the slides, the problems are on #11, and the solutions are on #12. The best way for students to check their work is to look at other groups and compare answers and discuss. Then rework problems they aren't sure about. However, you can use the slides if time is short.

Assignment Review (10 minutes)

 Students can work individually, with a partner, or even at the white boards (if you print the assignment).

This assignment is a review of the concepts worked on today. It is the wrap-up. If time permits, you can go over the answers to the assignment, or have students check with each other on their answers to the assignment.

 Review assignment is complete and ready to turn in

Formative Assessment:

- [Kahoot!](#) – 5 questions
- Daily reflection journal or form
- Class discussion on what they learned about lists
- Assignment completion
- Programming journal (add notes, vocab)
- Exit ticket

SUCCESS CRITERIA:

- Evaluate expressions with decimal division, integer division and modulo division
- Give applications for integer and modulo division
- Understand the possible answers in a modulo division problem