PROBABILITY CONCEPTS LEADING TO THE USE OF VENN-DIAGRAMS IN THE SOLVING OF PROBLEMS

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TARGET AUDIENCE: GET and FET as well as Math Literacy teachers.

DURATION: 2 Hours

MAXIMUM NO. OF PARTICIPANTS: 40

MOTIVATION FOR WORKSHOP

Probability is a concept that formed part of content examined in Paper 3, which was optional in the National Curriculum Statement (NCS). The change from NCS to Curriculum and Assessment Policy Statement (CAPS) has made the teaching of probability compulsory. Teachers are faced with a challenge of having to handle probability, a concept that was either not included in their formal professional training or have limited exposure or experience toward teaching it to learners. The purpose of conducting a workshop on probability is an attempt to close the gaps mentioned above.

CONTENT OF THE WORKSHOP

2011 Census results

As an introduction to the workshop, the census 2011 findings that are relevant to education will be discussed and interpreted. The purpose of this discussion is to enable teachers to share information that was drawn from real life situation with learners, and how it affects them so as to develop mathematics skills of listening, communication, investigation, analyzing, etc.

Probability

Introduction of terminology: Relative frequency, mutually exclusive, dependent and independent events, etc,

Venn diagrams: using Venn diagrams to depict and solve problems. Relevant and also some real life situations would be provided to clarify problems. Explanations of notations, for example,

P(A or B) = P(A) + P(B) – P(A and B) would also be included. The use of "AND" and "OR' rule, finding an unknown (variable) in a Venn diagram as well as the "union" of sets would also be explained.

It is anticipated that, by doing selected problems, teachers should gain content knowledge and skills of solving problems. Such knowledge and skills should enable

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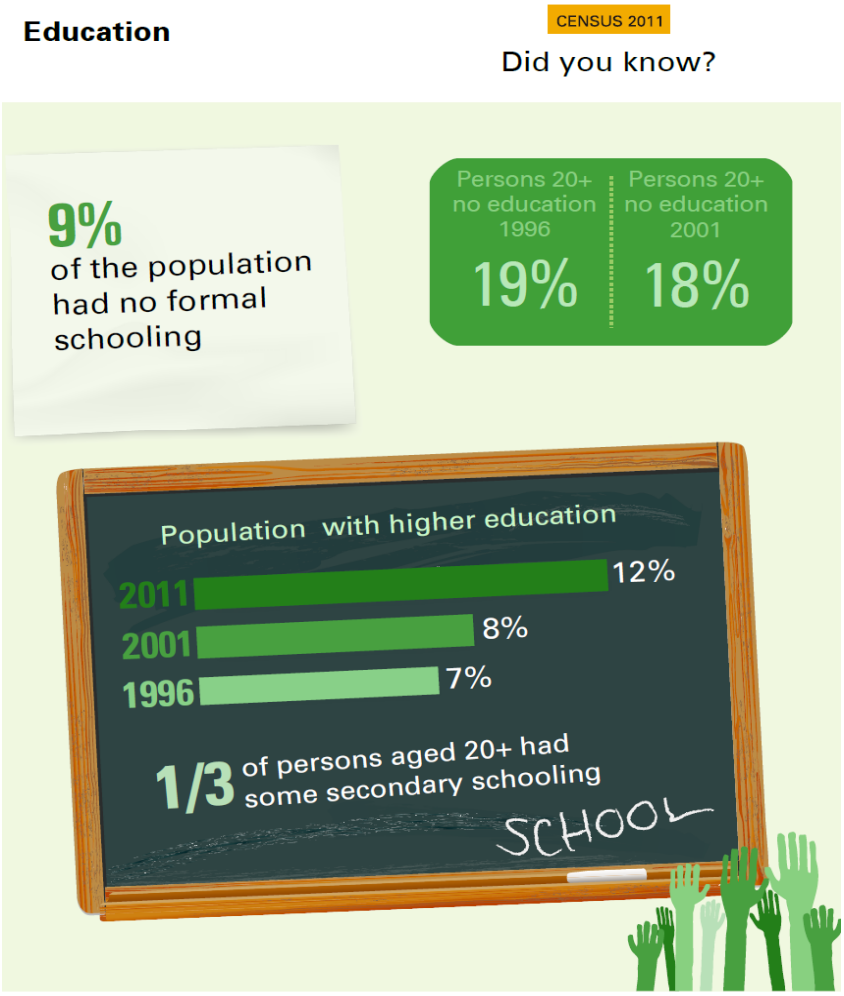
them to guide learners on how to solve problems from introductory level *up to questions on level 4.*

PROPOSED TIME ALLOCATION FOR WORKSHOP ACTIVITIES

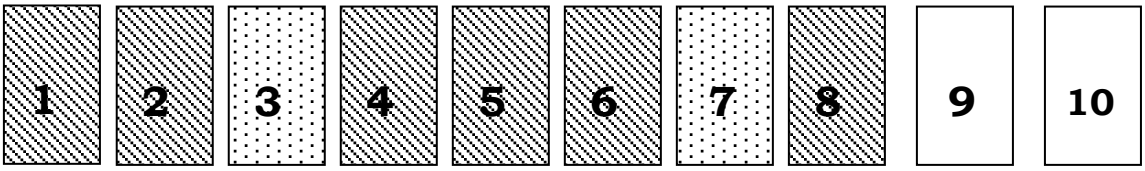
Activity	Time
1. Interpretation / Discussion few Census 2011 findings	20 Min
2. Probability Scale and Concepts to install and clarify	30 Min
3. Probability problems from hand out (Venn Diagrams)	60 Min
4. Summary of key concepts and handing out of completed memorandum for activities	10 Min

ACTIVITY 1: Discussion around Census 2011 findings



ACTIVITY 2: Investigating important probability concepts

One card from the cards below is drawn at random.



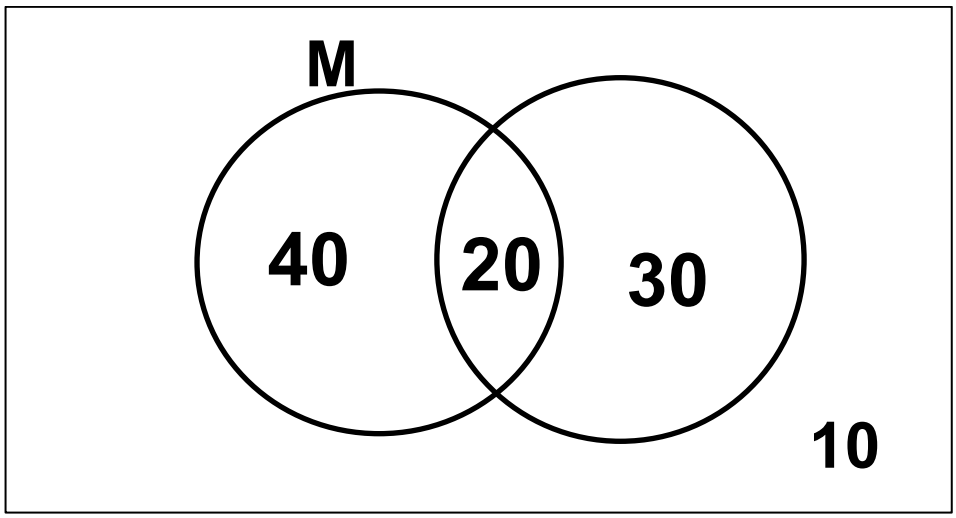
Write down the probabilities below as fractions and as percentages.

a) P(8) =
b) P(11) =
c) P(less than 11) =
d) P(dotted) =
e) P(even or dotted) =
f) P(even and dotted) =
g) P(plain and prime) =
h) P(plain or prime) =
i) P(more than 4 or striped) =
j) P(more than 4 and striped) =

ACTIVITY 3

Of the 100 learners in grade 12, 70 study Mathematics, 50 study Physical Science, 30 study both Mathematics and Physical Science and 10 study neither.

M = $\{Mathematics\}$
S = $\{Physical\ Science\}$



a) "M is an event learner studying Mathematics" and " S is an event learner studying Physical Science". Are the two events mutually exclusive?
b) Calculate the probability that a grade 12 learner, randomly chosen

   i. Studies Mathematics only
   ii. Does not study Mathematics
   iii. Studies Mathematics or Physical Science
   iv. Studies Mathematics and Physical Science

ACTIVITY 4

Seventy-five visitors to the Groblersdal Agricultural Show were surveyed to find out what food they had bought to eat.

The results showed that:
40 visitors had eaten boerewors rolls,
31 had eaten pap-and-wors,
41 had eaten fried chicken.
15 had eaten *both* boerewors rolls and pap-and-wors,
16 had eaten *both* pap-and-wors rolls and fried chicken and
18 had eaten both fried chicken and boerewors rolls.
7 had eaten all three types of food.

Draw a Venn diagram to show these results.

ACTIVITY 5

150 people were asked whether they watched Generations and/or 7de laan. 80 said they watched Generations, 55 watched 7de laan and 23 watched both programmes.

Draw a Venn diagram depicting the situation.

a) How many of the people asked watched neither programme ?
b) What is the probabilitythat a randomly chosen person watched Generations but not 7 de laan?

ACTIVITY 6

Suppose that 60% of households in South Africa have a television set, while 80% of all the households own a radio and 50% of all households own a television set and a radio.

a) Draw a Venn diagram to depict the situation above
b) What is the probability that a randomly chosen household in South Africa does not have a radio?
c) What is the probability that a randomly chosen household in South Africa will own either a television set or a radio or both of these items?

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