

## 5+ a Day

### Purpose:

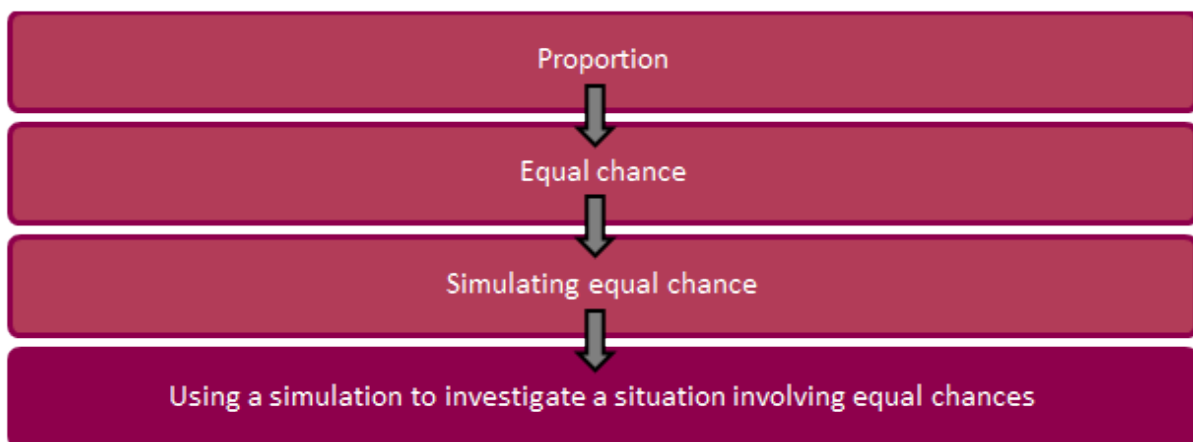
The purpose of this activity is to engage the students in finding an experimental probability and using this to model the outcome of a given scenario.

### Achievement Objectives:

S3-3: Investigate simple situations that involve elements of chance by comparing experimental results with expectations from models of all the outcomes, acknowledging that samples vary.

### Description of mathematics:

The background knowledge and skills that need to be established before and/or during this task are outlined in the diagram below:



#### Proportion

Fifteen people are asked if they like bananas. Twelve say they do and the remainder say they do not. What proportion of people questioned, do not like bananas?

#### Equal chance

A box of porridge sachets has three sachets of each of four different flavours. one of those flavours is 'plain'. If a sachet from a full box is chosen at random, what is the chance that it is plain?

#### Simulating equal chance

A box of porridge sachets has three sachets of each of four different flavours. one of those flavours is 'plain'. How could this be modelled with coloured counters to find the likelihood of a sachet chosen at random being plain?

#### Using a simulation to investigate a situation involving equal chances

A box of porridge sachets has three sachets of each of four different flavours. one of those flavours is 'plain'. Use coloured counters to model a full box. find the probability of getting at least one plain sachet amongst the first three picked at random. Run twenty trials to determine this probability.

This activity may be carried out with step by step guidance, or by allowing the student to follow their own method of solution. The approach should be chosen in sympathy with students' skills and depth of understanding.

**Activity:**

As part of a study on nutrition, a teacher asked her class to record everything they ate on a particular day. When they submitted the information anonymously, the class then looked through the data to find how many servings of fruit and/or vegetables each student in the class had consumed that day. The results were:

Room 12 Food  
5+ on Tuesday?

Servings of f+v	Tally	Frequency
0		1
1		3
2	<del>   </del>	5
3	<del>   </del>	5
4		4
5		3
6	==	2
7	-	1
8		0
		24

What is the chance, if any two students in the class are picked at random, that they both ate their 5+ servings of fruit and/or vegetables that day?

## The procedural approach

The student is able to follow the steps given, to find a probability and use it to model a given problem.

Prompts from the teacher could be:

1. How many students are in the class?
2. How many students had 5+ fruit and/or veges that day?
3. What proportion of students had 5+ fruit and/or veges that day?
4. What is the probability that a student chosen at random from this class had 5+ fruit and/or veges that day?
5. Model this probability. You could use coloured counters, with one colour for each of the students who ate 5+ servings of fruit and/or veges and another colour for each of those who didn't. Select two counters at random and record their colours. Replace the counters and repeat. Carry out at least 20 trials.
6. Use the results of your model (simulation) to answer the question: What is the chance, if any two students in the class are picked at random, that they both ate their 5+ servings of fruit and/or vegetables that day?

1. How many had 5+ yesterday? 6 out of 24

2. What is the probability that one student chosen at random had 5+ yesterday?  $\frac{6}{24}$  or  $\frac{1}{4}$

3. Run a simulation: I'm using red counters (6 of them) for yes 5+ and blue (18 of them) for no. I'm picking two out of a box without looking, marking it down and putting them back. Repeat to get 50 goes.

Red and Red	III	3 out of 50 or 6%
Blue and Red	IIIIII II	12 out of 50 or 24%
Blue and Blue	IIIIIIIIIIIIIIIIIIII	35 out of 50 or 70%

4. What is the chance that the 2 kids picked at random each had their 5+ yesterday? 6%

## The conceptual approach

The student is able to find a probability and use it to model a given problem.

Prompts from the teacher could be:

1. What proportion of students had 5+ fruit and/or veges that day?
2. What is the probability that a student chosen at random from this class had 5+ fruit and/or veges that day?
3. Model this probability. Carry out at least 20 trials.
4. Use the results of your model (simulation) to answer the question: What is the chance, if any two students in the class are picked at random, that they both ate their 5+ servings of fruit and/or vegetables that day?

Random numbers 1-24

1=0, 2-4=1, 5-9=2, 10-14=3, 15-18=4, 19-21=5, 22-23=6, 24=7

13	,	10	=	3,3
5	,	16	=	2,4
1	,	12	=	0,3
18	,	13	=	4,3
2	,	20	=	1,5
6	,	9	=	2,2
5	,	10	=	2,3
19	,	9	=	5,2
6	,	10	=	2,3
8	,	5	=	2,2
5	,	15	=	2,4
7	,	23	=	2,6
24	,	22	=	7,6
5	,	11	=	2,3
10	,	2	=	3,1
8	,	24	=	2,7
18	,	21	=	5,5
12	,	22	=	3,6
11	,	7	=	3,2
3	,	12	=	1,3
19	,	2	=	5,1
13	,	5	=	3,2
24	,	21	=	6,5
22	,	9	=	6,2
10	,	14	=	3,3

$3/25 = 6/50 = 12/100$

Answer: 12% chance of picking two 5+ students

T: Run me through what you've done here.

S: I used a random number app, set from 1 to 24. I assigned each number to a kid in the class going down through the tally chart. Then I just used then randm numbers to pretend to pick two kids ... 25 times over.

T: Tell me about your answer – 12%.

S: Well, that's what I got from doing the model thing; three out of 25, so 12 out of a hundred. But then I could just as easily got 2 or 4 so maybe the percent could be 8 or 16. It's anything around 12.

T: Like 10, or like 20?

S: Maybe, but not much more, because I can't imagine doing the thing again and getting like 10 out of 25. But it is possible.