Test 2 study topics (solutions coming soon)

- derived fact strategies, including:
    - using doubles
    - make 10/using 10
    - adding up through 10 to subtract
    - backing down through 10 to subtract
- equals signs, and fixing running equations
- base 10 manipulatives
- Childrens learning about base 10 numbers
- Alternate strategies for 2-digit addition and subtraction
- Expanded 3-digit addition and subtraction algorithms

Derived fact strategies questions:

1. Describe two ways to use derived fact strategies to solve 7+9
9=7+2
7+7=14 and 14+2=16 so 7+9=16

9+1=10
and 7=1+6
so add 10+6=16 so 9+7=16

2. Tell a basic addition fact for which using doubles would be a more efficient strategy than counting on.
6+7 (it is close to being a double, but you would have to count on by 6, which would be pretty long)

3. Tell a basic addition fact for which making 10/using 10 would be a more efficient strategy that counting on.

9+6. 9 is close to 10, and by counting on you would have to count on 6.

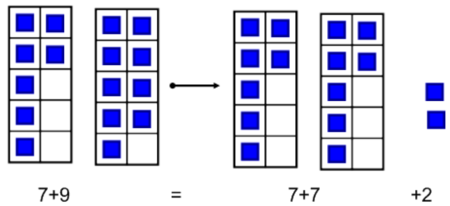
4. Tell a basic addition fact that you can't use the make 10 strategy to solve.
6+3 can't use make 10 because the sum is not greater than 10.

5. Describe how to solve 14 - 8 by **a.** building up through 10 and **b.** backing down through 10.
a. 8+2=10 and 10+4=14,
2+4=6 so 8+6=14 and 14-8=6.

b. 14-4=10
8=4+4
10-4=6
so 14-8=6

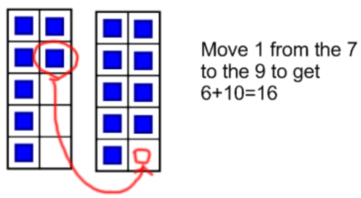
6. Tell a basic subtraction fact that you can't solve by backing down through 10.

10-4 because 10 is not greater than 10.
7. Show how so use doubles to solve 7+9 using ten frames.

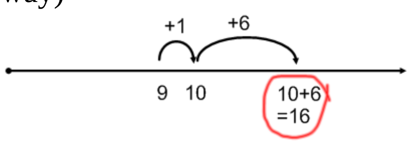


8. Show how you would write a use doubles strategy solution of 7+9 using equations.
9=7+2
7+7=14 and 14+2=16 so 7+9=16

9. Show how to use the make 10 strategy to solve 7+9 on ten frames

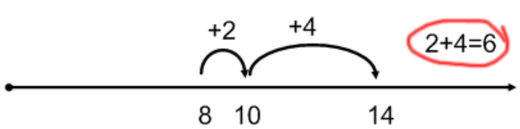


10. Show how to use the make 10 strategy to solve 7+9 on a number line (in the more efficient way)



11. Show how you would write a make 10 strategy solutions of 7+9 using equations
9+1=10
and 7=1+6
so add 10+6=16 so 9+7=16

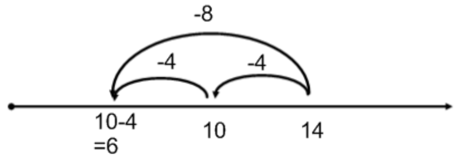
12. Show how you would show a build up through 10 strategy for solving 14-8 on a number line



13. Show how you would write a build up through 10 strategy for solving 14-8 using equations.

a. 8+2=10 and 10+4=14,
2+4=6 so 8+6=14 and 14-8=6.

14. Show how you would show a back down through 10 solution for 14-8 on a number line



15. Show how you would write a back down through 10 solution for 14-8 using equations.
14-4=10
8=4+4
10-4=6
so 14-8=6

Equals signs and fixing running equations

16. If we say we want children to understand the correct meaning of the equals sign, what is it that we want children to understand?
It means “the same as”
17. What is the most common misunderstanding children have about the equals sign?
They think it is like the calculator: do the calculation
18. Write a tricky equals sign problem (that children would get wrong if they don't understand the correct/balance meaning of the equals sign):

5+3=__+2

19. Fix these equations so that they show the same steps, but there is no incorrect use of the equals sign:
a. $6 \times 4 = 24 \div 2 = 12 \times 4 = 48 + 36 = 84$
$6\times4=24$
$24\div2=12$
$12\times 4=48$
$48+36=84$
b. $(1/3) \times 36 \times 5 = (1/3) \times 180 = 60 + 36 = 96$
$36 \times 5 = 180$
$(1/3) \times 180 = 60$
$60+36=96$

20. In a way that uses equals signs properly, write down this strategy for subtracting 73-29: "First I took away 30 from 70, because 30 is close to 29, and that gave me 40, and then I had to add 1 back on because it was 29 and not 30, so I got 41, and then I added the 3 and got 44." (Note that you don't have to write down all of the reasons, just the calculations that were actually done.)

70-30=40
40+1=41
41+3=44

Base 10 manipulatives

21. Explain the difference between a proportional and a non-proportional manipulative and give an example of each.
proportional: The size reflects the amount
Cuisenaire rods—the 1's and take 2 of them, that's the same size as the 2-rod, etc.
Base 10 blocks—take 10 ones and it's the same size as a ten.
Unifix cubes—link 10 together to make a ten.

non-proportional: money—10 pennies is not the same size as a dimes.

In a proportional manipulative, you can see that 10 ones = 1 ten because a ten is the same size as 10 ones, and/or a ten is visibly made up of 10 ones.

22. Explain the difference between a decomposable/groupable manipulative and a non-decomposable manipulative, and give an example of each.
decomposable: popsicle sticks in rubber bands (make a ten out of 10 ones and vice versa)
unifix cubes
Not decomposable: base 10 blocks.
Decomposable means that a ten can be taken apart into 10 ones and 10 ones can be put together to make a ten.

23. If I use lima beans to show 1's, and glue 10 lima beans each to a bunch of popsicle sticks to show 10's, is that decomposable or <u>not decomposable</u>? Is it <u>proportional</u> or non-proportional?

This is generally considered proportional because it's possible to count the 10 ones that make up the ten. It could not be used in the same way as a decomposable material, because you can't take the beans off of the sticks.

24. When choosing a base 10 manipulative for first grade students, what properties would you want that manipulative to have?

First graders should be working with decomposable manipulatives.

Childrens understanding of base 10 numbers

25. Describe two different ways that base 10 understanding was assessed in the video interviews you watched (Marilyn Burns talking to Cena and Jonathan). Why might children seem to understand base 10 numbers in one assessment and not in the other?

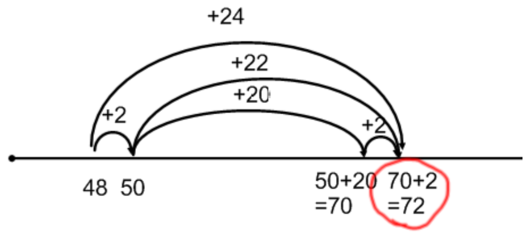
- Children counted manipulatives into groups of 10's and were asked what the number was
- Children were given an amount and asked how many 10's and ones would be in that amount
- Children were asked to match the parts of an amount of counters with the digits in a two digit number.

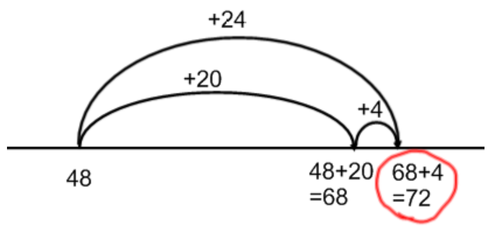
Alternate Algorithms and strategies

26. Show how to compute 48 + 24 using:

a. an open number line

Several correct solutions, including these two:





b. another student invented or informal algorithm

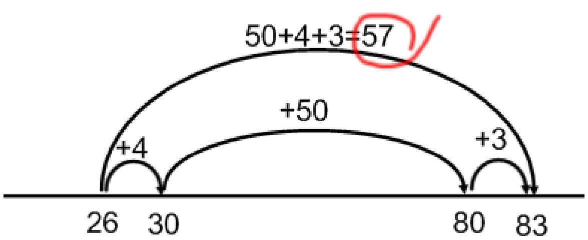
40+20=60

8+4=12

60+12=72

27. Show how to compute 83 - 26 using:

a. adding up on an open number line



b. the negative numbers algorithm

80-20=60

3 – 6 = -3

60-3=57

c. another alternate algorithm

80-20=60

60-6=54

54+3=57

28. Show how to compute 385 + 279 using the expanded algorithm

		500		110 10		13
623	→	~~600~~	+	~~20~~	+	~~3~~
- 184	→	-100		-80		-4
439		400		30		9