

LessonTitle: The Handshake Problem		Geo 1.2
Utah State Core Standard and Indicators Geometry Standards 2-4 Process Standards 1-5		
Summary		
This activity asks students to find a solution to a handshake problem and to generalize their solution to be used for any number of people. There are a number of different ways for students to organize their thinking, but this problem lends itself to creating a network. The variation on the handshake problem, Who Shook Who's Hand, is a challenging problem solving activity for students		
Enduring Understanding	Essential Questions	
Geometry enables us to model and analyze problems.	How do you use math and geometry to organize, represent, and solve questions and problems?	
Skill Focus	Vocabulary Focus	
Observing and representing patterns using geometric models and algebraic formulas		
Assessment		
Materials: Calculators		
Launch		
Explore		
Summarize		
Apply		

Directions:

Discourse Suggestions:

- What strategies would you use to solve the question of how many handshakes?
- What kind of function pattern develops? Is it linear or does it involve exponents?
- Observe what you do when you make the model. See if it helps in the development of a formula.

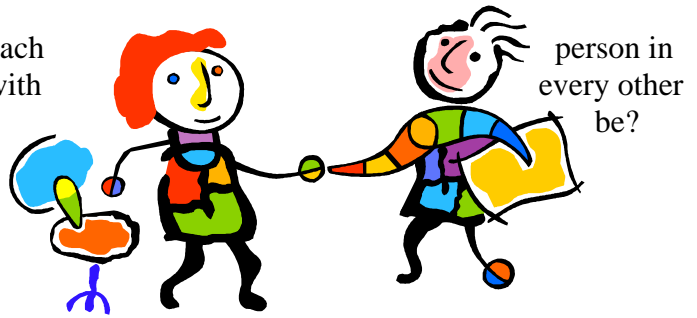
Using p for # of people, the equation would be: $handshakes = \frac{p(p+1)}{2}$.

If the students need help in finding the formula, suggest they find a formula for twice the handshakes at each stage. They will see that the formula is $p(p+1)$. Then it's easy to go back and divide by 2.

***The Who Shook Who's Hand variation is challenging but well worth it! Students must use some real problem solving strategies to get at the solution!

Handshake Patterns

1. If there are 4 people in a room and each the room shook hands once and only once with person, how many handshakes would there



2. What if there were 20 people in the room and they each shook hands once and only once with every other person, how many handshakes would there be? Organize your thinking, explain how you got your answer and show how why it is correct.

3. Write an algebraic expression that gives the number of handshakes for any number of people.

Who Shook Who's hand?

The Bakers had a barbeque in their back yard. They invited three couples. All the couples arrived at the same time. Mrs. Baker greeted them at the door while Mr. Baker finished the hamburgers on the grill. The guests were shaking hands with each other and Mrs. Baker.

When the Bakers and their friends sat down for hamburgers, one of the friends mentioned the number of times he shook hands at the door. Each of the other friends all remembered how many times they shook. It was strange because each of the six friends had shaken hands a different number of times. Mrs. Baker couldn't remember who she had shaken hands with or how many handshakes she had given.

Figure out exact many times Mrs. Baker shook hands at the door and show how you know that your answer is correct. Keep track of your work. Then write your process and solution below.

Problem Statement: Write the problem in your words.

Process: Explain what you did to answer the question.

Solution: Describe your solution and explain how you know the solution is correct.

Extension: How might you change the problem or add on to it?