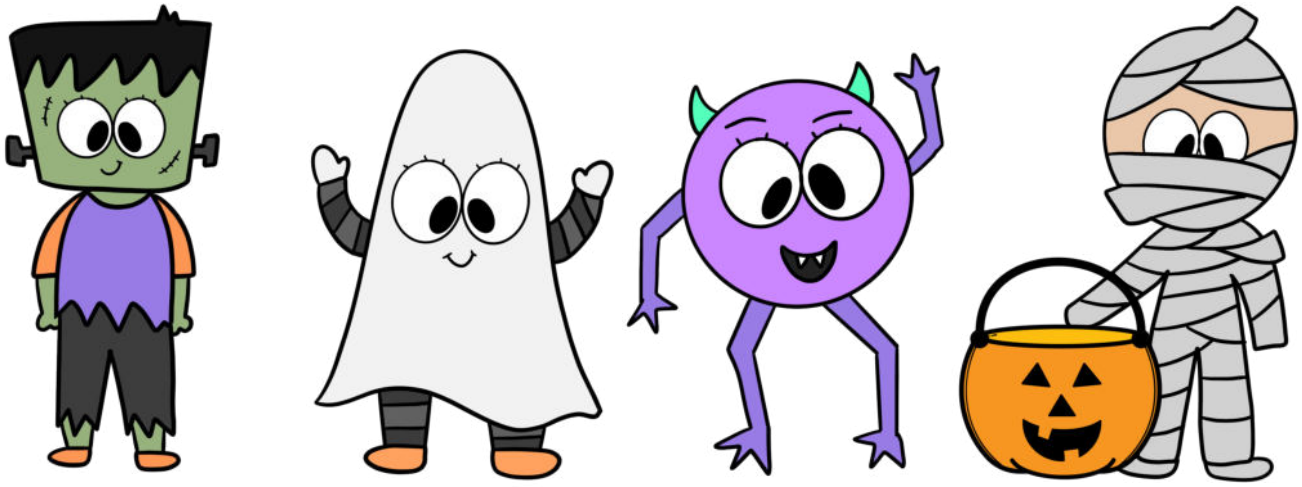
Candy Exchange

One Halloween, four friends went trick-or-treating. At the end of the night, they each grabbed one piece of candy out of their bucket. Shockingly, each of the friends disliked the piece of candy they picked out. They decided to exchange the candy with each other. How many different ways can the four friends exchange the candy so that no friend ends up with their original piece of candy?



Teacher Directions

Set-Up

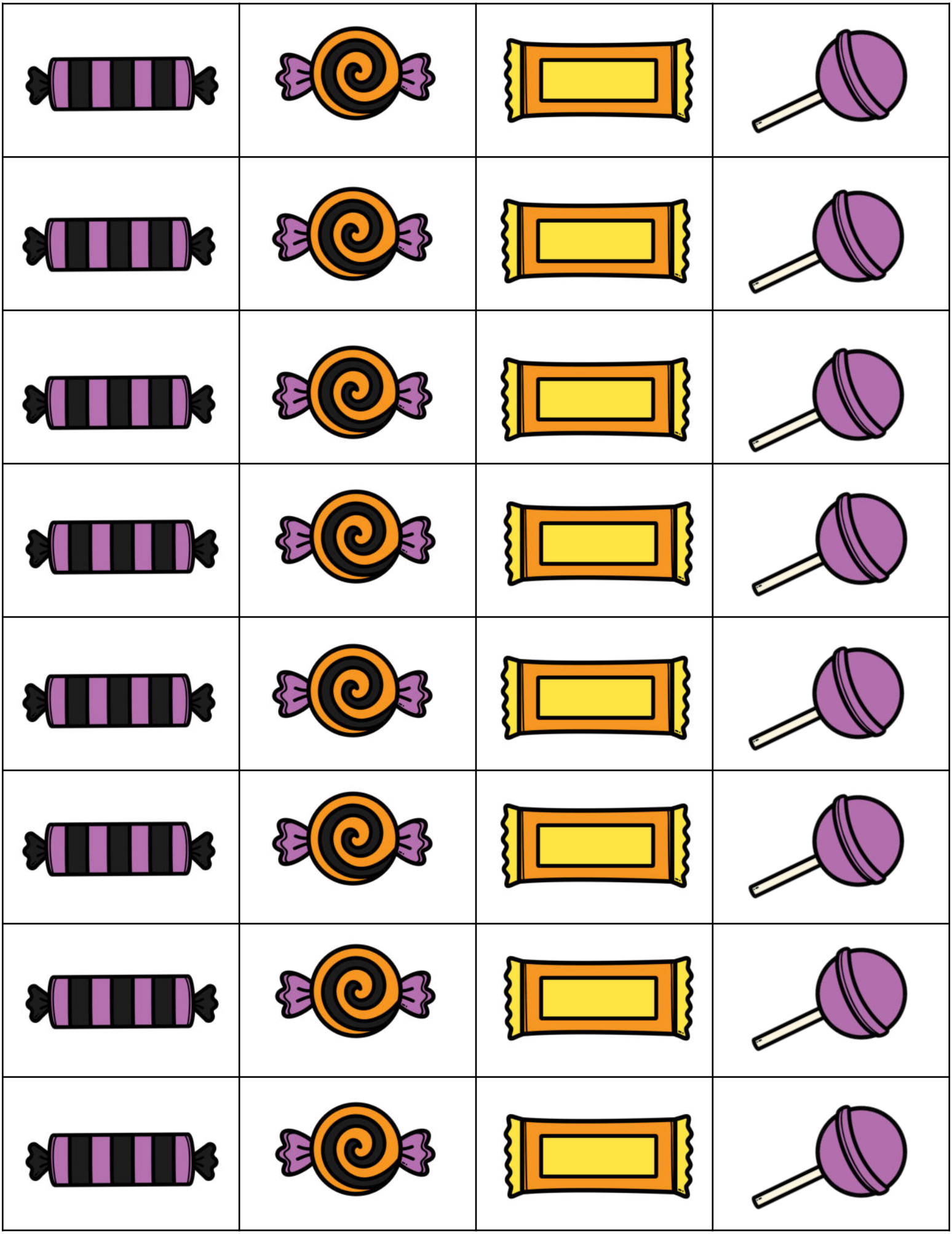
Teacher: Can I get three volunteers to help me demonstrate?
Students: "Me, Me, Me…"
Teacher: [selects three volunteers. With the student volunteers, arrange so that the four of you sit in a "square" arrangement.] Everybody else, please gather around us to observe, as if we are in a fishbowl!
Teacher: [distribute one candy card or one actual piece of candy to the four in your group. Make sure each candy is different].

Posing the Problem/Possible Script

Teacher: Bummer. We each got a piece of candy, but nobody likes the candy they got. Is there a way we can exchange candy so that nobody has their original piece?
Students: Sure. [Allie, Bob, and Chris all give their candy to the teacher. The teacher gives her candy to Bob.]
Teacher: Oh, I forgot to tell you. After we exchange candy, everybody has to have exactly one piece of candy. Can we try again?
Students: Okay. [Allie and Bob trade candy with each other. Teacher and Chris trade with each other}.
Teacher: That works! Is there another way we could exchange without anyone getting their own?
Students: Maybe. Can we try all passing our candy to the right? [Everybody does that].
Teacher: So far, we've exchanged our candy two different ways where nobody has ended up with their original piece. Your task is to figure out how many possible ways there are to do this. Are there any questions? Okay, make sure to document your thinking!

[Teacher gives 4 candy cards or pieces of candy to each group, then sends students to boards to work in groups. Note: even though students are used to working in 2s and 3s, it is helpful to have 4 people in a group to model this problem. But, it is also possible to have a smaller group and imagine that one of the pieces of candy or candy cards models a person.]

Note: Solutions are on the last page! Try to solve it yourself first before you look. ☺



Thank you! I hope you and your students love this!

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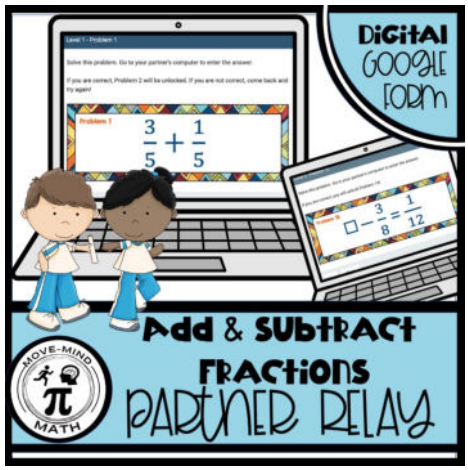
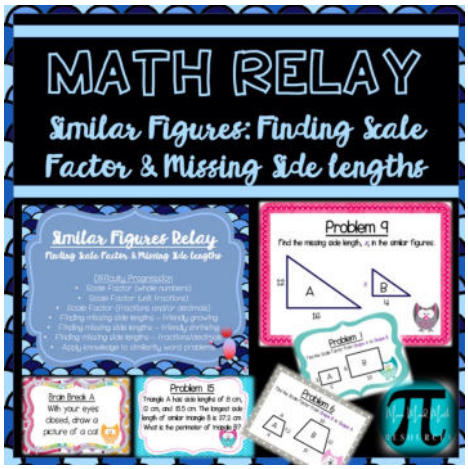
My Progressive Relays are inspired by *Building Thinking Classrooms* by Peter Liljedahl. They start with basic skills and add challenge throughout until by the end, the students are building autonomy and are completing rich problem-solving tasks!

Solving Equations Relay



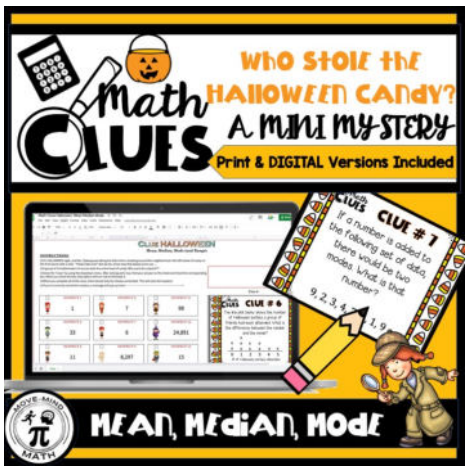
Similar Figures Relay



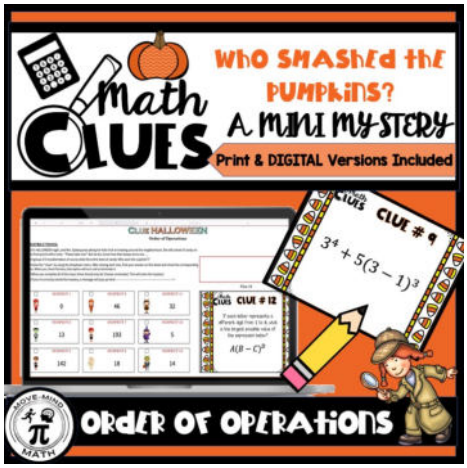
Digital Add & Subtract Fractions Relay

More to Enjoy

Mean, Median, Mode Digital Clue Game

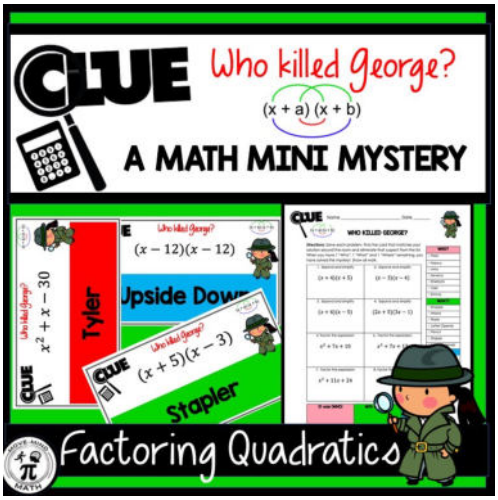


Order of Operations Digital Clue Game

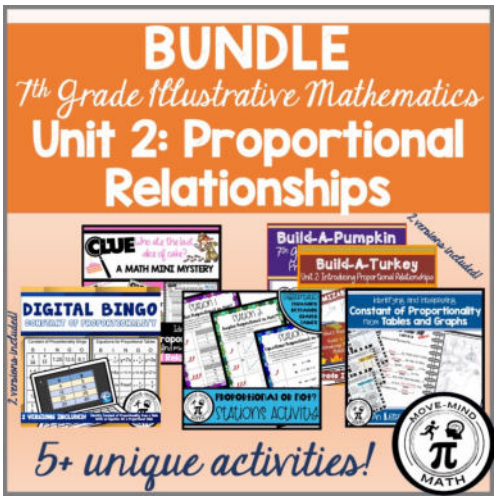


Factoring Quadratics Clue Game

Inspired by BTC



7th Grade Illustrative Math Activity Bundles



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For A Rainy Day

Solutions

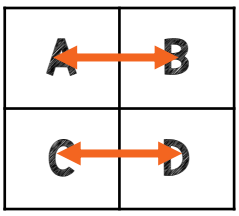
Answer: 9 different ways

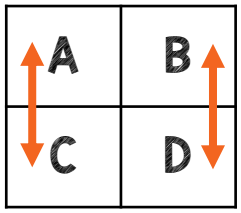
There are many different approaches to solving this problem. The following are two of my favorite ways I have seen students solve it.

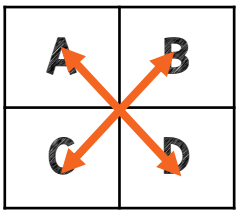
Solution 1: Organized list

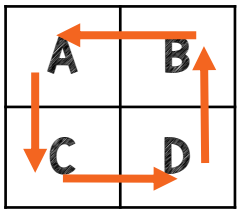
Original	A	B	C	D
Person who ends with the candy	B	A	D	C
	B	C	D	A
	B	D	A	C
	C	A	D	B
	C	D	A	B
	C	D	B	A
	D	A	B	C
	D	C	A	B
	D	C	B	A

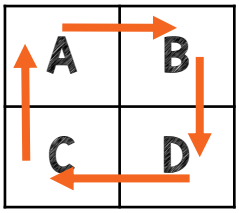
Solution 2: Drawing the types of exchanges

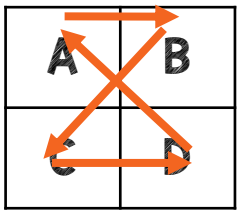


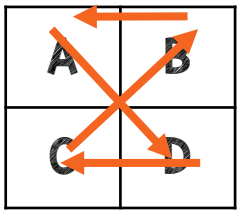


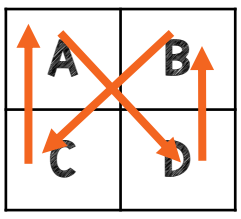


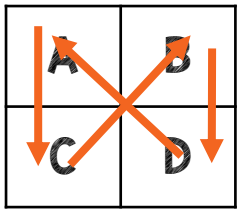












A good extension problem could be for students to solve this if there were FIVE friends. It is much tougher (with 44 ways). If students get excited, they may want to research the topic "derangements".