**Blood Type A**

A Guided Activity

Question:

*If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?*

Part I: Simulation

1. How could each of the following be used to simulate selecting a donor with type A blood or a donor with one of the other blood types?

* A random digits table
* A deck of cards
* A collection of colored chips

1. Suppose a random digits table is used for the simulation, describe what represents a trial of determining the number of donors needed before a donor with type A blood is found.
2. Conduct 10 trails and record the results in the table below:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Trial | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Number of people selected to find the first type A blood donor |  |  |  |  |  |  |  |  |  |  |

1. Based on your 10 trials:

* How many donors would be needed before a donor with type A blood is found?
* What is the probability that the first person with type A blood is the 4th donor?
* What is the probability that it takes at least 4 donors to find one with type A blood?

1. Record the results of your 10 trials on the class chart.
2. Based on the class results:

* How many donors would be needed before a donor with type A blood is found?
* What is the probability that the first person with type A blood is the 4th donor?
* What is the probability that it takes at least 4 donors to find one with type A blood?

Part II: Probability Tree

1. Create a probability tree for answering the question: W*hat is the probability that it will take at least 4 donors to find one with type A blood?*

* Draw the first set of branches representing the different outcomes for the blood type of the first donor (type A or other type).
* Write the probability beside each branch.
* Create branches representing the second donor and label these with their corresponding probabilities.
* How many sets of branches are needed if we want to represent the first four donors?
* Complete the probability tree.

1. Highlight the branch pathway that represents the first person with type A blood being the 4th donor.

* What is the probability that the first person with type A blood is the 4th donor?

To find this, multiply the probabilities given on each branch of the highlighted branch pathway.

1. Which branch pathway represents that a type A donor has not yet been found? Highlight this pathway.

* What is the probability that it takes more than 4 donors to find a donor with type A blood?
* What is the probability that it takes at least 4 donors to find one with type A blood? (Hint: Add the probabilities from the two highlighted pathways.)