Equivalent Expression Exploration

Pre-Planning

Learning Goals

- Students will identify like terms and combine them to simplify expressions.
- Students will identify and create equivalent expressions.

Standards
(from http://www.corestandards.org/Math/)

- CCSS.math.content.6.EE.A.3
- CCSS.math.content.6.EE.A.4

Curriculum Alignment

Connected Math, Grade 6: Variables and Patterns

Prior Knowledge

- Students should know basic expression vocabulary: term, coefficient

Materials

- Chromebook or technology for each student
- Handout
- 3 colored markers/pens
- Whiteboard markers/Whiteboard

Lesson Flow (45 - 55 minutes) (Slides)

Warm-Up (10 min)

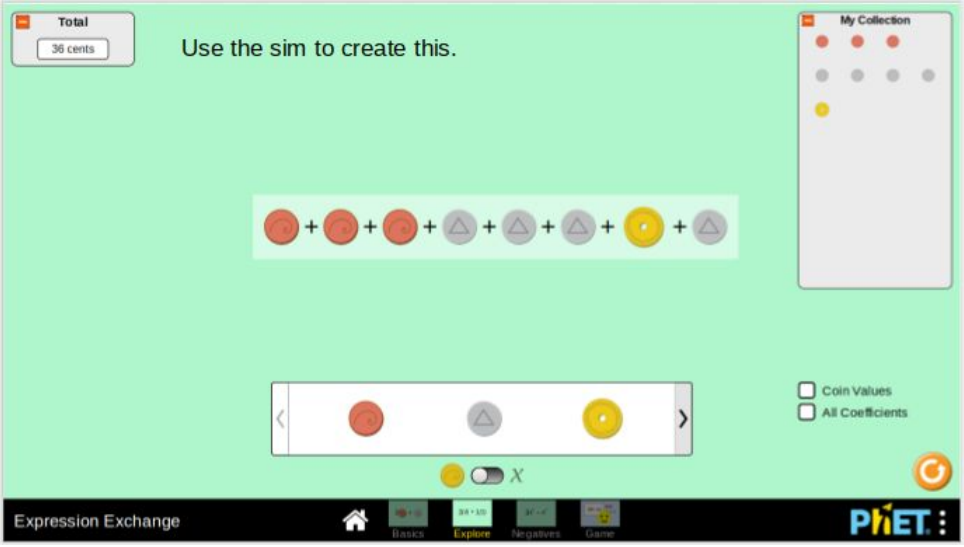
Individual Exploration (6 minutes)

- Students will go to Expression Exchange
- Students will go to to the explore tab and explore the sim. Have students consider the following questions while exploring:
    - What can you do or figure out with the sim?
    - What features of the sim might help us with the learning goals of the lesson? How? Write down at least 1 example.

- Have a 2-3 minute class discussion/debrief of the sim. If it doesn't come up in discussion, steer students towards the following features.
    - My collection
    - Scissors
    - The arrows
    - The coin to variable toggle

Whole Class (4 minutes)

Whole Class: Have students create Slide 5.



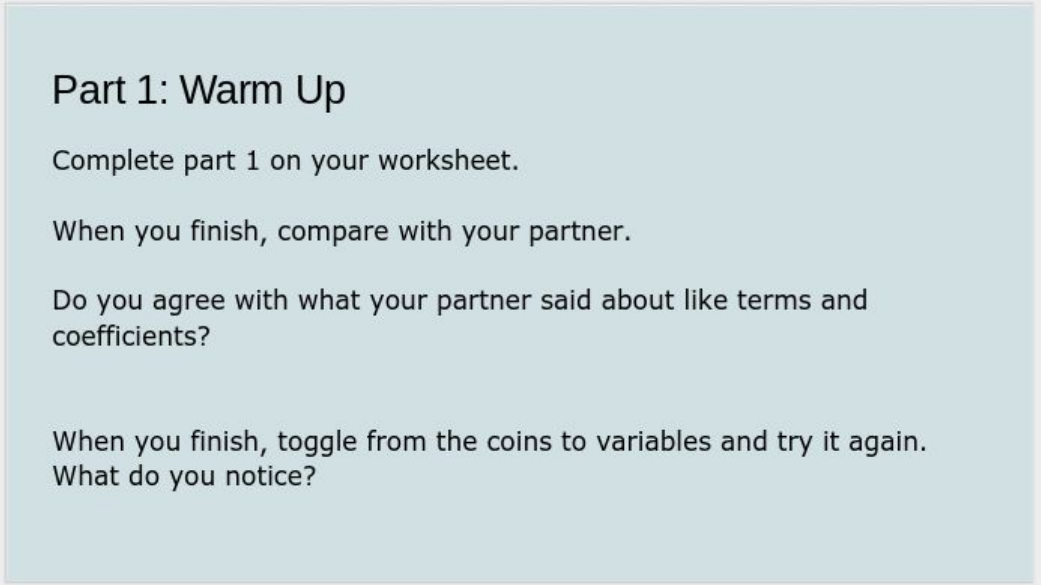
Open up PhET simulation and create this screen. Project the screen and have students complete the tasks as they answer the following questions.

1. Which coins can you group up or combine? How do you do that? (Make sure they understand how to use the scissors and the arrows function)
2. Why? (Introduce the vocabulary term: like terms. Write the word and the definition on the board.)
3. What does the number in front of the coin represent? What is the mathematical word for that? (Write the word **coefficient** and a definition on the board) What do you notice about the coefficient and the number of that coin in the **my Collection** box?

Hand out the activity sheet to students.

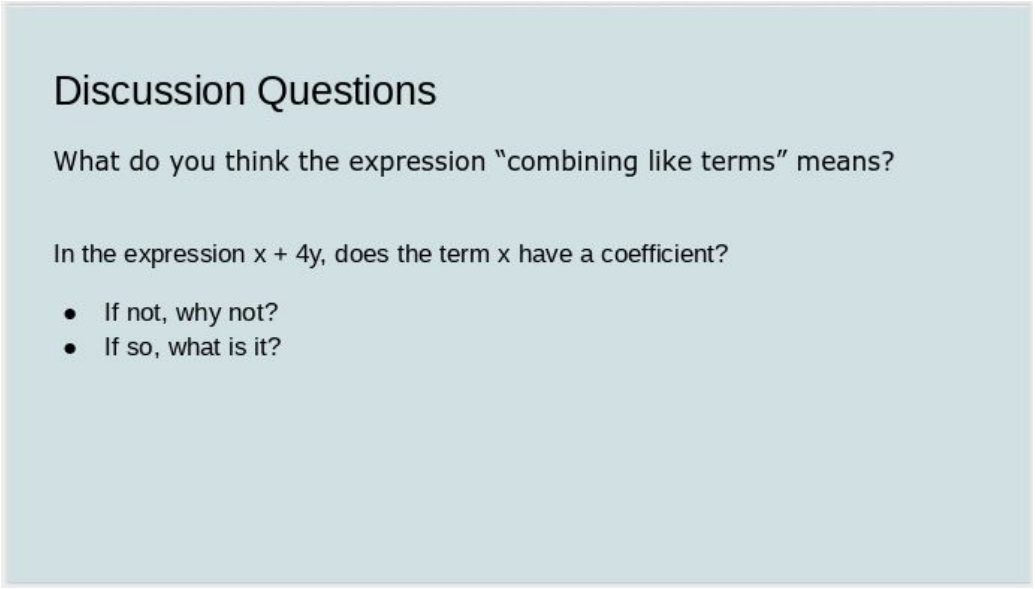
Guided Exploration and Discussion

Part 1: Like Terms (5 min)



Slide 7

Walk around room while students are completing this task.



Slide 8

- Start discussion by having multiple students share out their definition for **like terms,** come to a class consensus and write term and definition on the board.
- In the expression 2x + 3x + 4y, which terms can we combine?
- Next, get multiple students to share out about what it means to **combine like terms.** Have students give a couple examples.
- In the expression x + 4y, does the term x have a coefficient. If not, why not? If so, what is it?
- Which terms can you combine in the expression x + 4x + 7y and what does the resulting equation?

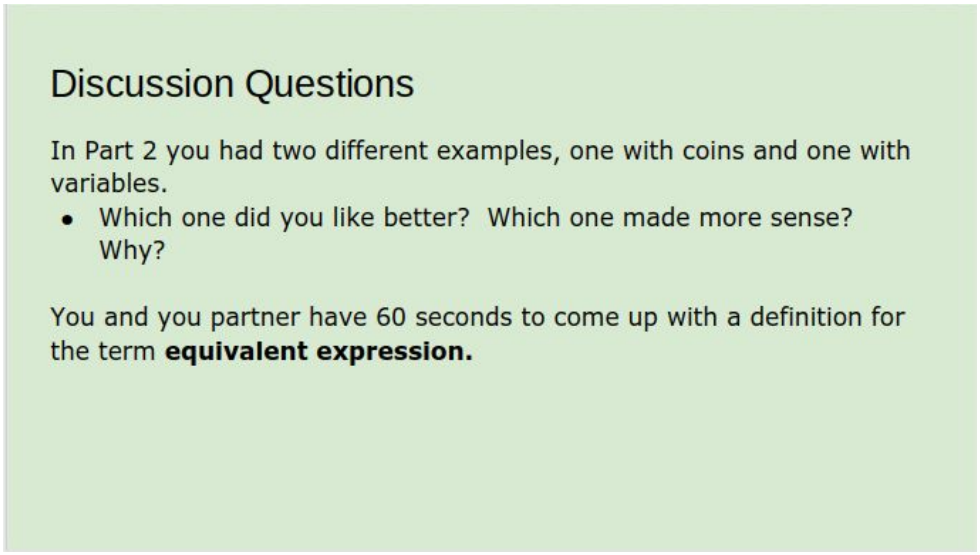
Part 2: Making Equivalent Expressions. (10 - 15 min)

Slide 9

Walk around room while students are working on the the activity.

Possible questions to ask to formatively assess understanding:

- Which terms can be combined? How do you know?
- Which terms can not be combined?
- What does it mean for things to be equal?
- What does the word equivalent mean?
- Do equal and equivalent mean the same thing?
- In level 3 of the game, they are trying to build the same thing 3 times (3 different ways). Why do you think they put that level in the game?
- Other option for students who finish early: Can they find a way to make an equivalent expression using the distributive property?



Slide 10

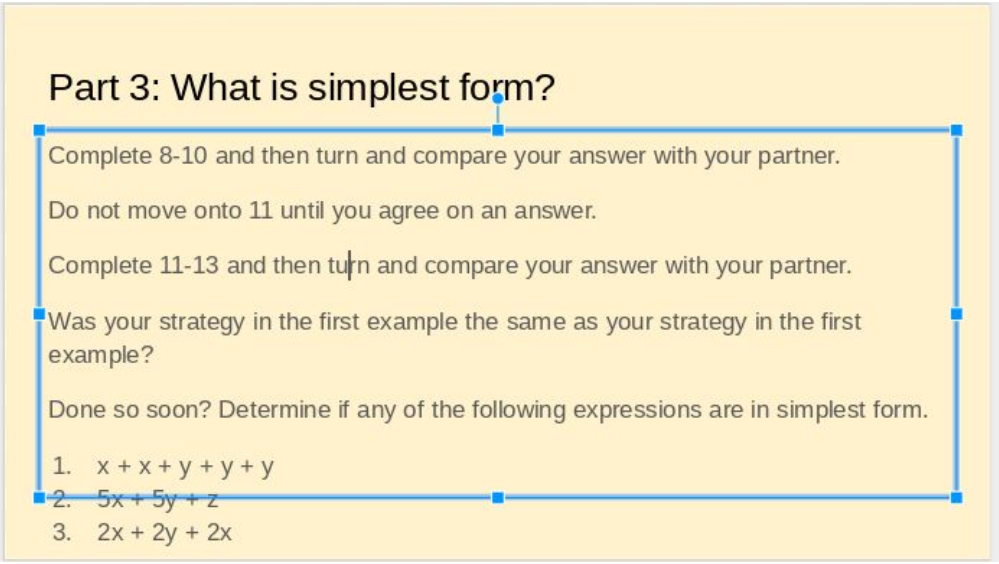
Are the expressions that you created in each of the activities equal?

Can expressions be both different and equal?

Introduce the word equivalent. Give pairs the 60 seconds to come up with their definitions.

Share definitions ad merge to create the final definition of **equivalent expression.** Write it on the board.

Part 3: What is Simplest Form? (10 - 15 min)

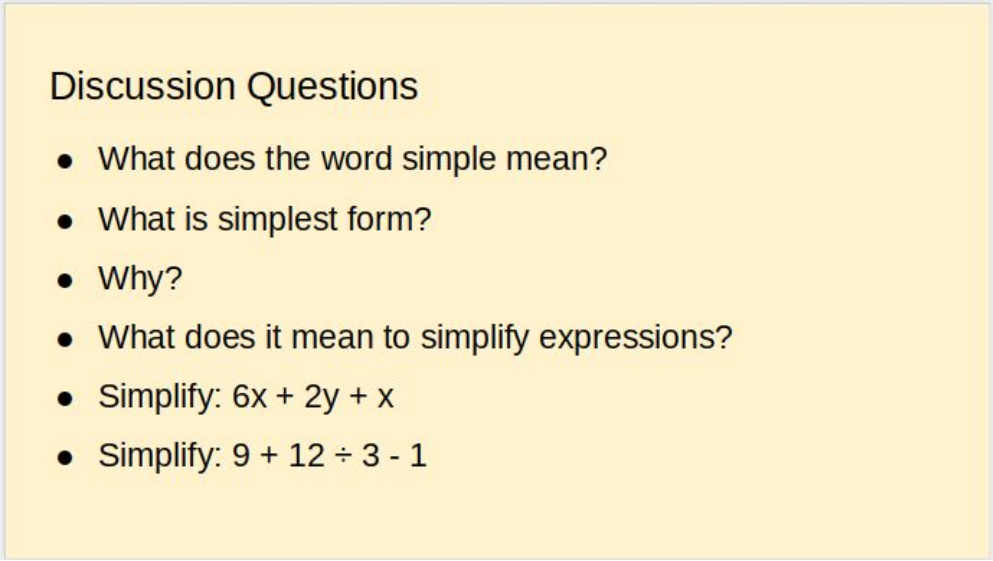


Slide 11
Walk around the room while students are working.

While walking around, start asking students about the words simple, simplest, simplify.

- What do those words mean to you? Where else in the world do you use them?

Ask students to start thinking about a procedure for putting an expression in simplest form.



Slide 12

- After asking what is **simplest form,** allow time for different groups to share their definitions.
- Discuss the similarities and differences between the definitions?

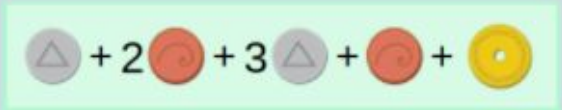
Summary: (5 min)

Have students work with their partner to develop a procedure for finding the simplest form of an algebraic expression.

Exit Ticket

Develop a procedure for finding the simplest form of an algebraic expression.

Explain how to use that procedure to simplify one of the expressions below.



$y + 2x + 3y + x + z$