

# LKPD

## **Lembar Kerja Peserta Didik**

### **KELAS IX SEMESTER GANJIL**

#### **Inheritance of Traits (Heredity)**

NAME :  
CLASS :  
ATTENDANCE NUMBER :  
TIME ALLOCATION :

## learning Outcomes

Learners are able to carefully explain the molecules of trait inheritance, identify the relationship between chromosomes, DNA, genes, RNA, and characteristics of living things, and explain the terms of trait inheritance with the student book. They can also analyze the mechanism of inheritance of trait disorders in humans appropriately using the student book.

## learning Objectives

1. Learners are able to explain the molecules that underlie the inheritance of traits in living things carefully.
2. Learners identify the relationship between chromosomes, DNA, genes, RNA, and characteristics of living things carefully.
3. Learners are able to explain the terms in the inheritance of traits in living things with the student book correctly.
4. Students are able to analyze the mechanism of inheritance of abnormalities in humans using the student book appropriately.

## Pancasila Student Profile

1. Independent
2. Critical thinking
3. Creativity

## EXERCISE TEST

Directions!

Choose one of the most appropriate answers!

1. In a family, the probability of a boy and a girl being born is
  - a. The probability of a girl being born is greater
  - b. The probability of a boy being born is greater
  - c. Equally likely
  - d. The number of girls is greater
  - e. Cannot be determined
2. A woman with normal skin and normal vision has an albino daughter who is color blind. The child inherits the gene
  - a. Albino and color blind from both parents
  - b. Albino and color blind and her father
  - c. Albino and color blind from his mother
  - d. Albino from both parents and color blind from his mother
  - e. Albino from both parents and colorblind from his father
3. Thalassemia is controlled by autosomal dominant alleles. Heterozygous (Thth) genotyped individuals are ....
  - a. Normal
  - b. Normal carrier
  - c. Thalassemia minor
  - d. Thalassemia major
  - e. Lethal

4. A boy is toothless (anodontia) and brachycephalic. In the future, if he has a family, he will inherit this trait to

- Anodontia in girls, brachidactily in boys
- Anodontia in women, brachidactily in boys and girls
- Anodontia in boys, brachidactily in girls
- Anodontia and brachidactily will be inherited in both boys and girls
- Anodontia and brachidactily will be inherited by both boys and girls.

5. In the region of pakistan, there are some adult males who grow hair on their ears. The most correct statement regarding the occurrence of this trait is.....

- Controlled by a recessive gene
- Controlled by dominant genes attached to chromosomes
- Influenced by genes attached to autosomes
- Genes affecting the trait are attached to the X chromosome
- Genes that affect traits are attached to the Y chromosome

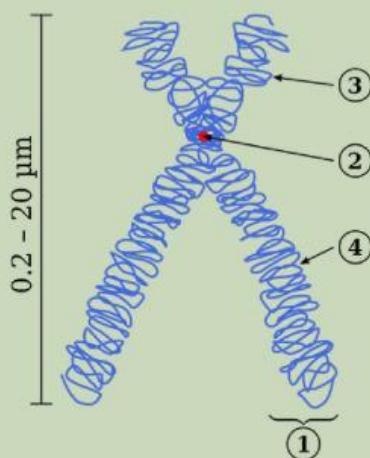
6. Genetic disorders that are linked to autosomes include...

- Color blindness, thalassemia, and sidaktili
- Hemophilia, progeria, and marfan syndrome
- Thalassemia, albino, and cyclemia
- Progeria, polydactily, and toothlessness
- Brachydactily, hypertrichosis, and color blindness

## PART A

# CHROMOSOME

Information about this activity was sourced from the website:



Long Sleeve

Short Sleeve

Chromatids

Centromere

Identify the features below by putting a check mark (✓) as a chromosome feature and a cross (✗) as a non-chromosome feature

1. Size 0.2 to 0.4 microns
2. Can divide
3. Can be seen with the human eye
4. Contains genetic information
5. Consists of protein, DNA, RNA
6. Play a role in cell division

# Working Instructions

1. Identify problems that arise by reviewing the images provided.
2. Collecting data by reading the student book to record important information.
3. Studying the teaching material provided.
4. Answering questions appropriately according to the information.
5. Proving by presenting the answers and other students respond.
6. Summarizing

## PART B

### Activities 1

Look carefully at the picture below.



## Problem Identification

Write down the problems you get after seeing the picture above!

## Activities 2

Read and record important information obtained.

Let's take a look at our own faces, do they resemble your siblings? Has it ever crossed your mind why that is? Where do traits like your skin color, eye shape, nose and mouth come from?

The traits that you have are inherited from both parents, a process known as inheritance. The science that studies this process is known as genetics. George John Mendel was the first person to study genetics.

To understand more about the mechanism of inheritance of traits, please read the student book and open the following link.

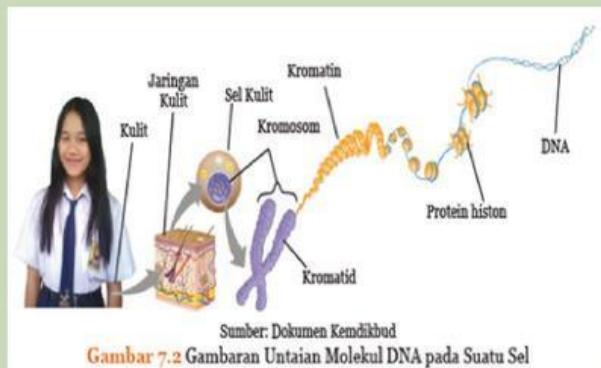
After that, record the important information found to get an explanation related to the problems identified in the previous stage.

## TEACHING MATERIAL

Every individual has diverse characteristics. These characteristics are inherited from parents to offspring through the process of interbreeding. These characteristics are carried by hereditary inheritance factors called genes, which are located in the cell nucleus. In cells that do not have a nucleus, genes are located in a part called the nucleoid, which is an area in the cell that contains genetic material. The discovery of genes was made by Crick and Watson in 1953.

## 1. Genes and Chromosomes

Genes are the basic unit of inheritance of traits in living things. Genes are stored in special positions in chromosomes. Physically, genes are codes in an organism's genetic material, known as DNA molecules or RNA in some viruses. In the structure of DNA, a gene includes a sequence of nucleotide bases that code for exon genetic information and regions that do not code for intron genetic information. Gene expression is affected by the internal and external environment of the organism, and the results of gene expression are important for the formation of proteins required at different levels of organization, such as cells, tissues, organs, or the whole organism.



Genes are located inside structures called chromosomes. Chromosomes are macromolecular structures composed of DNA and other molecules, where genetic information is stored. Chromosomes have two main parts, the centromere (the round-shaped center of the chromosome) and the chromosome arm, which contains the chromoneme and a pair of genes. The properties of chromosomes include being visible only at cell division, being between 0.2 to 40 microns long, having only one chromosome in prokaryotic cells, being located in the nucleus of eukaryotic cells, and having a chemical makeup involving proteins, DNA, and RNA, including histones and nonhistones. Chromosomes also involve enzymes involved in DNA and RNA synthesis.

## 2. DNA

DNA is a complex chemical molecule made up of four types of components, called nucleotides. DNA has a twisted double chain shape, forming a double helix structure. DNA is the most crucial chemical substance in living things because it carries all the genetic information that is passed on from one generation to the next. Gene information in DNA is passed on in the form of nucleotide sequences that are specific to each gene.

## 3. RNA

RNA, similar to DNA in its role as a genetic compound, is shorter in size. RNA consists of a single chain, with the pentose sugar that makes it up called ribose sugar. The nitrogenous bases that make up RNA consist of purines (adenine and guanine) and pyrimidines (cytosine and uracil). RNA is formed through a process involving DNA in the cell nucleus.

### Activities 3

After studying the teaching material, then answer the questions below appropriately according to the information.

1. What is meant by:

a. Gene

Answer:

b. Chromosomes

**Answer:**

c. DNA

**Answer:**

d. RNA

**Answer:**

2. List the functions of genes in inheriting traits

**Answer:**

3. Mention the properties of chromosomes

**Answer:**

4. List the differences between DNA and RNA

Objects	DNA	RNA
Location		
Shape		
Sugar Component		
Size		
Nitrogen Bases		
Level		
Function		

5. Who was the first to discover the concept of genetics?  
What was his reason for using pea beans in the investigation of genetic traits?

Answer:

## PART C

Pair the inheritance term with the correct answer by drawing a line.

Alleles

A gene that is able to mask its recessive allele

Genotype

Genes that do not outcompete each other or have equally strong effects

Heterozygous

Pairs of genes that have different alleles, e.g. Aa

Intermediates

Genes located on homologous chromosomes

Dominant

Properties of living things that are not visible and therefore cannot be observed

## PART D

# TRAIT DEFECTS IN HUMAN

### Activities 4

- Pull out the orange box and place it in the corresponding empty green box.
- Answer the questions.

Albino



Normal

is determined by  
the gene

Aa

Normal  
carrier

is determined by  
the gene

aa

Albino

is determined by  
the gene

AA

Is Albino linked to the sex chromosome?

## PART E

### Activities 5

Look for terms related to inheritance of traits in the box provided by clicking on the letters based on the term in the blue box!

Y	G	S	M	L	H	D	U	E	C	E	E	X	Q	C
M	F	D	B	N	I	N	Y	X	F	M	G	L	A	H
D	C	I	A	R	B	J	O	L	O	Y	A	Z	R	E
I	D	H	B	Q	S	I	M	S	F	I	E	A	E	T
R	K	Y	U	G	P	L	O	D	L	P	T	L	C	E
B	H	B	L	T	E	M	V	L	Y	N	I	L	E	R
Y	Y	R	N	A	O	N	I	T	A	N	P	E	S	O
H	O	I	A	R	T	F	O	N	G	Y	I	L	S	Z
O	G	D	O	U	V	N	I	T	Q	C	D	E	I	Y
N	W	H	R	T	E	M	E	H	Y	M	E	S	V	G
O	C	X	Y	H	O	M	K	R	H	P	N	A	E	O
M	A	N	P	D	M	A	U	L	A	U	E	T	R	U
K	Y	U	S	R	I	L	I	D	A	P	G	O	U	S
L	M	H	O	M	O	Z	Y	G	O	U	S	E	L	O
Z	I	N	T	E	R	M	E	D	I	A	T	E	S	M

Parental

Alleles

Hybrid

Fillial

Phenotype

Chromosomes

Dominant

Genotype

Intermediates

Recessive

Homozygous

Monohybrid

Gene

Heterozygous

Dihybrid

## PROOF

Each student presents his/her answer and other friends give responses or comments.

## CONCLUSION

Answer:

**THANK YOU**

