Monthly Math Science Challenge - December

Name: _____ School: _____ Teacher: _____

1.1 Simple Arithmetic

17+67 = …… 35-18 = ….. 9x9 = ….. 12x13 = ….. 84/4 = …..

5.5x2 = ….. 386-299 = ….. $10^3+10^2+10^1$ = ……. 10^2-10^1 = …….

3^1 = …….. 5x5x5x5= …….. 38-15-14-9 = ….. 18/6-5 = ……

2x6x18/6x$\frac{1}{18}$ = ……. 13/7x7/13 = ….. $\frac{12}{18}-\frac{1}{3}$ = ……. $\frac{19}{5}-\frac{3}{15}$ = …. $\frac{1}{2}-\frac{1}{4}+\frac{1}{3}$ = ……

1.2 Conversions: 10,000 meter (m) = ……. Kilometer (km), 1.5 km = …….. m

1.3 Another conversion: 1.2 x10^2 seconds = …… minutes

1.4 Tom works at the grocery store for $8/hour. He works Monday to Friday from 9 am to 5 pm. How much does he make in 2 weeks? $ ……

1.5 Is the ratio of one side of a square always 1:1 to the adjacent side? …….

1.6 Round 55 min to the nearest hour: ……..

1.7 You have a rectangle with one side being 6 cm long. How long is the second side so that the perimeter value equals that of its area? …… cm

1.8 A paper is folded in half for four times. Then a single hole is punched into the paper. How many holes are there upon unfolding the paper? …….

1.9 Three people buy two pizzas (8 slices each). The second person eats twice as many slices as the first. The third eats twice as many as the second. How many slices are left over? ……

1.10 More Arithmetic:

$\frac{3}{7}+\frac{1}{2}$ = + = $\frac{3}{8}-\frac{2}{9}$ = − =

$\frac{2}{5}*\frac{3}{4}$ = $\frac{1}{2}:\frac{2}{3}$ =

Section 2: Science

2.1 Energy and Forces:

What force keeps us on the ground? ……..

What force keeps our planet's atmosphere from drifting into space? ……..

An apple falling from a tree converts potential Energy into? ……..

What force keeps a water strider "floating" on the water? ……

What is light? □ A force □ A form of energy □ Neither

Jedi Knights use "The Force". Is this an example of? □ A force □ An energy

Jumping straight up increases what? □ Kinetic energy □ Potential energy

Energy can never be generated or diminished, just transformed into a different form of energy. The sun is a fusion reactor converting mass into light. When this light hits a black object on earth, what is it ultimately converted to? …….

2.3 Hands on experiment: Last week, on a very cold day, Tom bought a nice shiny "Happy birthday" balloon (the non-stretchable kind) at the dollar store. The store clerk used helium to blow up the balloon completely. Tom paid and left the store. After reaching his car, he realized that the balloon had gone flat and hardly floated any more. He naturally concluded a leak in the balloon and went back to the store. He complained to the manager only to find the balloon floating nicely and completely filled again. So he went back to his car to find the balloon had gone flat again. Yet again, in the store the balloon looked fully inflated floating nicely.

Can you suggest any explanation?

Section 3: Math challenge

The last two months you have learned about rules of arithmetic operations:

Rule 1: First, perform all operations in brackets, working left to right.

Rule 2: Then perform all multiplications and divisions, working left to right.

Rule 3: Finally perform all additions and subtractions, working left to right.

$$5 + 5 \text{ x } (4 - 2) = 5 + 5 \text{ x } (\overbrace{\mathbf{4 - 2}}^{\mathbf{2}}) = 5 + \overbrace{\mathbf{5 \text{ x } 2}}^{\mathbf{10}} = 5 + \mathbf{10} = 15$$

The easy part is that every single equation follows the above scheme. No surprises, just stepwise operations!!

3. 1 Examples:

8 – (8 – 4) = 8 - _____ = _____ 15 : (5 x 3) = 15 : _____ = _____

15 + 13 x (8 – 7) = 15 + 13 x _____ = 15 + _____ = _____

3. 2 Now without any assists:

8 – 8 – 5 +6 = _____ 7 x 8 + 4 = _____ 9 + (6 - 2) = _____

10 x 10 -10 = ___ 10 x (10 – 10) = _____ (10 x 10) – 10 = _____

$10^{(1+1)}$ = _____ $10^1 + 1$ = _____ $(8 + 2)^2$ = _____

15 – 7 x (3 – 1) = _____ 8 x (10 – 5) : (7 – 3) = _____

8 : 4 x 2 = _____ 8 : (4 x 2) = _____ (8 : 4) x 2 = _____

3.3 Cross out the term that is not not equal to the others (only 1):

$15 : 3 \times 2 = (15 : 3) \times 2 = 15 : (3 \times 2) = 15 : \frac{3}{2} = \frac{15}{3} \times 2 = 15 \times \frac{2}{3} = 15 \times 2 : 3$

Section 4: Trivia

T 1 What ocean covers the largest area? ……

T2 What continent never has sent any athlete to the Olympic Games? ……

T 3 Who was the main antagonist in the original Star Wars trilogy? ……

T 4 A cat had 3 kittens named January, February, and March. What was the name of the cat. Name of the mother cat: ……..

T 5 The British colonization of today's East Coast US only became possible after this world changing event in 1588: ……

T6 How many toes is a human baby born with? □ 0 □ 2 □ 4 □ 6 □ 8 □ 10

T 7 Which of the following is not a fossil fuel?

□ Oil □ Wood □ Coal □ Natural gas

T 8

T 9 Complete the following row: 10 10^2 1,000 $10^{(2+2)}$ ……..

T 10 How many stripes are on the American Flag? Why? ……

T 11 Who is the current Vice President? ……..

T 12 The Statue of Liberty stands in which state?

□ New Jersey □ New York □ Connecticut □ Pennsylvania

T 13 What animated series features the "The Krusty Krab"? ……..

T 14 The Chinese characters " **= + =** " stand for which number? ……..

T15 What was the name of Columbus's flagship? ……..

□ Pinta □ Santa Maria □ Titanic □ Nina □ Enterprise