

*Last week: first visit to Siff*

## Counting

Siff is the planet of the six-fingered folk. They count

$$0, 1, 2, 3, 4, 5, 6, 7, 8, 9, \vee, \ell, 10, 11, \dots$$

which they say out loud as

“zero, one, two, . . . , nine, gabe, el, eep, eep one, . . .”

Further on their number line looks like this:

$$\dots 99, 9\vee, 9\ell, \vee 0, \vee 1, \dots, \ell 9, \ell\vee, \ell\ell, 100, 101, \dots$$

Since their name for 100 is “frayn” they read that as “nineep nine, nineep gabe, nineep el, gabeep, gabeep one, . . . , eleep nine, eleep gabe, eleep el, frayn, frayn one, . . .”

The number after elfrayn eleep el ( $\ell\ell\ell$ ) is bob (1000). The number after elbob elfrayn eleep el is eep bob (10,000). Then 100,000 is frayn bob and 1,000,000 is bob bob. It probably has another name but we don’t know it. <sup>1</sup>

Learn to think and speak Siff like a native.

10 and 100 are “eep” and “bob” — never *think* “ten” or “hundred”, let alone say those words. 148 is “one bob foureep eight” — not “one hundred forty eight”.

Practice reading Siff numbers aloud and having your friends write them down.

## Addition

Challenge yourself and your friends with some problems in Siff addition (and subtraction).

If you are having lots of trouble you might want to finish this (boring but helpful) table in your math notebook.<sup>2</sup>

+	0	1	2	3	4	5	6	7	8	9	$\vee$	$\ell$
0	0	1	2	3	4	5	6	7	8	9	$\vee$	$\ell$
1	1	2	3	4	5	6	7	8	9	$\vee$	$\ell$	10
2	2	3	4	5	6	7	8	9	$\vee$	$\ell$	10	11

*Work in your math notebook, not here or in the margins.*

<sup>1</sup>In scientific notation 1,000,000 is  $1 \times 10^6$ , read aloud as “one times eep to the sixth”.

<sup>2</sup>Second graders on Siff know it by heart.

# Multiplication

Siff Fourth graders learn this multiplication table:

$\times$	1	2	3	4	5	6	7	8	9	$\vee$	$\ell$	10
1	1	2	3	4	5	6	7	8	9	$\vee$	$\ell$	10
2	2	4	6	8	$\vee$	10	12	14	16	18	1 $\vee$	20
3	3	6	9	10	13	16	19	20	23	26	29	30
4	4	8	10	14	18	20	24	28	30	34	38	40
5	5	$\vee$	13	18	21	26	2 $\ell$	34	39	42	47	50
6	6	10	16	20	26	30	36	40	46	50	56	60
7	7	12	19	24	2 $\ell$	36	41	48	53	5 $\vee$	65	70
8	8	14	20	28	34	40	48	54	60	68	74	80
9	9	16	23	30	39	46	53	60	69	76	83	90
$\vee$	$\vee$	18	26	34	42	50	5 $\vee$	68	76	84	92	$\vee$ 0
$\ell$	$\ell$	1 $\vee$	29	38	47	56	65	74	83	92	$\vee$ 1	$\ell$ 0
10	10	20	30	40	50	60	70	80	90	$\vee$ 0	$\ell$ 0	100

- The row starting with 2 lists the even numbers. How can you tell when a number is even?
- The row starting with 3 lists the multiples of 3. How can you tell when a number is a multiple of 3?
- What do the previous two questions tell you about multiples of 6?

The multiples of 4, 8 and 9 are a little harder. The multiples of 5 are ugly. They are as hard for Siffings as the multiples of 7 are for Earthlings. 7 is hard on Siff too.

- Challenge yourself and your friends with some Siff multiplication problems.
- Play buzz with multiples of 5. For a real headache, play fizz-buzz with 5 and 7.

# Division, fractions, eepimals and perfrayntages

Since  $2 \times 6 = 10$ ,

$$\text{one half} = \frac{1}{2} = \frac{6}{10} = 0.6 = \text{six eepths.}$$

The Sifflings like fractions with denominator one frayn, just as we use one hundred to write percentages. When they can, they make perfrayntages:

$$0.6 = 60\# = \text{sixleep perfraynt.}$$

The Sifflings *never* use our division sign  $\div$ . They *always* write fractions instead.

Here are some fraction and division games to play ... *in your math notebook!*

- Explore some common fractions. Which fractions make nice perfrayntages? Practice fraction arithmetic.
- Draw a picture to help a Siff third grader understand

$$\frac{2}{3} + \frac{1}{4} = \frac{\ell}{10}.$$

- Here on Earth we can tell if a number is divisible by 9 by checking whether the sum of its digits is divisible by 9. Check the corresponding Siff test for divisibility by  $\ell$ .
- $\pi$  is approximately three and eep eight fraynths. Here it is with many eepimal places:

3.184809493ℓ918664573∨6211ℓℓ151551∨05729290∨7809...

The fraction  $1\vee/7$  is a good approximation for  $\pi$ . Calculate the beginning of its eepimal expansion to see how good. If you're ambitious, check that  $239/8\vee$  is better.

## Time and money

It's a remarkable coincidence: Siff days and years are just the same length as ours.

- How do they tell time on Siff? Draw some clocks and calendars.
- The Siff dollar contains frayn frents. What coins do they use?

## Translation

Now that you are fluent Siff arithmeticians you are allowed to convert our numbers to Siff and back.

- What are eep, frayn, bob, eep frayn, bob frayn and frayn frayn in our number system?
- What year is our 2019 in the Siff calendar?
- The population of the United States is about 330,000,000 (our arithmetic). Write that number for the Siffings, using two significant figures. Your answer should be

$$ab00\dots 00.$$

You have to figure out  $a$  and  $b$  and the correct number of 0's.

- The prime numbers are the same numbers everywhere in the universe. They just *look* different on different planets. Write down the first few primes in Siff notation. Do the same for the first few squares.

## Read all about it!

Visit the *Dozenal Society* at [www.dozenal.org/](http://www.dozenal.org/)