**Purpose:**

Students in math classes often rely heavily on an end of unit, set of review problems to help them prepare for the unit test. Even with the reminder that this set of review problems should not the only method of preparation for the test, students do not know what other methods of preparation will help them in a better understanding of the concepts.

Through the preparation of a study guide at the end of each unit, students will learn to look at different resources to prepare for the unit test. The study guide will help them to look at resources that they may have never considered in gaining a stronger understanding of mathematical concepts. The students will learn that, not only are their teachers a resource in their learning and understanding, but also their textbooks, peers, and even themselves.

**Description of Activity:**

The study guide is broken down into three areas to help students in their understanding of the mathematical concepts of a unit and prepare for the unit test:

I.      Information—found in textbooks and teacher-provided class notes
  a.      Vocabulary terms
  b.      Formulas and concepts
  c.      Algorithms and procedures
II.     Practice problems—to work through individually and with their classmates/peers
III.    Extension—thinking through the concepts and problems after practicing
IV.    Self-reflection—exploring the reasons for their failures and successes

A template for the study guide is provided on the next page and an example of a study guide follows.

As the school year progresses, the teachers will provide less details on the study guides. The students will learn to come up with more of those details and eventually be able to produce their own unit study guides.

**Checking for Understanding:**

The study guides will be one of the assignments for the unit, collected and evaluated by the teacher. Furthermore, individual conversations can occur between teacher and students, to further explore the connections between this preparation activity and the individual results.

**Reflection:**

Too often after a poor performance on an assessment, students will make the comment that they thought they knew the material. One of the most important aspects of this activity is for the students to take some time for self-reflection and to assess what concepts they really know and do not know. Through the self-reflection questions on this study guide, the goal is to provide the students with the tools to assess true understanding and to also help them to identify the methods that help themselves to learn.

**Adaptation for Different Levels:**

The study guides themselves will not differ greatly between levels.  However, the amount of guidance provided may differ on the needs of the different level student.  Also, for some courses at the lower level, the students may need more units with fully detailed study guides and the weaning process may be longer than the higher level classes.

**Template:**

**Course:**                                    **Name:** _____

**Study Guide:  Chapter \_\_\_\_**

I.         **Vocabulary—Write down the definitions of each of these terms.**

II.        **Formulas and Concepts—Write down some notes that are important to each of these concepts.**

III.      **Algorithms and Procedures—Provide an example of a problem described and jot down some important ideas associated with each.**

IV.      **Practice set of problems for Chapter \_\_\_\_**

V.        **Extension**

    a.     **What are some specific questions and concepts that you think will be on this test?  Are you ready for them?**

    b.     **Come up with some good extra credit type of problems that I could put on the test.  If your question is good, I may choose to use it.**

VI.      **Self-reflection**

    a.     **Problems and Concepts that I struggled with.  Be very specific.**

    b.     **What have you done to address the areas that you struggled with?**

    c.     **What frustrated you the most in this chapter?**

    d.     **How will you work through the next chapter differently?**

**Study Guide:  Chapter 1**

**I.**       **Vocabulary—Write down the definitions of each of these terms.**
   a.   Variable (1.1)


   b.   Algebraic expression versus algebraic equation (1.1)


   c.   Exponents (1.2)


   d.   Opposites (1.3)


   e.   Absolute value (1.3)


   f.   Matrix (1.4)


   g.   Element (1.4)


   h.   Reciprocal (1.6)


   i.   Coefficient (1.7)


   j.   Term (1.7)


   k.   Like terms (1.7)


**II.**      **Formulas and Concepts—Write down some notes that are important to each of these concepts.**
   a.   Order of Operations (1.2)



   b.   Classifying numbers (1.3)



   c.   Distributive property (1.7)

**III.** **Algorithms and Procedures—Provide an example of a problem described and jot down some important ideas associated with each.**

a. Translating words to mathematical symbols (1.1)

b. Simplify a numerical expression (1.2)

c. Evaluate an algebraic expression by substitution (1.2)

d. Add, subtract, multiply, divide signed numbers (1.4-1.6)

e. Add/subtract matrices, multiply matrices by a number (1.4-1.6)

**IV.    Practice set of problems for Chapter 1**

1.  Define the variables and write an equation to model the relationship.

| Number of hours worked | Total money earned |
|---|---|
| 1 | $6 |
| 3 | $18 |
| 5 | $30 |
| 7 | $42 |

2.  Simplify each expression.

a)  $8+-3\left(2^{3}-1\right)$

b)  $\left|-2-(-1)\right|$

c)  $2-4\left|-2-8\right|$

d)  $-5^{2}$

e)  $(-5)^{2}$

f)  $2+4-3^{2}\div 9-5\cdot 4$

g)  $-3^{2}-\left(20-3\cdot 5\right)+2^{2}$

3.  Simplify each expression.

a)  $\left(7-42a\right)\left(-2\right)$

b)  $1-2\left(3x+1-4x+5\right)$

c)  $2xy-3x^{2}y+5xy+2x^{2}y-2x$

4.  Write the expression for each phrase.
   a)  negative ten times the quantity two minus eleven.

b) five divided by the quantity of a number plus six.

c) four less than the product of twice a number.

5. Give an example of each number.
   a)  an irrational number.                    B)  a positive rational number.

   c)  a number that is an integer but not a whole number.

6. Tommy had \$163 in his checking account.  On Monday, he wrote a check for \$274.  How much does Tommy have in his checking account?

7. A music mp3 file costs \$0.95.  Find the total cost of buying 11 music mp3 files.

8. Simplify
   a)  $4x - 3 - 3x + 9$          b)  $5 - 2(x - 4)$          c)  $9 - 10 + 2 - (-3)$

   d)  $\dfrac{24}{\frac{1}{2}}$          e)  $\dfrac{45 - 9x + 3x^2}{9}$          f)  $\dfrac{x}{4} \div 3$

9. Evaluate
   a)  $|x| - y$, where $x = -3$ and $y = -1$          b)  $15 - (-x) + 7$, where $x = -6$

c)   $-x(x + x^2)$, where $x = -2$

10. Simplify by distributing:  $(4 - 5y)(2y)$

11. Write the numbers in increasing order:   $1.5, \quad -\dfrac{1}{2}, \quad 6, \quad -4.6, \quad -\dfrac{3}{4}, \quad \dfrac{1}{3}$

12. A $k \times h$ matrix has _____ rows.

13. Simplify

$$-3\begin{bmatrix} (-2)^2 & 1 \\ -3^2 & -2 \end{bmatrix} - 2\begin{bmatrix} -8 & 4 \\ 5 & 5 \end{bmatrix}$$

14. Simplify

a)   $6x + (5x - 8)$

b)   $2x - (9x - 4)$

c)   $-9 - (12 - 3x)$

d)  $7(2x - 4) - (10 - 3x)$

e)  $3x - 4x + 2x - 8x + x$

f)  $3a - 4y + a^2 - 5y + 6a$

g)  $-8T - 5P + 2T + 3(T - 2P)$

h)  $3y^2 - 4y + 2y^2 - 6y^2 + y - 5$

V.    **Extension**

    a.  **What are some specific questions and concepts that you think will be on this test?  Are you ready for them?**

    b.  **Come up with some good extra credit type of problems that I could put on the test.  If your question is good, I may choose to use it.**

**VI.**        **Self-reflection**

    **a.**   **Problems and Concepts that I struggled with.  Be very specific.**

    **b.**   **What have you done to address the areas that you struggled with?**

    **c.**   **What frustrated you the most in this chapter?**

    **d.**   **How will you work through the next chapter differently?**