**Selection Sort**

Lay out cards on the numbered grid in a random order.

Remember to count how many times you have to compare two cards. A comparison is made any time TWO cards are in the Zone of Comparison at the same time.

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| Comparison Tally: |

1. Assume the card in box one is the lowest. Slide it into the zone of comparison.

2. Slide the card in box 2 into zone of comparison.

3. Compare the cards. Leave the lowest card in the zone of comparison and return the larger one to its box.

4. Slide the card in box 3 into zone of comparison.

5. Repeat step 3.

5. Continue the process for boxes 4 through 7.

6. The smallest card has now been found. Place this card in box A.

7. Push cards over so they fill boxes 1-6.

Repeat steps 1-7 until all cards have been sorted. The last card that cannot be compared should be placed in box G.

**Bubble Sort**

Lay out cards on the numbered grid in a random order.

Remember to count how many times you have to compare two cards.

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| Comparison Tally: |

1. Compare the cards in box 1 and box 2. Swap them if the first card is larger.

2. Repeat step 1 for box 2 and 3.

3. Repeat step 1 for box 3 and 4.

4. Repeat step 1 for box 4 and 5.

5. Repeat step 1 for box 5 and 6.

6. Repeat step 1 for box 6 and 7.

\*\*Note: You may not need all of the following iterations. If, after any repetition below you have made no swaps, stop counting. The cards are sorted!\*\*

Repeat steps 1-5.

Repeat steps 1-4.

Repeat steps 1-3.

Repeat step 1-2.

Repeat step 1.

**Expert Extensions**

1. Will a selection sort always take the same number of comparisons? Will a bubble sort? Justify your answers.
2. Determine an algorithm for the number of comparisons in a selection sort for any number of cards.
3. Determine an algorithm for the number of comparisons in a bubble sort for any number of cards.
4. Do you think you have a more efficient way of sorting the cards? Demonstrate this method to your teammates and to write a set of instructions that a computer might understand.