Multi-digit multiplication name:_____class time:_____

1. Answer these questions as if you were explaining the process of multiplying with the standard algorithm and the reasons why to a student.

$$\begin{array}{r} 5\ 6\ 4 \\ \times\ 3\ 8 \\ \hline \end{array}$$

a. In the standard algorithm, we write a 0 place holder in the ones place of the second partial product. Explain where that 0 comes from and what it does.

b. In the process of multiplying, we multiply the tens digit of 38 by the ones digit of 564: 3× 4 = 12.

i. What place value should the digit 2 go in (tens or ones)? Why should we write it there?

ii. Where should we write the digit 1 (above which place value)? Why should we write it there?

$$\begin{array}{r} 1\ 3\ 7\ 8 \\ \times\ \ \ 6\ 4 \\ \hline \end{array}$$

2. a. In the standard algorithm, we write a 0 place holder in the ones place of the second partial product. Explain where that 0 comes from and what it does.

b. In the standard algorithm, we multiply the tens digit of 64 by the tens digit of 378: 6×7 = 42.

i. What place value should the digit 2 go in (ones, tens, hundreds, thousands)? Why?

ii. Where should we write the digit 4 (above which place value)? Why?

4. On the back side of the page:

a. Sketch a by-hand (non-proportional) array diagram for the product. $\begin{array}{r} 6\ 3\ 8 \\ \times\ 4\ 7\ 3 \\ \hline \end{array}$	b. Write out the solution using the expanded algorithm. Show how the partial products in the expanded algorithm correspond to the parts of the diagram in part a	c. Write out the solution using the standard algorithm. Show (by color coding or labelling) how the numbers in the standard algorithm correspond to the representations in a and b.