Colour by Numbers with Leonardo

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Discussion Questions:

1. How do facsimile (fax) machines work?
2. How can computers store pictures when they can only use numbers?

Activity:

Computer screens are divided up into a grid of small dots called pixels (picture elements). In a black and white picture, each pixel is either black or white. When a computer stores a picture, all that it needs to store is which dots are black and which are white.

The letter "a" has been magnified below to show the pixels. When a computer stores a picture, all that it needs to store is which dots are black and which are white.
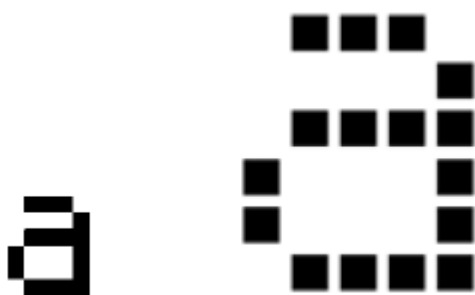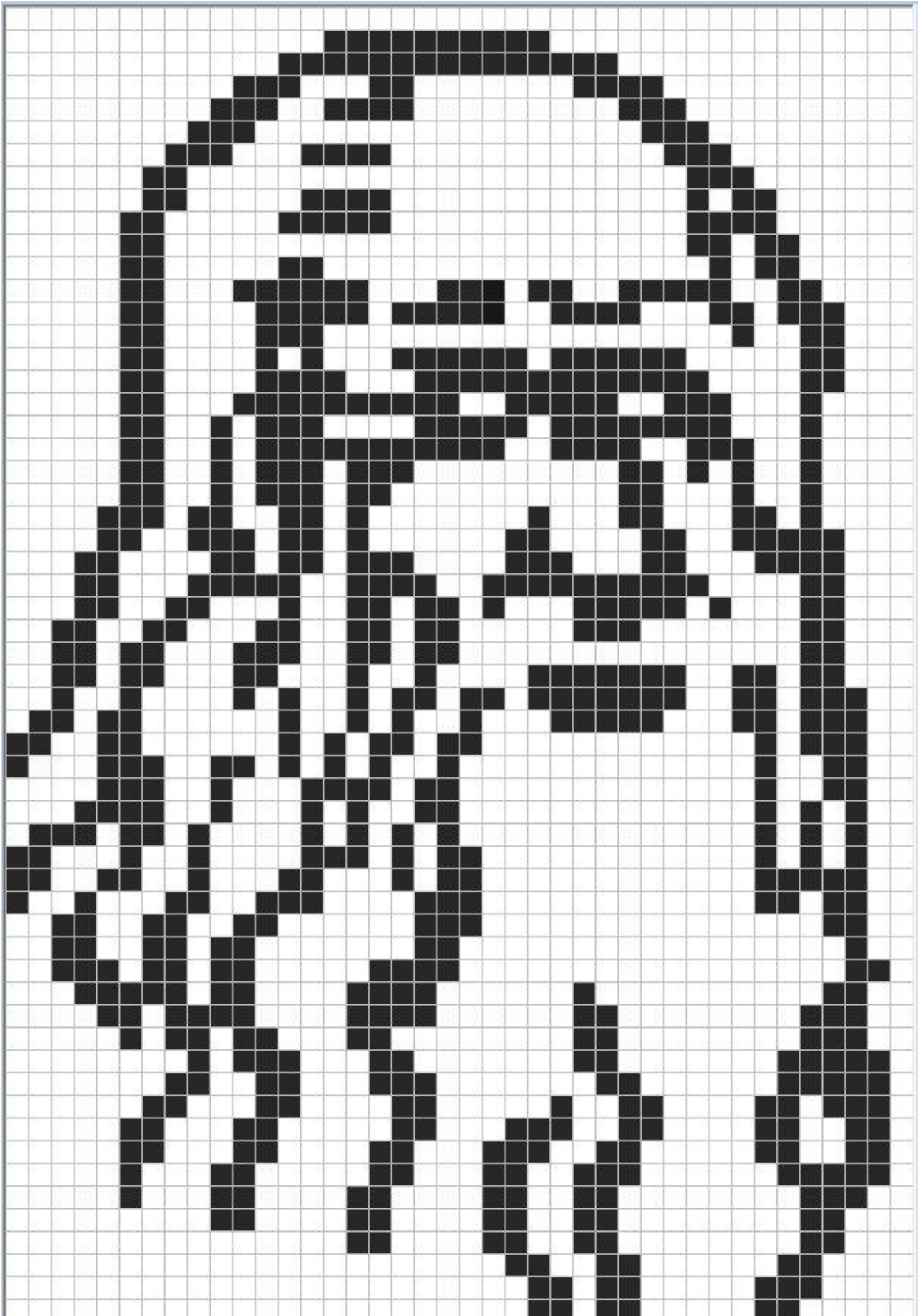
The picture below shows how a picture can be represented by numbers. The first line consists of one white pixel, then three black, then one white. Thus the first line is represented as 1, 3, 1.

1, 3, 1
4, 1
1, 4
0, 1, 3, 1
0, 1, 3, 1
1, 4

The first number always relates to the number of white pixels. If the first pixel is black the line will begin with a zero.
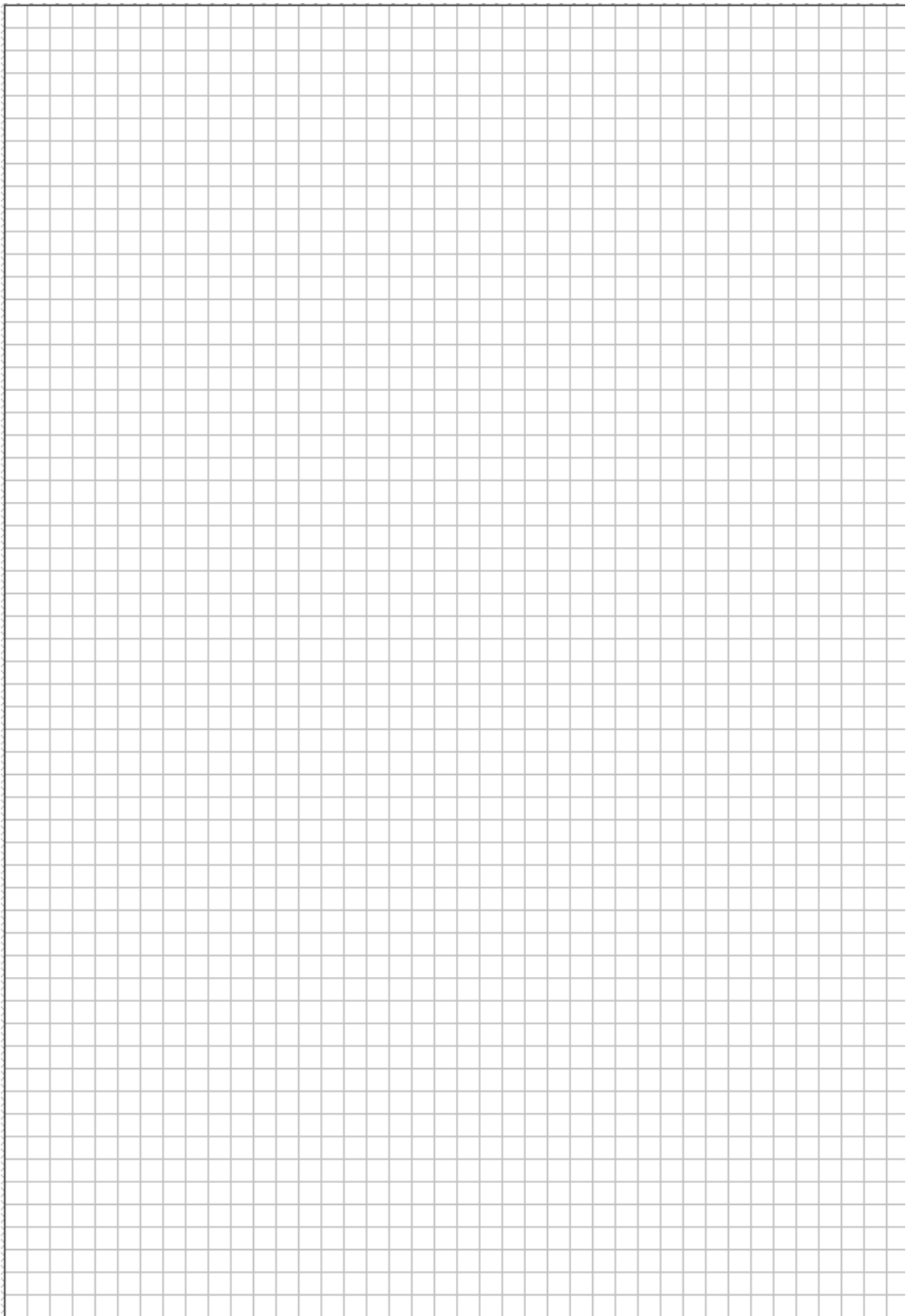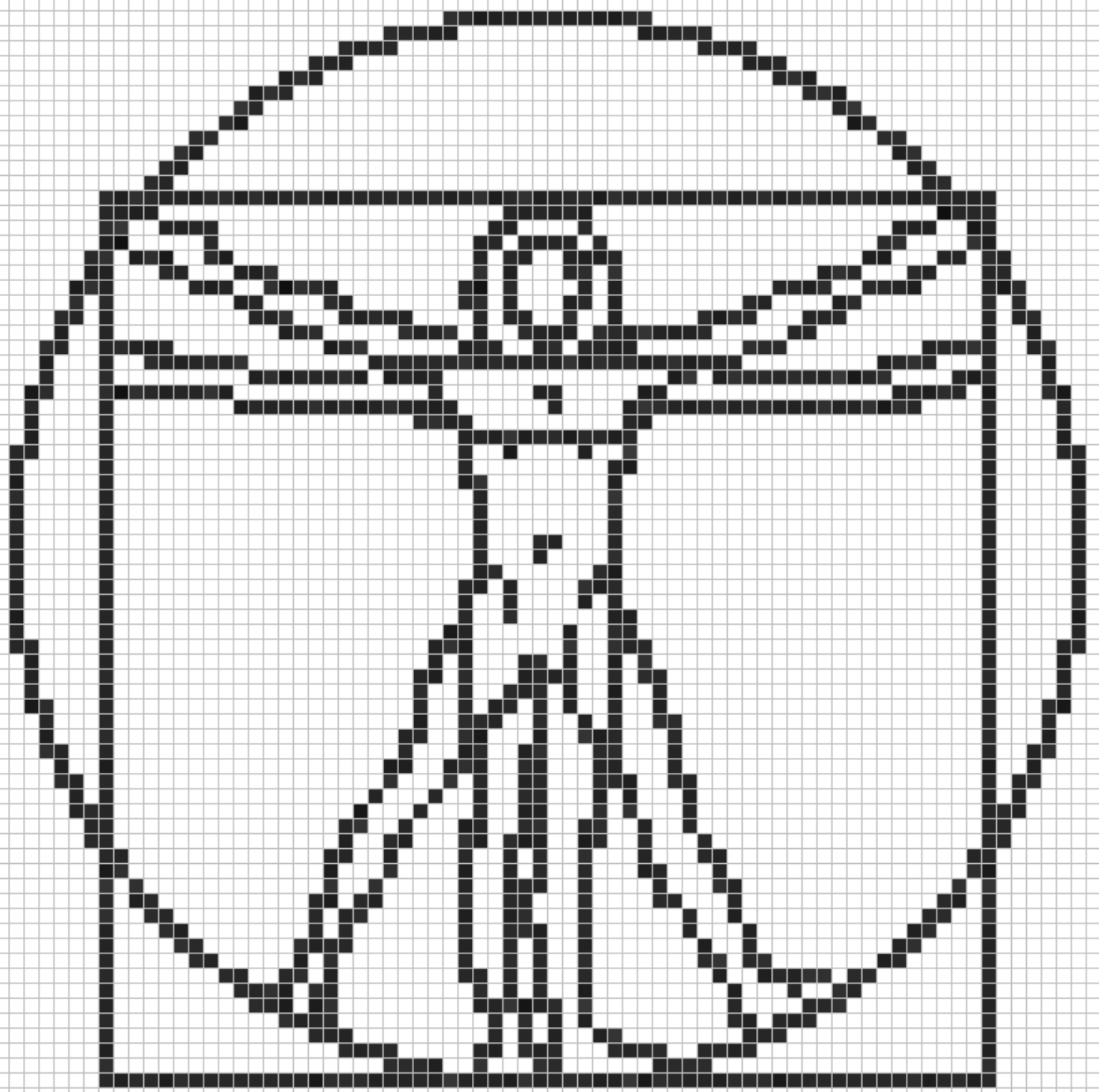
Group work- competition

Students are divided in 4 groups, each group has to convert a pixel picture (Vitruvian man or Leonardo's self-portrait) into number; as finished, they exchange their results with another group who has to use the information to draw a pixel image into a white grid and recognize the original Leonardo's object.

line	white, black, white, black, white…..		30	
1	40		31	
2	14, 10, 16		32	
3	12, 15, 13		33	0,
4			34	0,
5			35	
6			36	
7			37	
8			38	
9			39	
10			40	
11			41	
12			42	
13			43	
14			44	
15			45	
16			46	
17			47	
18			48	
19			49	
20			50	
21			51	
22			52	
23			53	
24			54	
25			55	
26			56	
27			57	
28			58	
29				

line	white, black, white, black, white…..
1	80
2	80
3	80
4	80
5	33, 14, 33
6	29, 5, 12, 5, 29
7	26, 4, 20, 4, 26
8	
9	
10	
11	
12	
13	
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