

Subject: Mathematics

Topic: Simple Idea of Probability

Level: S.3

Background information:

Learning objective:

1. Content

Students should be able to identify events as an event of certainty or a random event.

Students should be able to give examples of an event of certainty and a random event.

2. Language

Students should be able to describe the degree of certainty of an event by using the following sentence patterns:

(1) *The event will certainly happen.*

(2) *The event will certainly not happen.*

(3) *The event has a chance to happen.*

S.2 Mathematics
Events of Certainty and Random Events
Worksheet for Student A

Name: _____ No.: _____ Class: _____ Date: _____



Instruction:

Before you do this worksheet, you should

- ✓ Pair up with a partner.
- ✓ Decide who is Student A, who is Student B.
- ✓ **This worksheet is for Student A only**

Part 1

- You are **Student A**.
- You are given 3 examples of daily events below.
 - i. Event 1: The day after Sunday is Monday.
 - ii. Event 2: Number 6 comes up after throwing a die.
 - iii. Event 3: The Christmas Day is on the twenty-fifth of November.

Decide whether each event is an **event of certainty** (i.e. it will certainly happen or it will certainly not happen) or a **random event** (i.e. it has a chance to happen). Describe each event by using the following sentence pattern:

The event will certainly happen.

The event will certainly not happen.

The event has a chance to happen.

- i. Event 1: _____
- ii. Event 2: _____
- iii. Event 3: _____

- Your partner has worked out the types of event of 3 other examples. Show your answers to your partner to see if s/he agrees with you. If not, ask him/her to give some suggestions for changes. Show your changes below when needed.

- i. Event 1: _____
- ii. Event 2: _____
- iii. Event 3: _____

Part 2

Write 2 examples of an **event of certainty** and 1 example of a **random event** in the spaces below:

2 examples of an **event of certainty**:

1 example of a **random event**:

Show your answers to your partner to see if he/she agrees with you. If not, ask him/her to give some suggestions for changes.

S.2 Mathematics
Events of Certainty and Random Events
Worksheet for Student B

Name: _____ No.: _____ Class: _____ Date: _____



Instruction:

Before you do this worksheet, you should

- ✓ Pair up with a partner.
- ✓ Decide who is Student A, who is Student B.
- ✓ **This worksheet is for Student B only**

Part 1

- You are **Student B**.
- You are given 3 examples of daily events below.
 - i. Event 4: Throw a die to get a number less than 7.
 - ii. Event 5: You get 100 marks in the next Maths test.
 - iii. Event 6: There are thirty days in February.

Decide whether each event is an **event of certainty** (i.e. it will certainly happen or it will certainly not happen) or a **random event** (i.e. it has a chance to happen). Describe each event by using the following sentence pattern:

The event will certainly happen.

The event will certainly not happen.

The event has a chance to happen.

- i. Event 4: _____
- ii. Event 5: _____
- iii. Event 6: _____

- Your partner has worked out the types of event of 3 other examples. Show your answers to your partner to see if s/he agrees with you. If not, ask him/her to give some suggestions for changes. Show your changes below when needed.

- i. Event 4: _____
- ii. Event 5: _____
- iii. Event 6: _____

Part 2

Write 2 examples of an **event of certainty** and 1 example of a **random event** in the spaces below:

2 examples of an **event of certainty**:

1 example of a **random event**:

Show your answers to your partner to see if s/he agrees with you. If not, ask him/her to give some suggestions for changes.

Subject: Mathematics

Topic: Simple Idea of Probability

Level: S.3

Learning objective:

1. Content

Students should be able to work out and explain the probability of different events.

2. Language

Students should be able to explain the probability of different events by using the following sentence patterns:

1. *There are...favourable outcomes in which...comes up..*
2. *The total number of possible outcomes is....*
3. *Therefore, the probability of getting...is....*

S.2 Mathematics
Calculating probability using a tree diagram
Worksheet for Student A

Name: _____ No.: _____ Class: _____ Date: _____



Instruction:

Before you do this worksheet, you should

- ✓ Pair up with a partner.
- ✓ Decide who is Student A, who is Student B.
- ✓ **This worksheet is for Student A only**

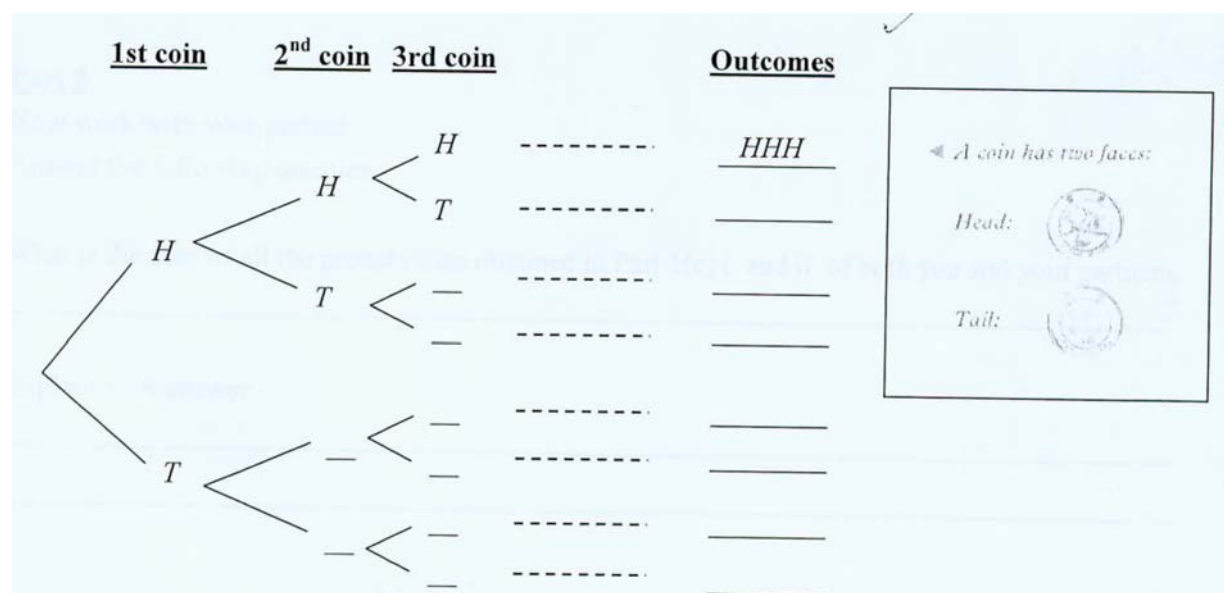
Part 1

- You are **Student A**

In the following exercise, you have a similar question to your partner's. Finish it on your own **within 5 minutes** and then work together with your partner.

Complete the tree diagram below and write down all the possible outcomes for tossing 3 coins at one time. Then answer the questions that follow.

(H stands for a head, T stands for a tail.)



(a) What is the total number of possible outcomes? _____

(b) What is the number of outcome(s) of **getting 3 heads**? _____

You should answer this part with the following sentence patterns:

1. *There are...favourable outcomes in which...comes up..*

2. *The total number of possible outcomes is....*

3. *Therefore, the probability of getting...is....*

(c) i. What is the probability of **getting 3 heads**?

ii. What is the probability of **not getting any heads**?

Part 2

Now work with your partner.

Answer the following question.

What is the sum of all the probabilities obtained in Part 1(c) i. and ii. of both yours and your partners'?

Explain your answer.

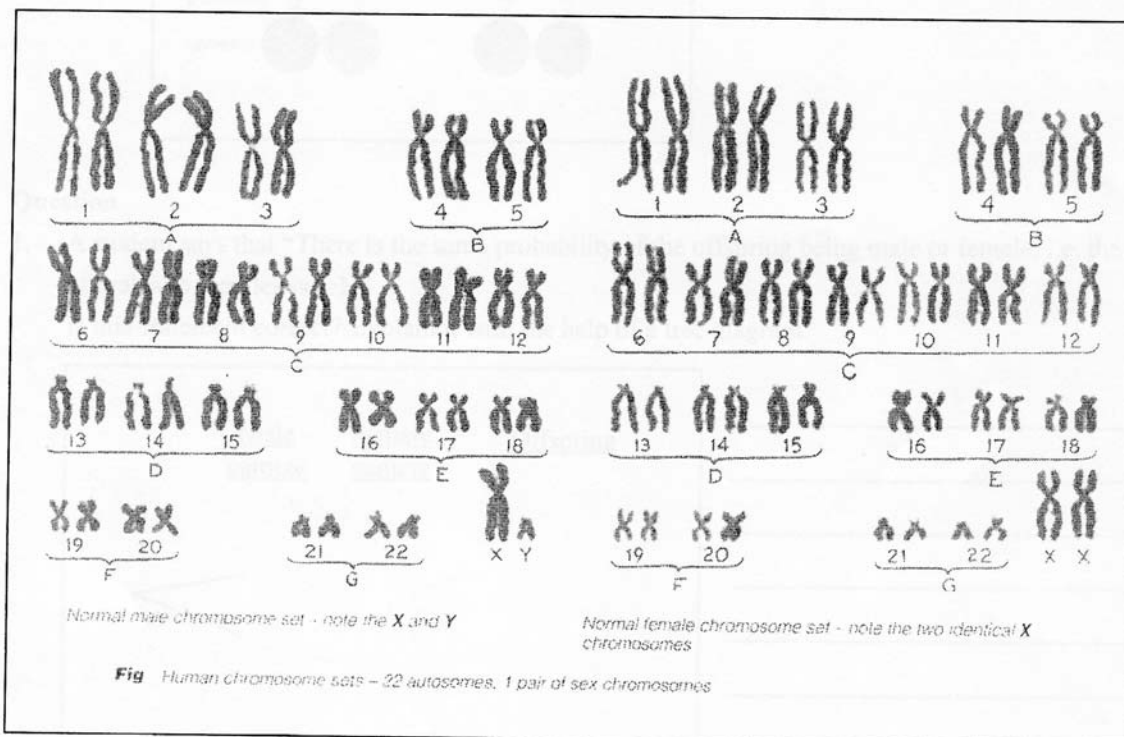
Part 3

Reading and problem-solving

The following is a passage extracted from a textbook in Biology. Read it first. Raise your hand if you have any difficulties in understanding the passage. Then discuss with your partner and answer the questions given.

How is sex determined in humans?

In human beings, there are 23 pairs of chromosomes. Twenty two of these pairs determine general body characteristics. They are called **autosomes** (groups A to G in the figure). The other pair of chromosomes determines the sex. These are the sex chromosomes (see the following figure).



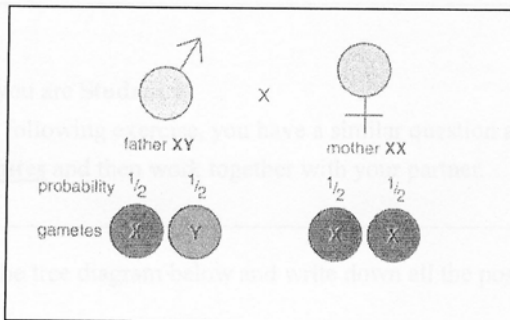
There are two sorts of sex chromosomes: a large one called the **X** chromosome; and a smaller one called the **Y** chromosome. In human beings, females have two X chromosomes (XX). Males have one X and one **Y** chromosome (XY).

The inheritance of sex

Basic Information

The following information is useful for answering the questions.

- i. The father is always XY. The mother is always XX.
- ii. The male produces two sorts of sperms. One half of the sperms will contain the X chromosome. The other half will contain the Y chromosome. The probability of any of these gametes (X or Y) being produced is $1/2$. The female produces one sort of egg. All eggs contain the X chromosome.



Question

1. A student says that "There is the same probability of the human offspring being male or female, i.e. the ratio of males to females is 1:1." Is this statement correct? Explain it with the help of a tree diagram.

<u>Male gamete</u>	<u>Female gamete</u>	<u>Offspring</u>

2. From the tree diagram drawn above, can we say that the male gamete X determines the sex of the child? Explain.

S.2 Mathematics
Calculating probability using a tree diagram
Worksheet for Student B

Name: _____ No.: _____ Class: _____ Date: _____



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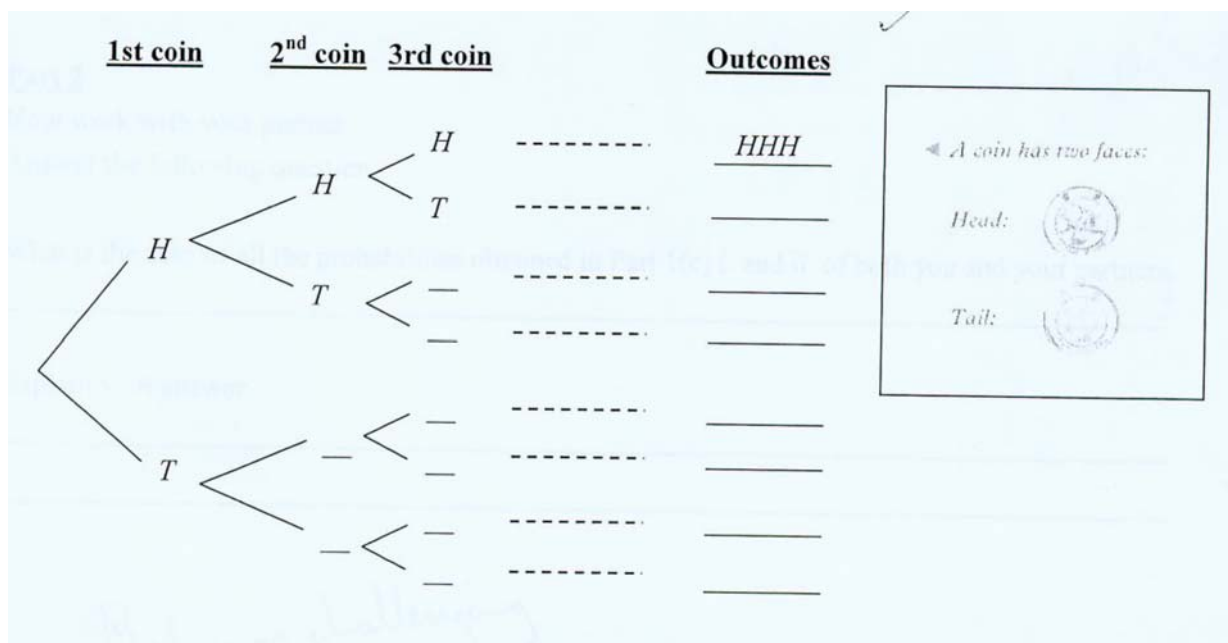
Part 1

- You are **Student B**

In the following exercise, you have a similar question to your partner's. Finish it on your own **within 5 minutes** and then work together with your partner.

Complete the tree diagram below and write down all the possible outcomes for tossing 3 coins at one time. Then answer the questions that follow.

(H stands for a head, T stands for a tail.)



(a) What is the total number of possible outcomes? _____

(b) What is the number of outcome(s) of **getting 3 tails**? _____

You should answer this part with the following sentence patterns:

1. *There are...favourable outcomes in which...comes up..*
2. *The total number of possible outcomes is....*
3. *Therefore, the probability of getting...is....*

(c) i. What is the probability of **getting 2 heads and 1 tail**?

ii. What is the probability of **getting 1 head and 2 tails**?

Part 2

Now work with your partner.

Answer the following question.

What is the sum of all the probabilities obtained in Part 1(c) i. and ii. of both yours and your partners'?

Explain your answer.

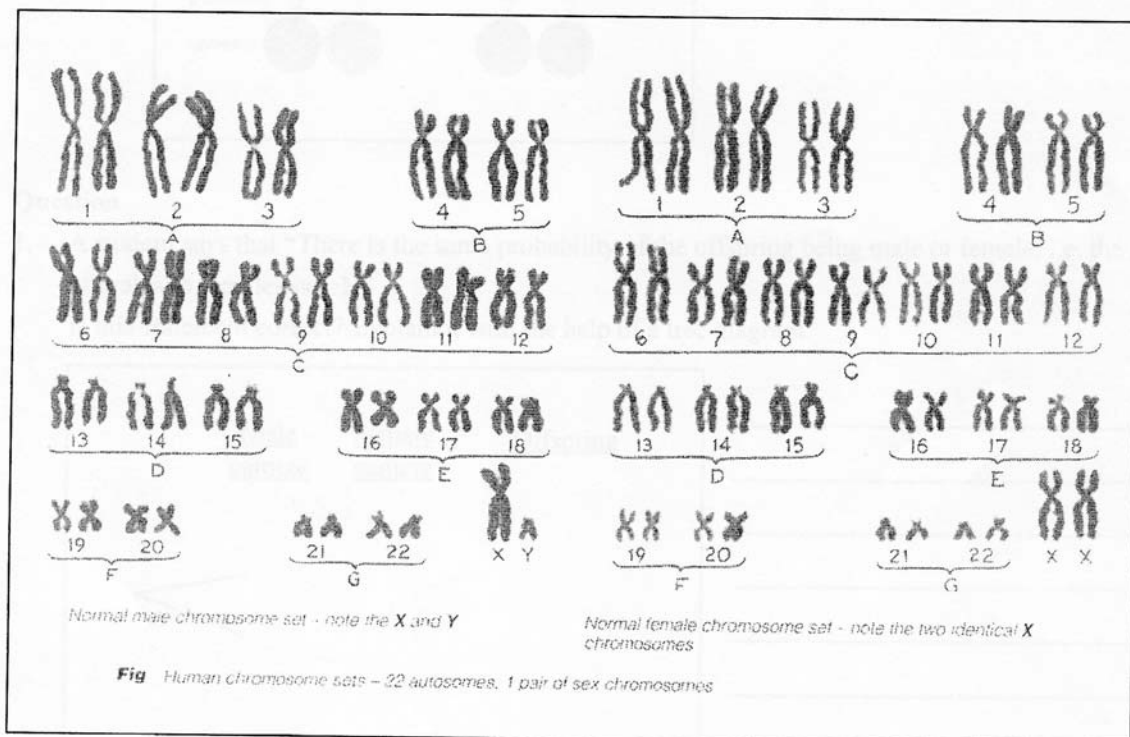
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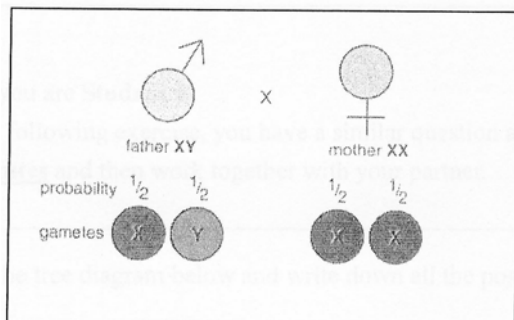
There are two sorts of sex chromosomes: a large one called the **X** chromosome; and a smaller one called the **Y** chromosome. In human beings, females have two X chromosomes (XX). Males have one X and one **Y** chromosome (XY).

The inheritance of sex

Basic Information

The following information is useful for answering the questions.

- The father is always **XY**. The mother is always **XX**.
- The male produces two sorts of sperms. One half of the sperms will contain the **X** chromosome. The other half will contain the **Y** chromosome. The probability of any of these gametes (**X** or **Y**) being produced is $\frac{1}{2}$. The female produces one sort of egg. All eggs contain the **X** chromosome.



Question

- A student says that "There is the same probability of the human offspring being male or female, i.e. the ratio of males to females is 1:1." Is this statement correct? Explain it with the help of a tree diagram.

<u>Male gamete</u>	<u>Female gamete</u>	<u>Offspring</u>
		

- From the tree diagram drawn above, can we say that the male gamete X determines the sex of the child? Explain.
