Outcomes using Fractions, Sum Equals 1, Likelihood.

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Differentiate and Assess

Not every student will be ready to investigate this concept at this Level and so we will need to differentiate to ensure every student is learning at their leading edge. Select the Differentiate button on this screen.

Integrate

Every mathematical concept is integrally related to other mathematical concepts. Teaching and learning related concepts simultaneously develops deep relational understanding. Select the Integrate button on this screen.

Intervene

Some students may not yet be ready to investigate this concept at any Level, and so we will need to provide some intervention. Select the Intervention button on this screen.

OUTCOMES USING FRACTIONS, SUM EQUALS 1, LIKELIHOOD.

EXPLICIT TEACHING PLAN OVERVIEW PAGE

THIS PAGE IS A SUMMARY OF THE EXPLICIT TEACHING PLAN, INCLUDING STRATEGIC QUESTIONS, AND DESRIBING THE SEQUENCE WHICH WILL OCCUR OVER MULTIPLE LESSONS.

RESOURCES: PAPER BAG, 50 COUNTERS – 30 OF COLOUR A, 15 OF COLOUR B AND 5 OF COLOUR C, PENCIL, PAPER, RULER

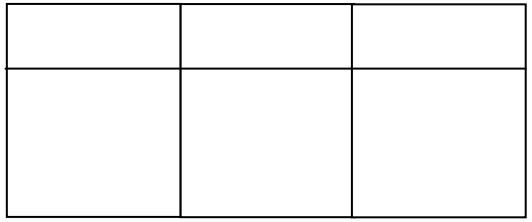
WHAT COULD WE DO?	WHAT LANGUAGE COULD WE USE TO EXPLAIN AND ASK QUESTIONS?
Children: • conduct a chance experiment • identify the outcomes • list probability of each outcome in fractions • ensure the fractions add to make 1 • identify the likelihood of winning a game, using the number of possible outcomes and probability of each outcome.	Children • ask one another questions about Identify outcomes of chance experiments listing probabilities using fractions, verifying their sum equals 1, likelihood of winning using probability of each outcome , for example: ▸ how could we conduct a chance experiment? ▸ what are the possible outcomes? ▸ what is the probability of each outcome? ▸ how can we list the probabilities as fractions? ▸ do our probabilities as fractions add to make 1? ▸ what is the probability we will win if we choose outcome 1? ▸ what is the probability we will win if we choose outcome 2? ▸ what is the probability we will win if we choose outcome 3?

OUTCOMES USING FRACTIONS, SUM EQUALS 1, LIKELIHOOD.

EXPLICIT TEACHING PLAN

FULL EXPLICIT TEACHING PLAN, EMBEDDING DEEP RELATIONAL UNDERSTANDING, METALANGUAGE, AND QUESTIONS THAT MAY BE USED OVER MULTIPLE LESSONS.

WHAT COULD WE DO?	WHAT LANGUAGE COULD WE USE TO EXPLAIN AND ASK QUESTIONS?
Children think about, talk and listen to a friend about, then have the opportunity to share what they already know.	► Today brings an investigation about chance and data. ► What do you know about chance and data? ► Talk about chance and data with a friend. ► Is anyone ready to share what they are thinking about chance and data?
Record, for example, data = statistics	► We've investigated data. ► And we found that data is another word for information. ► We found that we could collect and record data in tables and in picture, column and line graphs and dot plots. ► When we record data in tables and graphs, we call it statistics.
Record, for example, chance = probability	► We've investigated chance. ► And we found that chance describes the likelihood of an event occurring. ► And we found that once we had some data, we could describe chance. ► Another word for chance is probability. ► Can you almost see the word 'probable' in probability? ► **Today we're going to conduct a chance experiment, identifying the outcomes and listing probabilities using fractions.**
Display a bag in which there are 50 counters, 30 of one colour, 15 of another colour	

and 5 of another colour, for example 30 red, 15 blue and 5 green, (don't tell children the number or colours). Record, for example, 50 counters Record, for example, 3 colours	► Here we have a bag ► Inside the bag there are 50 counters. ► There are 3 colours. ► Without looking, we're going to take out one counter at a time. ► We're going to record the colour of each counter that we take out, in a table using tally marks.
Display a table with 3 columns (or rows) for the colours, for example, 	► How many colours are there? ► Are there 3 colours? ► Because there are 3 colours, could we record 3 columns in our table? ► Let's leave a row for the column headings, when we've worked out the 3 colours. ► So we're going to take out 1 counter at a time, and record it in the table. ► Please copy the table onto your paper. ► When you think you have enough data to predict the total number of counters of each colour, you may go to your table and record your predicted data in your table.
Allow a child to place their hand into the bag without looking, to select 1 counter, for example,  Record the colour and the counter using a tally mark in the table, for example,	► Let's conduct the chance experiment! ► Let's take out a counter ► What colour is the counter? ► Is the counter red?

red		
I		

Continue allowing children to place their hand into the bag without looking, to select 1 counter, recording any new colour in the headings row and the counter using a tally mark in the table each time, for example,

red	blue	green
~~IIII~~ II	II	I

Stop once all 3 colours have been identified.

When individual children think they have enough data to predict the 3 colours and the number of each colour, they take the table in which they have been recording their data, and go to their desk to record their prediction.

Continue allowing children to place their hand into the bag without looking, to select 1 counter, recording any new colour in the headings row and the counter using a tally mark in the table each time, ensuring children who are already making their predictions cannot see the colours as they are selected, until every child has gone to their table to record their prediction.

Some children may think they have enough data after they know the three colours. Others may wait until almost every counter has been withdrawn.

Allow children to go to their table when THEY feel they have enough data.

When all children have recorded their prediction, the gather to check if their

- Let's record the colour as one of our headings and the counter in the table using a tally mark.
- Let's continue taking out 1 counter at a time, recording the counter as a tally mark in the table.
- Have we worked out the three colours of the counters?
- Are the colours red, blue, and green?
- Let's continue taking out 1 counter at a time, recording the counter as a tally mark in the table.
- Does anyone think they have enough data to predict the colours and the number of counters of each colour?
- If you think you now have enough data in your table, take your table, and go to your desk to record your predicted data in your table.

prediction was close to being correct.

If there are still any counters remaining in the bag, withdraw them in front of the children and record the colours.

Display the actual results, for example,

Compare the children's predicted data with the actual data.

Children group according to the number of counters they used as their data before making their prediction.

- It is time to check if your predicted data were close to the actual data.
- How many red counters are there?
- Are there 30 red counters?
- How did that compare to your predicted data?
- How many blue counters are there?
- Are there 15 blue counters?
- How did that compare to your predicted data?
- How many green counters are there?
- Are there 5 green counters?
- How did the actual data compare to your predicted data?
- Let's get into groups based on the amount of data you used to make your prediction.
- If you made your prediction when we had fewer than 10 counters selected, group here.
- If you made your prediction when we had between 10 and 15 counters selected, group here.
- If you made your prediction when we had between 16 and 20 counters selected, group here.

- If you made your prediction when we had between 20 and 25 counters selected, group here.
- If you made your prediction when we had between 26 and 30 counters selected, group here.
- If you made your prediction when we had between 30 and 35 counters selected, group here.
- If you made your prediction when we had between 36 and 40 counters selected, group here.
- If you made your prediction when we had more than 40 counters selected, group here.

In each group, children compare their predictions and discuss whether the number of counters they used as their data was enough to make a prediction.

- In your groups, compare your predictions and discuss whether you think the number of counters you used as your data was enough to make a prediction.

Children identify which groups' predictions were close to the actual.

- Which group's prediction were closer to the actual?
- Did you have enough data to make an accurate prediction?

Discuss whether the predictions of the children who had more data were closer.

Allow children to suggest the amount of data they think would be enough to make a prediction that is close to the actual. This will vary with some children being 'risk takers' and others being 'risk averse'. Continue the discussion to come up with a number of counters that is in the middle.

- Whose predictions were closer – the predictions of the children with more or less data?
- Did the people with more data make more accurate predictions?
- How much data do you think would be enough to make a prediction that is close to the actual?

Display the actual results,

red	blue	green
𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸	𝍸 𝍸 𝍸	𝍸

for example,	► **Here are the actual results of the chance experiment.**
	► Now that we know the actual data, how could we record the probability of each outcome when all of the counters are in the bag?
	► Is there an equal chance of selecting each colour?
	► Is there an equal probability of each outcome?
	► If all of the counters are in the bag, what is the probability of selecting a red counter?
	► How many red counters?
	► Are there 30 red counters?
	► How many counters altogether?
Record, for example, red = 30 chances in 50	► Are there 50 counters altogether?
	► Is the probability of selecting a red counter, 30 chances in 50?
Record, for example, red = $\frac{30}{50}$	► How could we record this as a fraction?
	► Is 30 chances in 50, thirty-fiftieths?
	► If all of the counters are in the bag, what is the probability of selecting a blue counter?
	► How many blue counters?
	► Are there 15 blue counters?
	► How many counters altogether?
Record, for example, blue = 15 chances in 50	► Are there 50 counters altogether?
	► Is the probability of selecting a blue counter, 15 chances in 50?
Record, for example, blue = $\frac{15}{50}$	► How could we record this as a fraction?
	► Is 15 chances in 50, fifteen-fiftieths?

Record, for example, green = 5 chances in 50

Record, for example, green = $\frac{5}{50}$

Record, for example, $\frac{30}{50} + \frac{15}{50} + \frac{5}{50} = \frac{50}{50}$

Record, for example, $\frac{30}{50} + \frac{15}{50} + \frac{5}{50} = \frac{50}{50} = 1$

- If all of the counters are in the bag, what is the probability of selecting a green counter?
- How many green counters?
- Are there 5 green counters?
- How many counters altogether?
- Are there 50 counters altogether?
- Is the probability of selecting a green counter, 5 chances in 50?
- How could we record this as a fraction?
- Is 5 chances in 50, five-fiftieths?

- What is the sum of these fractions?
- What does 30 fiftieths plus 15 fiftieths plus 5 fiftieths equal?
- Does 30 fiftieths plus 15 fiftieths plus 5 fiftieths equal 50 fiftieths?
- What is 50 fiftieths equal to?
- Is 50 fiftieths equal to 1?
- When we add the probabilities, is their sum, 1?

	► **Imagine this was a game of chance where you had to select one counter from this bag of 50 counters.** ► What is your probability of winning if you choose red? ► Is your chance of winning, 30 fiftieths? ► Is your chance of winning, 30 in 50? ► What is your probability of winning if you choose blue? ► Is your chance of winning, 15 fiftieths? ► Is your chance of winning, 15 in 50? ► What is your probability of winning if you choose green? ► Is your chance of winning, 5 fiftieths? ► Is your chance of winning, 5 in 50? ► Do you have an equal chance of winning with each colour? ► Which colour gives you the greatest probability of winning? ► Which colour gives you the lowest probability of winning?