MATHS PBL: CROP TRADE
BY: SIDDHARH NARAIN 8B

ACTIVITY 1:

- Imagine Farmer Blue has 100 acres of land. On his farm, an acre can yield 5 tons of corn or 5 tons of potatoes.

- Farmer Red has 150 acres. On his farm, an acre can yield 2 tons of corn or 6 tons of potatoes

If we write corn in terms of potatoes, what would the equations be?

- Yield is proportional to Land $\Rightarrow$ Yield= x*$Land$

- 500 = x*100 (5 tons potato grows per acre and there are 100 acres) x= 5

- Let P tones of potatoes and C tons of corn yielded by BLUE FARMER P= 5*Land

- Hence, land used for potatoes at any instance by BLUE FARMER can be given by = $p/5$

- Similarly, land used for corn at any instance by BLUE FARMER can be given by = $C/5$

- Land used for potatoes + land used for corns = 100 acre Hence; p/5+ $C/5$=100

- $\therefore P+C$=500 Equation for BLUE FARMER is P = 500 -C

EQUATION FOR RED FARMER

$$p/6 + c/2 = 150$$
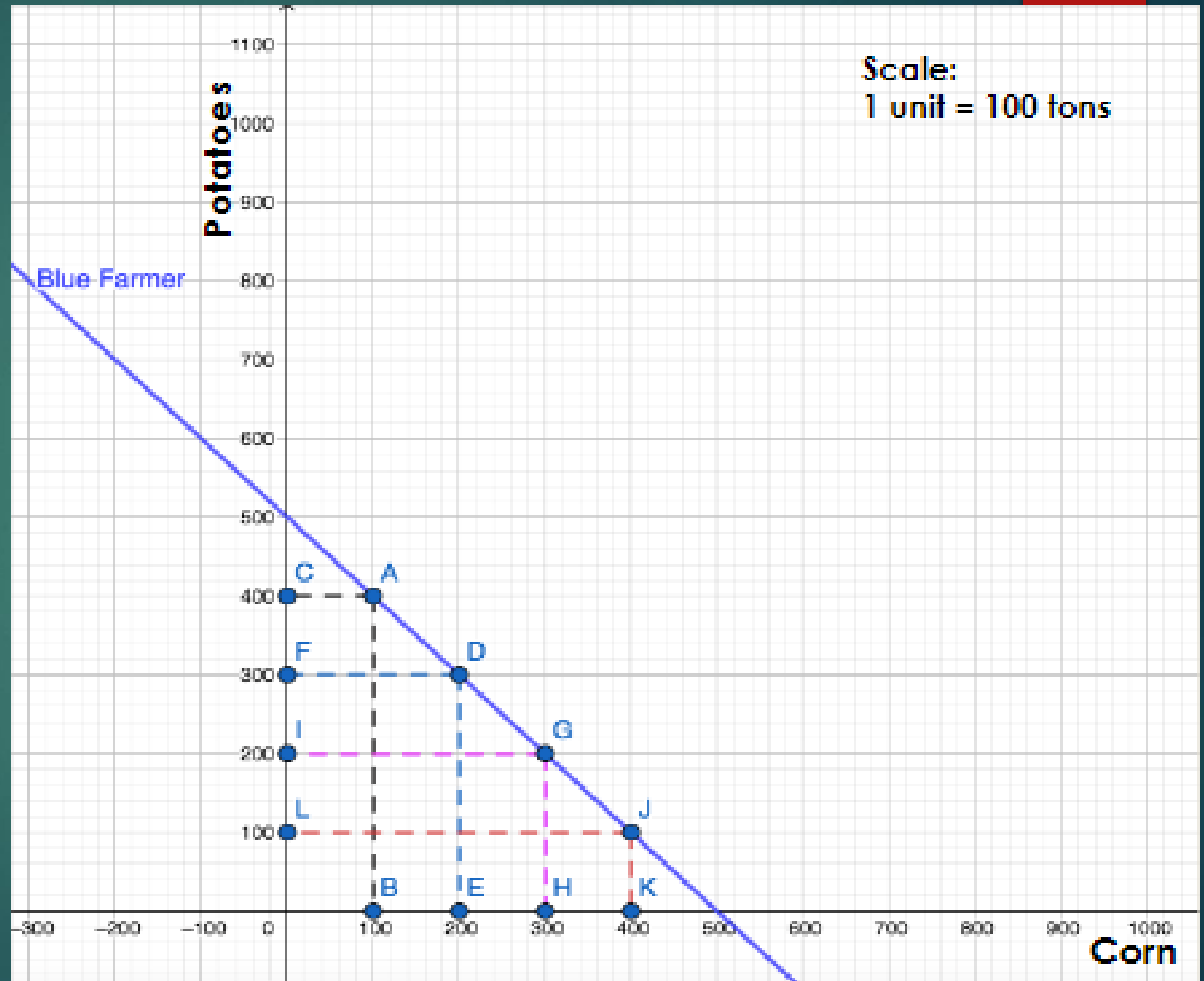
$$\Rightarrow P + 3C = 900$$

$$\therefore P = 900 - 3C$$

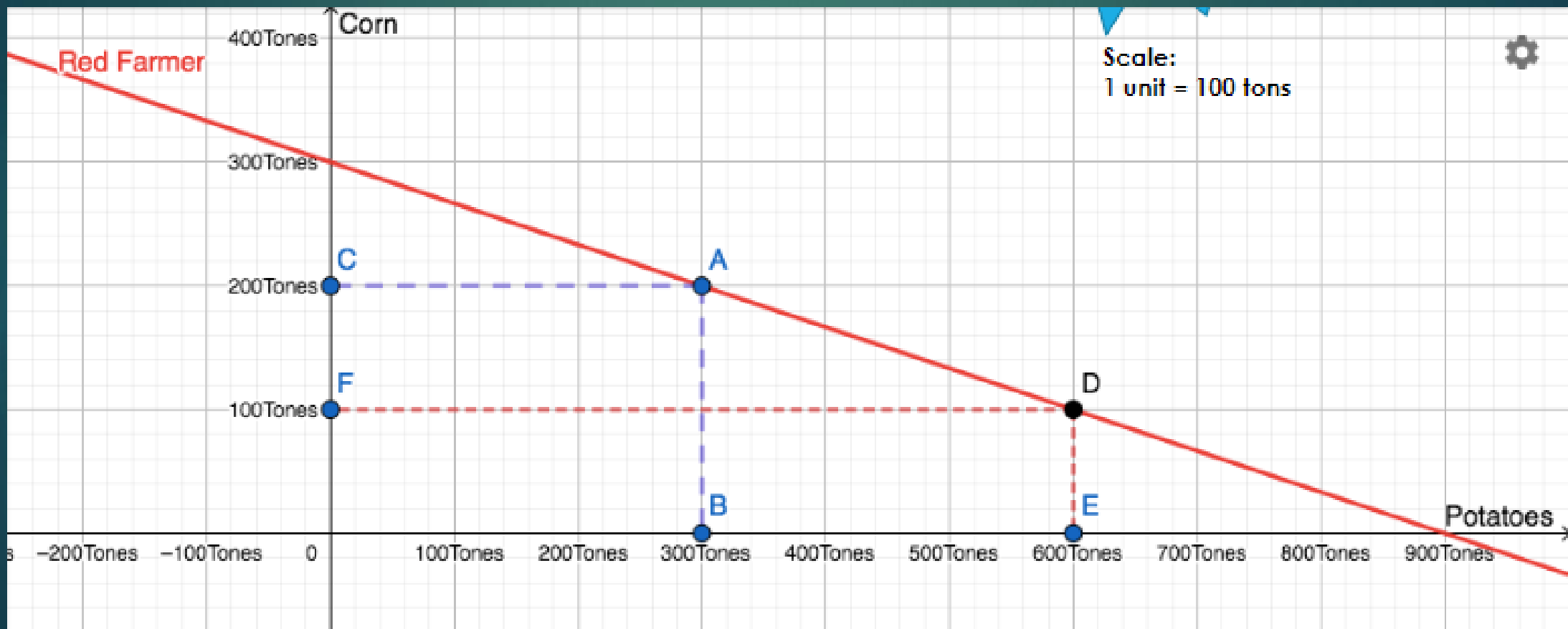# TABLE SHOWING IF BOTH FARMERS GROW CROPS IN DIFFERENT COMBINATION:

Blue	Corn	500 tons	400 tons	300 tons	0 Tons
	Potatoes	0 Tons	100 tons	200 tons	500 tons

Red	Corn	300 Tons	200 Tons	100 Tons	0 Tons
	Potatoes	0 Tons	300 Tons	600 Tons	900 Tons

Graph showing relation between Potatoes and Corn
(Blue Farmer)

Graph showing relation between Potatoes and Corn
(Red Farmer)

WHAT IS THE MAXIMUM QUANTITY OF EACH CROP THAT EACH FARMER COULD GROW?

BLUE FARMER:

▶ If he grows only potato, total quantity of potatoes produced = 5*100 = 500 tons

▶ If he grows only corn, total quantity of corn produced = 5*100 = 500 tons

RED FARMER:

▶ If she grows only potato, total quantity of potatoes produced = 6x150 = 900 tons

▶ If she grows only corn, total quantity of corn produced = 2x150 = 300 tons

PROBING QUESTIONS

1. Is the graph linear?

2. What does the y-intercept represent?

3. What does the slope represent in above graph? (Can be eliminated for the level of class 8)

4. Using the graph only find out :-

▶ **BLUE FARMER:**

1. If 300 Tons of potatoes are yield then how many tons of corn will be yield?

2. If 100 tons of corn is yielding then how many tons of potatoes will be yield?

▶ **RED FARMER:**

1. If zero tons of corn is yielding then, how many tons of potatoes will be yield ?

ANSWERS (1)

1. Yes, the graph is linear
2. y' intercept represents the quantity of corn in tones.
3. The slope represents the relation between the quantity of production of corn and potatoes. If the slope is high, it means that corn quantity is more than potato.

ANSWERS (2)

▶ **BLUE FARMER**

The equation for BLUE FARMER is P = 500 –C

1. Quantity of potatoes is 300 tons

   $300 = 500 - C$

   $C = 500 - 300$

   200 tons

2. Quantity of corn is 100 tons

   $P = 500 - 100$

   400 tons

ANSWER (3)

RED FARMER

The equation for RED FARMER is P = 900 –3C
Quantity of Corn is 0 tons

P = 900 –3 x 0

P = 900 tons

QUESTIONS

▶ How many tons of corn could FARMER BLUE produce on a single acre?

▶ How many tons of potatoes could FARMER BLUE produce if he only grew potatoes?

▶ How many tons of corn could FARMER RED produce in total? How many tons of potatoes ?

▶ For every ton of potatoes that FARMER BLUE grows, how many tons of corn can he not grow?

▶ What mathematical concepts you are using to do the above tasks?

ANSWERS (1)

▶ **FARMER BLUE** can produce 5 tons of corn on a single acre.

▶ **FARMER BLUE** produces 5 tons of potatoes in 1 acre. Total land is 100 acres. So, if he grew only potatoes, he would grow 500 tons of potatoes.

▶ Total land that **Farmer Red** has: 150 acres
Quantity of corn produced on 1 acre: 2 tons
Quantity of corn produced on total land: 150x2=300
Quantity of potatoes produced on 1 acre: 6 tons
Quantity of potatoes produced on total land:150x6=900
He can produce 300 tons of corn and 900 tons of potatoes in total

ANSWERS (2)

- **Quantity of corn: 400 tons**

Quantity of potato:100tons

We can write this as:

100 tons of potato=400 tons of corn

=1 ton of potato=4 tons of corn

For every 1 ton of potato the Blue Farmer grows, he cannot grow 4 tons of corn.

- **The concepts I learned are:**

Linear equations

Making graphs and reading them

Direct and inverse proportions

Thank you