Name: _____ Date: _____

MODELING WITH INEQUALITIES – BECAUSE MODELING IS SUPER IMPORTANT.

Just as we can solve many real-world problems involving linear equations, there are plenty of situations when an inequality is called for instead. In this lesson, we will practice setting up and solving inequalities based on real-world scenarios.

***Exercise* #1:** A school is taking a field trip with 195 students and 10 adults. Each bus can hold at most 40 people. We need to determine the smallest number of busses needed for the trip.

(a) Using a guess-and-check method, determine the minimum number of busses needed. Show evidence of your thinking.

205 people 6 busses

$\times 40$

240

(b) Let b be the number of busses taken on the trip. Write and solve an inequality that models this problem based on b.

each / per → 40 per bus

$\frac{40b}{40} \geq \frac{205}{40}$ $b \geq 5.125 \rightarrow 6$

It is important that you are able to deal with the phrases **at least** and **at most**. Let's try to do some translating.

***Exercise* #2:** Translate each of the following phrases into an inequality. Do not solve.

(a) When three times a number n is increased by 12, the result is at least 32.

$3n + 12 \geq 32$

★ **AT LEAST:** Must be more than.

(b) The sum of two consecutive even integers, n and $n + 2$, is at most 8.

$n + n + 2 \leq 8$

★ **AT MOST:** Can't be more than.

***Exercise* #3:** Find all numbers for which five less than half the number is at least seven. Set up an inequality, carefully define expressions and solve the inequality.

$\frac{1}{2}n - 5 \geq 7$

$+5 \quad +5$

$2 \cdot \frac{1}{2}n \geq 12 \cdot 2$

$n \geq 24$

$\frac{5n}{5} \geq \frac{12}{5}$

$n \geq 24$