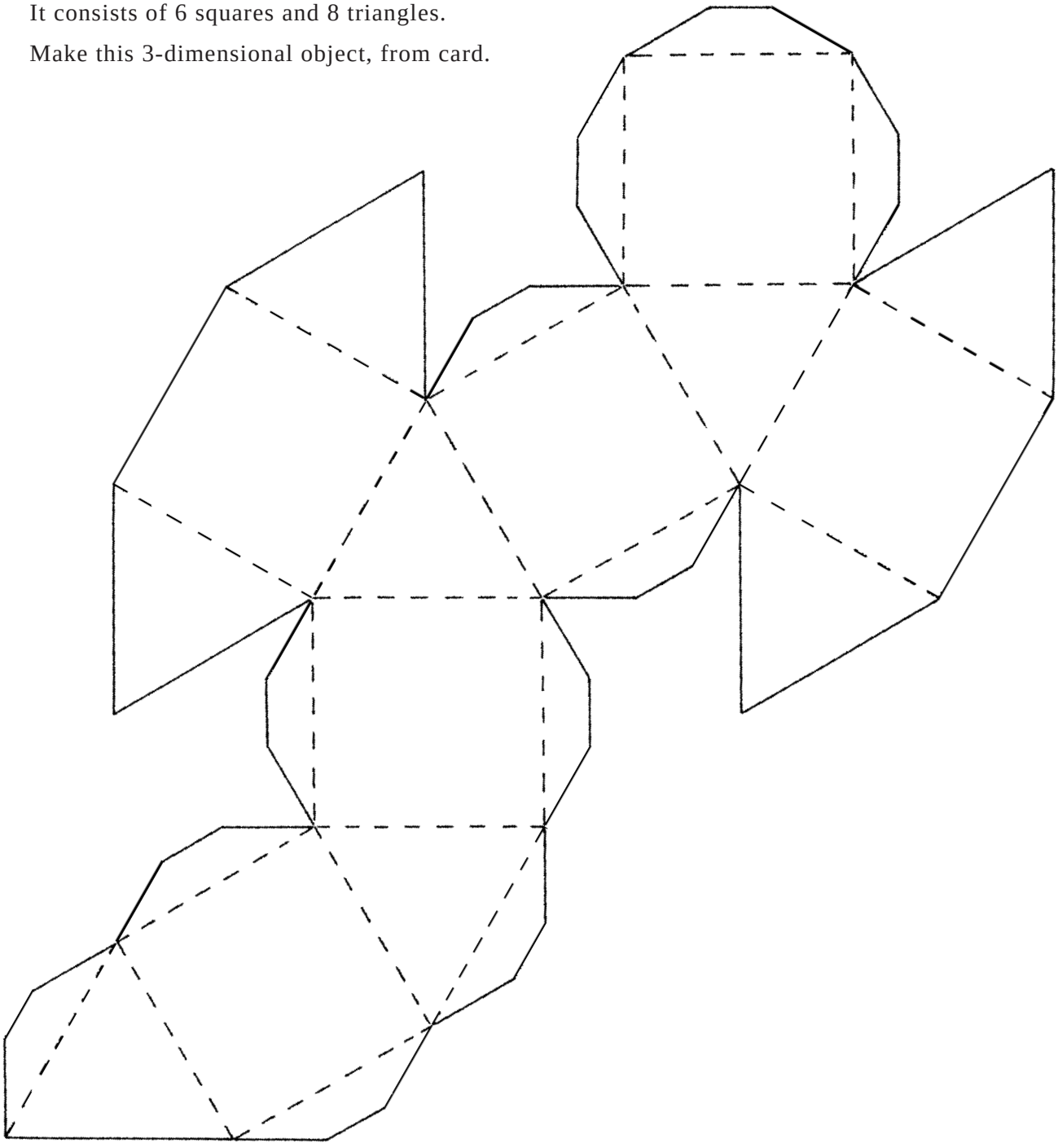
UNIT 10 *Probability - Two Events* Activities

Activities

ACTIVITY 10.1 *Experimental Probability*

The net of a cuboctahedron is given below.
It consists of 6 squares and 8 triangles.

Make this 3-dimensional object, from card.



If this object is thrown, what do you think will be the probability of it landing on:

(i) one of its *square* faces,

(ii) one of its *triangular* faces ?

Throw the object (at least 100 times) and estimate these probabilities.

How close are they to your original estimates?

ACTIVITY 10.2 *Two Coin Experiment*

When you toss two unbiased coins, the possible outcomes are as shown in the table. Each of these outcomes is equally likely.

		2nd Coin	
		H	T
1st Coin	H	H H	H T
	T	T H	T T

1. You toss the two coins 200 times.

   (a) Explain why you would expect to get the outcome H H (2 heads) 50 times.

   (b) How many times would you expect to get:

   (i) 2 tails,

   (ii) a tail and a head ?

2. Toss the two coins 200 times and record your results in a table like this:

Outcome	*Tally*	*Frequency*
2 Heads		
1 Head and 1 Tail		
2 Tails		

3. Compare your experimental results with your predictions.

ACTIVITY 10.3 *Two Dice Experiment*

1. Two fair dice are thrown and the sum of the numbers obtained is noted.

   (i) Complete the table opposite to show the possible outcomes:

		2nd DICE					
		1	*2*	*3*	*4*	*5*	*6*
1st DICE	*1*						
	2						
	3						
	4						
	5						
	6						

   (ii) Complete the following table:

Score	*Probability*	*Number Expected in 180 Throws*
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

2. Throw a pair of fair dice 180 times and record your total scores.

3. Compare your results with the expected numbers listed above.

4. Combine the results for your whole class, and compare the results obtained with your predictions.

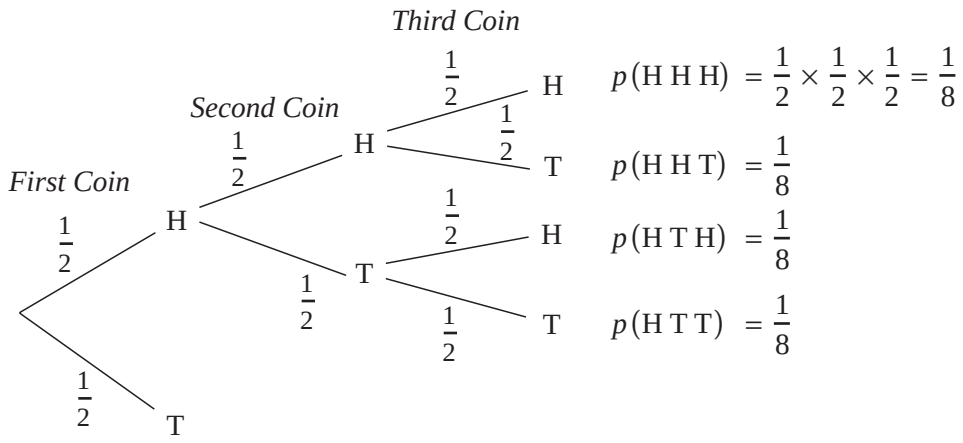
ACTIVITY 10.4 *Tossing Three Coins*

Toss three unbiased coins and record the number of HEADS uppermost in a chart like the one opposite.

Carry out the experiment 40 times, and complete the frequency column in the tally chart.

No. of Heads	*Tally*	*Frequency*
0		
1		
2		
3		

You can find the theoretical probabilities by completing the tree diagram begun for you below:



1. What is the probability of obtaining exactly:

   (a) 3 HEADS, (b) 2 HEADS, (c) 1 HEAD, (d) no HEADS ?

2. If you perform the experiment 40 times, what is the expected frequency for obtaining:

   (a) 3 HEADS, (b) 2 HEADS, (c) 1 HEAD, (d) no HEAD ?

3. Compare your theoretical frequencies with those you actually obtained.

ACTIVITIES 10.2 - 10.3 *Notes for Solutions*

Notes and solutions given only where appropriate.

10.2 1. (i) 50 (ii) 100

10.3 1. (i)

		2nd DICE					
		1	*2*	*3*	*4*	*5*	*6*
1st DICE	*1*	2	3	4	5	6	7
	2	3	4	5	6	7	8
	3	4	5	6	7	8	9
	4	5	6	7	8	9	10
	5	6	7	8	9	10	11
	6	7	8	9	10	11	12

(ii)

Score	*Probability*	*Number Expected in 180 Throws*
2	$\frac{1}{36}$	5
3	$\frac{2}{36} = \frac{1}{8}$	10
4	$\frac{3}{36} = \frac{1}{12}$	15
5	$\frac{4}{36} = \frac{1}{9}$	20
6	$\frac{5}{36}$	25
7	$\frac{6}{36} = \frac{1}{6}$	30
8	$\frac{5}{36}$	25
9	$\frac{4}{36} = \frac{1}{9}$	20
10	$\frac{3}{36} = \frac{1}{12}$	15
11	$\frac{2}{36} = \frac{1}{18}$	10
12	$\frac{1}{36}$	5

ACTIVITY 10.4 *Notes for Solutions*

10.4 1. (a) $\frac{1}{8}$ (b) $\frac{3}{8}$ (c) $\frac{3}{8}$ (d) $\frac{1}{8}$

2. (a) 5 (b) 15 (c) 15 (d) 5