Here is my solution to the first part:

The probability of each face is ½×⅙=1/12

The probability of each edge is 1/3×1/12=1/36

The probability of each corner is ⅙×⅛=1/48

Edges:

Score	Combinations
3	(1,2)
4	(1,3)
5	(1,4) (2,3)
6	(1,5) (2,4)
8	(2,6) (3,5)
9	(3,6) (4,5)
10	(4,6)
11	(5,6)

Corners:

Score	Combinations
6	(1,2,3)
7	(1,2,4)
9	(1,3,5)
10	(1,4,5)
11	(2,3,6)
12	(2,4,6)
14	(3,5,6)
15	(4,5,6)

Table of probabilities:

Score	Probability	/144
1	1/12	12
2	1/12	12
3	1/9	16
4	1/9	16
5	5/36	20
6	23/144	23
7	1/48	3
8	1/18	8
9	11/144	11
10	7/144	7
11	7/144	7
12	1/48	3
14	1/48	3
15	1/48	3

For 3 people, the /144 column numbers must be grouped into 48s.

e.g. (1,6,7,10,12) (2,3,5) (4,8,9,11,14,15)

There are other solutions because (10, 11) (3, 4) (1, 2) (12, 14, 15) are interchangeable in groups.