Lesson: Thinking like a Researcher

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Researcher Habits of Mind:
1. Solve a simpler problem
2. Look from a different perspective
3. Develop expectations, then test them
4. Explain what you see
5. Generalize
6. Look for trends
7. Test the extremes
8. Record your data. Present in an easy-to-understand way
9. Change something, and see what happens
10. Come up with a new way of representing the problem

Adding and Subtracting Integers: Thinking Like a Researcher

-8 + 3 – 7 – -4

New Representation

Say the sign indicates the direction and the operation says to “do” or “undo”
- Positive: right
- Negative: left
- Plus: go, or do
- Minus: go opposite, or undo

Example #1
-8 + 3 – 7 – -4 becomes
L8, go R3, go opposite R7, go opposite L4
L8, R3, L7, R4
L5, L7, R4
L12, R4
L8
-8
**Draw a Picture:**
Show the movements (walking to the left or to the right) successively and see where you end up.

**Change Something, Make a Prediction, and See What Happens**

Change a Sign:
1. \(-8 + 3 - 7 + 4\)  
   Prediction: Answer will be 4 more than Example #1  
   Result: Same as last Example #1
2. \(-8 + -3 - 7 - -4\)  
   Prediction: Answer will be 3 less than Example #1  
   Result: 6 less than Example #1

Change Operation:
3. \(-8 + 3 + 7 - -4\)  
   Prediction: 7 more than Example #1  
   Result: 14 more than Example #1

Change Number Order
4. \(-8 + 7 - 3 - -4\)  
   Prediction: No change (same result as Example #1)  
   Result: 8 more than Example #1
   
   To Student: Can you come up with a rule that allows you to reorder the numbers and NOT change the results?

In each category, students should make more changes and predictions until they can consistently make accurate predictions.