Equals signs notes and practice:

name:_____

1. How is the the equals sign is different from add, subtract, multiply and divide?

2. a. Give an example of a "running equals sign" or a "run-on equation"

b. Is a running equals sign a correct or an incorrect use of the "=" symbol?

3. What do researchers at University of Texas at Austin identify as a likely cause or partial cause of the children's misunderstandings about the equals sign in the US?

4. If children don't understand the balance meaning of the equals sign, what do they probably think it means?

5. What is another helpful word/phrase teachers can use besides "equals" when reading the "=" sign in an equation?

6 (notes). Show two ways of fixing this unbalanced equation:
$7 \times 5 = 35 + 7 = 42$
a. one step equations   b. complex equations

7. (practice). Show two ways of fixing this unbalanced equation: $3 \times 4 = 12 \div 2 = 6 \times 4 = 24 + 16 = 40$
a. one step equations   b. complex equations

8. Write a variety of open number sentence problems to help teach the meaning of the equals sign. Include (and label) at least one that is easier and one that is tricky.

9. These examples are taken from
Luke, Cameron, Fiona and Chris are all answering the question: $7 + 6 = \boxed{?} + 5$

Luke: 7 + 6 = 13 + 5	Cameron: 7 + 6 = 18 + 5
Teacher: *Luke, what number did you put in the box?* **Luke:** *Thirteen* **Teacher:** *How did you decide?* **Luke:** *7 and 6 are 13* **Teacher:** *What about the 5?* **Luke:** *It doesn't matter. The answer to 7 + 6 is 13* **Teacher:** *What is the 5 doing then?* **Luke:** *It's just there.*	**Teacher:** *Cameron, what number did you put in the box?* **Cameron:** *Eighteen* **Teacher:** *How did you decide?* **Cameron:** *7 and 6 are 13 and 5 more is 18* **Teacher:** *Does 7 plus 6 equal 18 plus 5?* **Cameron:** *7 + 6 is 13 and 5 more is 18*

What can you say about how Luke and Cameron think about the equals sign and what it means in an equation? How do they go about solving a problem with a missing number like this?

Fiona: 7 + 6 = 8 + 5	Chris: 7 + 6 = 8 + 5
Teacher: *Fiona, what number did you put in the box?* **Fiona:** *Eight* **Teacher:** *How did you decide?* **Fiona:** *7 and 6 gives 13 and I then thought what number goes with 5 to give 13.* *7 + 6 is 13 and 5 + 8 is 13*	**Teacher:** *Chris, what number did you put in the box?* **Chris:** *Eight* **Teacher:** *How did you decide?* **Chris:** *(Points to the numbers) 7 + 6 = ☐ + 5* *5 is one less than 6, so you need a number that is one more than 7 to go in the ☐ so it all balances.*

What can you say about how Fiona and Chris think about the equals sign and what it means in an equation? How do they go about solving a problem with a missing number like this?

10. Chris' strategy of thinking how to change things so it all balances is important. Figure out how to make things balance in these situations, and finish the sentence

a. $3+8=\_+9$

9 is one more than 8, so to keep the equation balanced, you need to change 3 by…

b. $10-7=11-\_$

11 is one more than 10, so to keep the equation balanced, you need to change 7 by…

Running Equals sign practice problems:

11. Fix each of these equations by making them into shorter one-step equations

a. $\dfrac{1}{3}\times36\times5=\dfrac{1}{3}\times180=60\times2=120+36=156$

b. $3\times3=9+3=12+3=15+3=18$

12. Fix this equation by making them into a complex equation where all numbers are included at each step.

$\dfrac{1}{3}\times36\times5=\dfrac{1}{3}\times180=60\times2=120+36=156$

13. In a way that uses equals signs properly, show this strategy for dividing $48\div6$:

"Five times 6 is 30, and then add 6 so that's 36, and add another 6 and that's 42, and add another 6 and that's 48, That's 8 sixes, so $48\div6=8$"