V.M.V.V Sangha's

V.M. K. S. R. Vastrad Arts Science And V.S Bellihal Commerce college, Hungund

Department of Botany Year 2021-2022

Project reports by B.sc VI semester students

Principal
Vijaya Mahantesh Krupaposhit
S.R.Vastrad Arts, Science & V.S.Bellihal
Commerce College, Hungund-587118

Sl.no	Student Name	Reg.No	Project topic
1	Amaresh kumbar	S1937006	Transgenic plants
2	Aruna k	S1937009	Polymerasechain reaction
3	Bharat	S1937018	Transgenic plants
4	Chanchal	S1937020	Transgenic plants
5	Deepa	S1937022	Transgenic plants
6	Kavita	S1937037	Transgenic plants
7	Meharunnisa	S1937051	Transgenic plants
8	Nagaraj	S1937054	Transgenic plants
9	Prem	S1937066	Transgenic plants
10	Reshma	S1937072	Transgenic plants
11	Sangeeta	S1937076	Transgenic plants
12	Satish	S1937078	Transgenic plants
13	Sharanbasava	S1937082	Transgenic plants
14	Shilpa	S1937085	Polymerase chain reaction
15	Shridhar	S1937089	Transgenic plants
16	Tejaswini	S1937098	Transgenic plants
17	Vijayalaxmi	S19370104	Transgenic plants

Botany
Head of the Department
V.M.K.S.R Vastrad Arts, Commerce And
Science College, Hungund Dist: Bagalkot

V M K S R VASTRAD ARTS, SCIENCE, V S BELLIHAL COMMERCE COLLEGE HUNGUND

PROJECT REPORT

College roll no: 06

Examination seat no: S1937018

CERTIFICATE

This is to certify that Mr:Bharata N Badiger of BSc 5th semester has satisfactory completed the project report in Botany subject as prescribed by Rani Chennamma University Belagavi.

During year 2021-2022

Head Dept of Botany

Examiner:

1)

2) 14/07/22

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V M K S R VASTRAD ARTS, SCIENCE &
V S BELLIHAL COMMERCE COLLEGE
HUNGUND

AIMS & STRATERIES FOR DEVELOPMENT OF TRANSGENIC PLANT

PROJECT DONE BY

BHARATA N BADIGER

BSc 5th Sem

Botany

Rani Chennamma University Belagavi

2021-2022

Aims and stratergies For Development Transgenic Plant

Introduction of Transgenic plant :

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There are several methods which are used in gene transfer

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All these approaches led to the development of transgenic Crop plants of economic importance .

More than 1000 field trial tests with transgenic Crop plant have been conducted some of the commercially grown transgenic crop plants in developed countries are Flavr Savri & Endless summer tomatoes Freedom II Squash High – lauric rapeseed (canola and Round up Ready Soyabean etc

- In 1994 the European Union approved by the US Environmental protection Agency making it the Country's first pesticide producing crop
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- In 2000 – Vitamin A -Enriched golden rice ,was the first food with increased nutrient value .

Modification of DNA using genetic Engineering techniques

Aim is to introduce a new trait to the plant

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The inserted Sequence is known as the transgene

The purpose of inserting a combination of genes in a plant so as to make it as useful and productive as possible

Examples in food crops include resistance to certain pests , diseases ,or Environmental conditions ,reduction of spoilage, or resistance to chemical treatments or improving the nutrient profile of the crop .

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Desirable genes may provide features such as higher yield or improved quality ,pest or disease resistance or tolerance to heat ,cold and drought

Transgenic technology enables plant breeders together in one plant useful genes form a wide range of living sources

Generate more useful and productive crop varieties containing new combinations of genes

Transgenic plant

The plant containing an inserted foreign DNA is called transgenicplant .

The process of production of a transgenic plant is transgenesis .

The Following are some transgenic plants

- Transgenic plants with nif genes
- Transgenic tobacco plants
- Transgenic tobean

Transgenic plants are created by applying genic Engineering techniques .

- The Desired DNA and plasmids are treated with a restriction Enzyme. The cleaved desired DNA and plasmid are mixed. DNA ligase Enzyme is added to this mixture. Now the desired DNA is joined with the plasmid to produce a recombinant DNA .
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a) **Herbicide Resistance**

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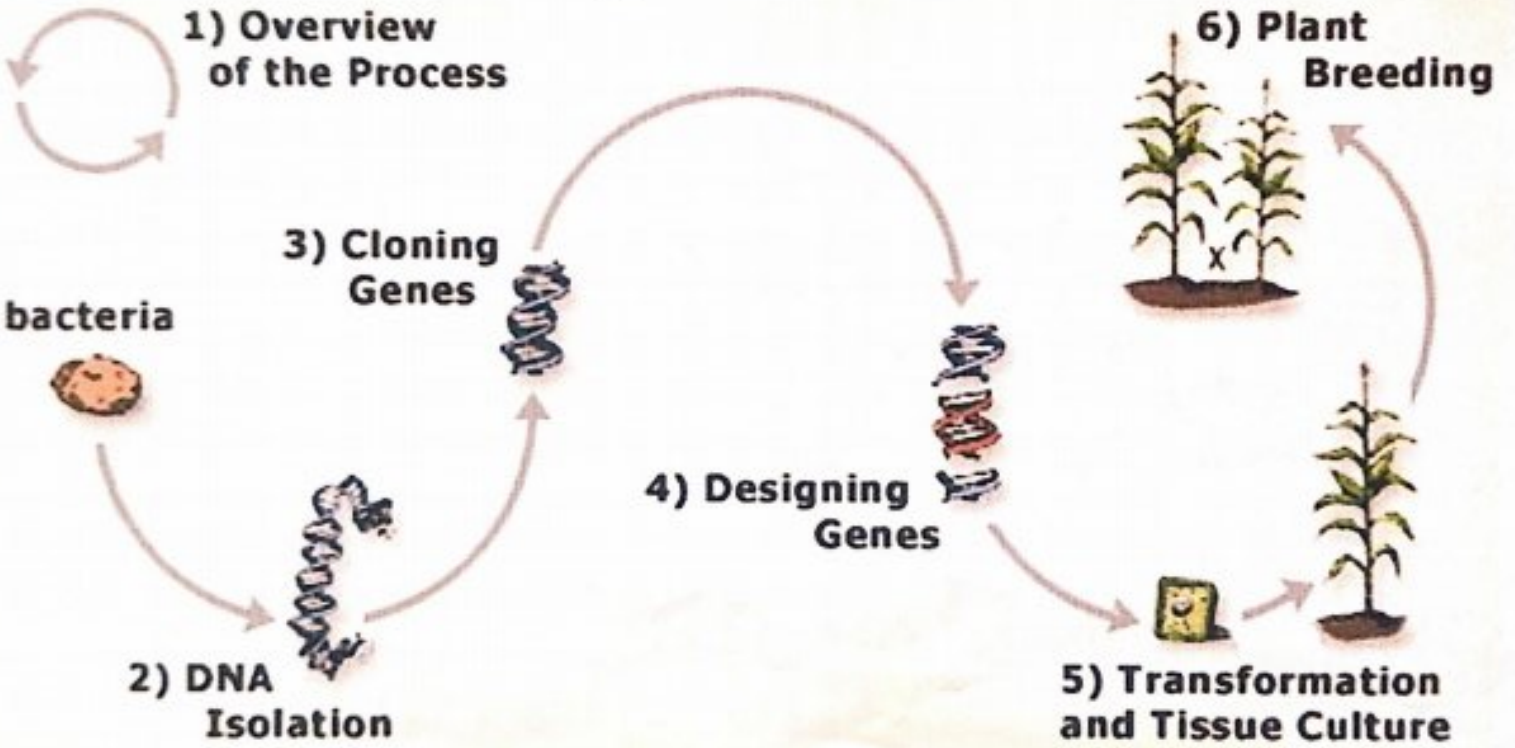

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- Many transgenic plants with herbicide resistance have been developed by using genetic engineering .
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EX :- Glyphosate resistant petunia ,tobacco tomato

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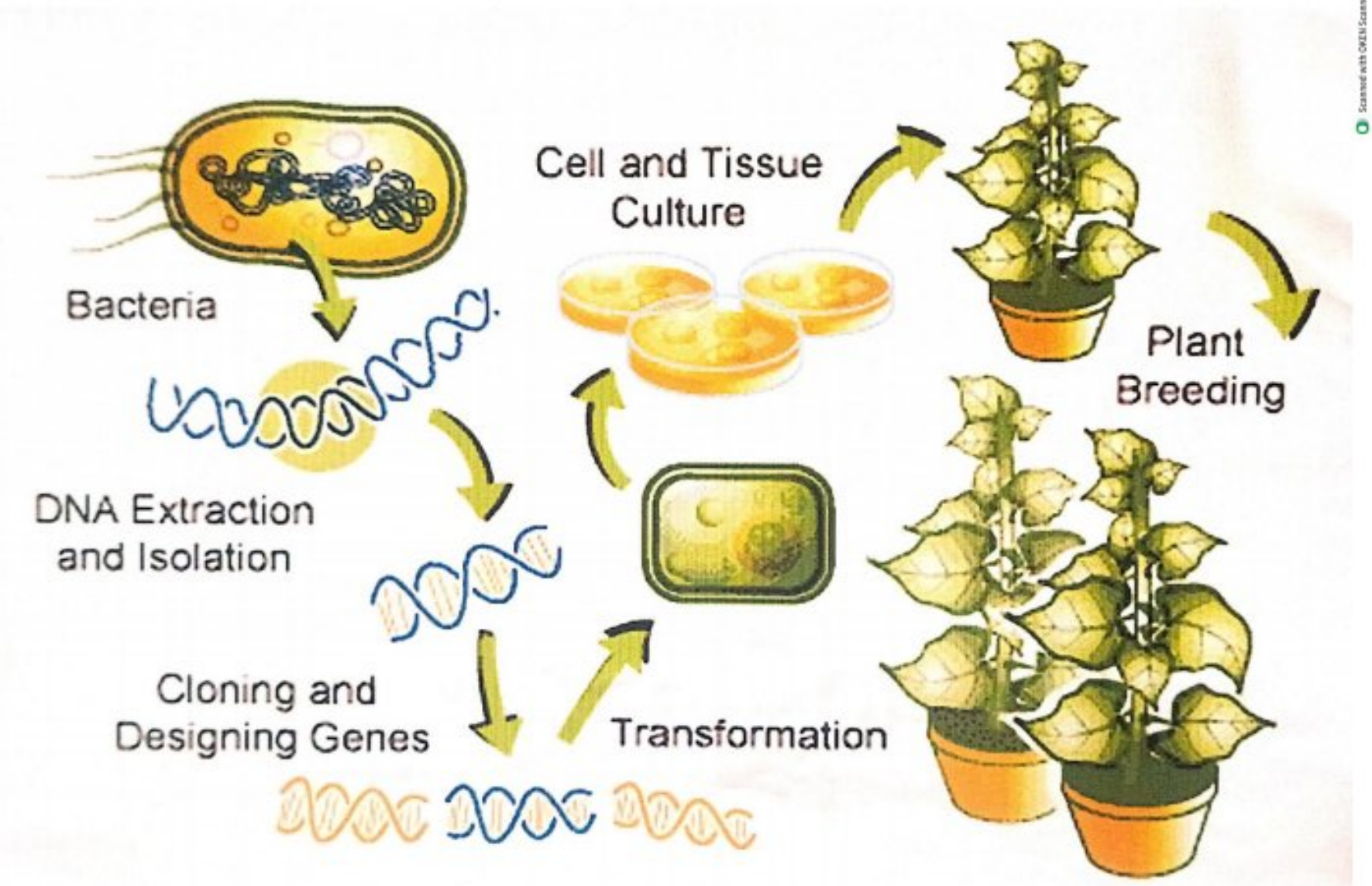

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Many economically important crop species like cotton pigeon pea , cassava ,groundnut etc fall under this group

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V M K S R VASTRAD ARTS, SCIENCE, V S BELLIHAL COMMERCE COLLEGE HUNGUND

PROJECT REPORT

College roll no: 36

Examination seat no: S1937006

CERTIFICATE

This is to certify that Mr: Amaresh M Kumbar of BSc 5th semester has satisfactory completed the project report in Botany subject as prescribed by Rani Chennamma University Belagavi.

During year 2021-2022

Examiner: Head Dept of Botany

1) 15/2/22

2) 15/2/22

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V S BELLIHAL COMMERCE COLLEGE
HUNGUND

AIMS & STRATERIES FOR DEVELOPMENT OF TRANSGENIC PLANT

PROJECT DONE BY

AMARESH M KUMBAR

BSc 5th Sem

Botany

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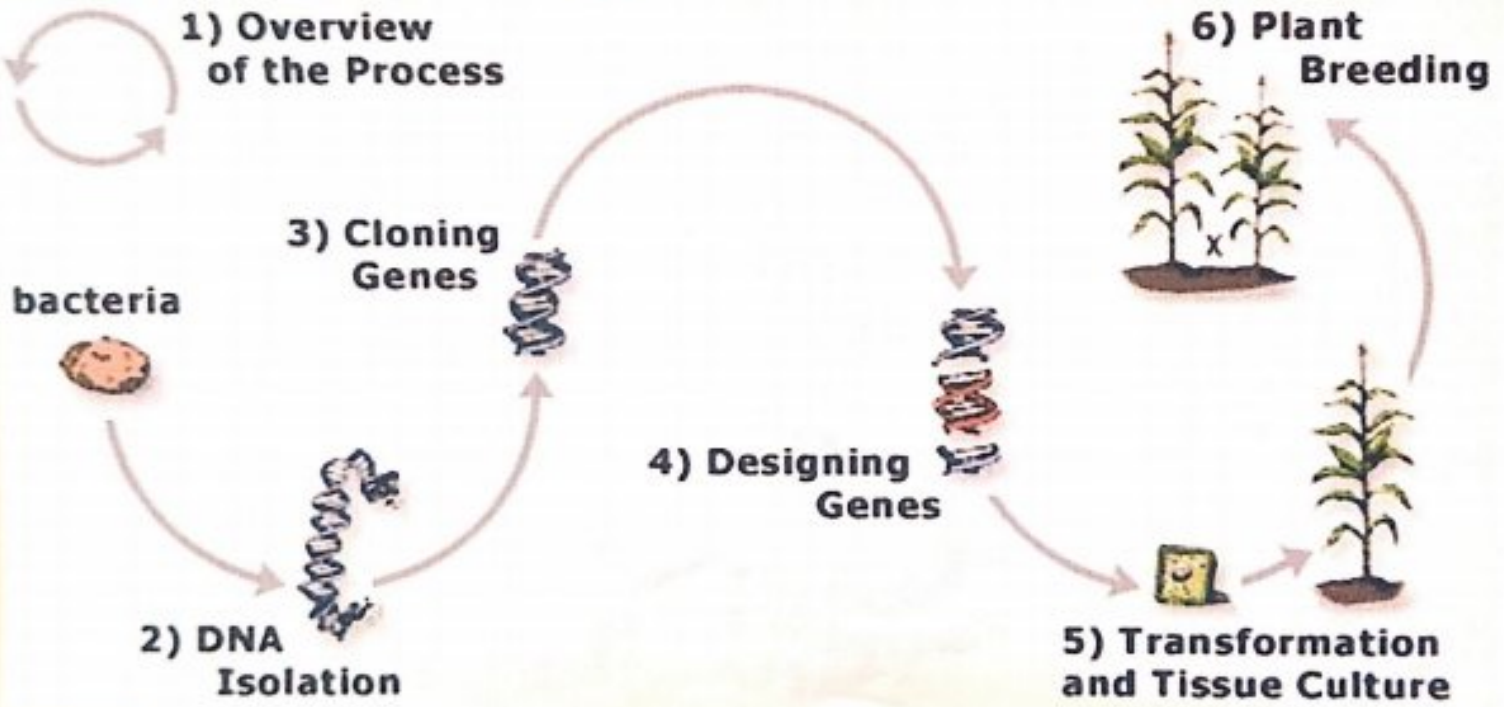

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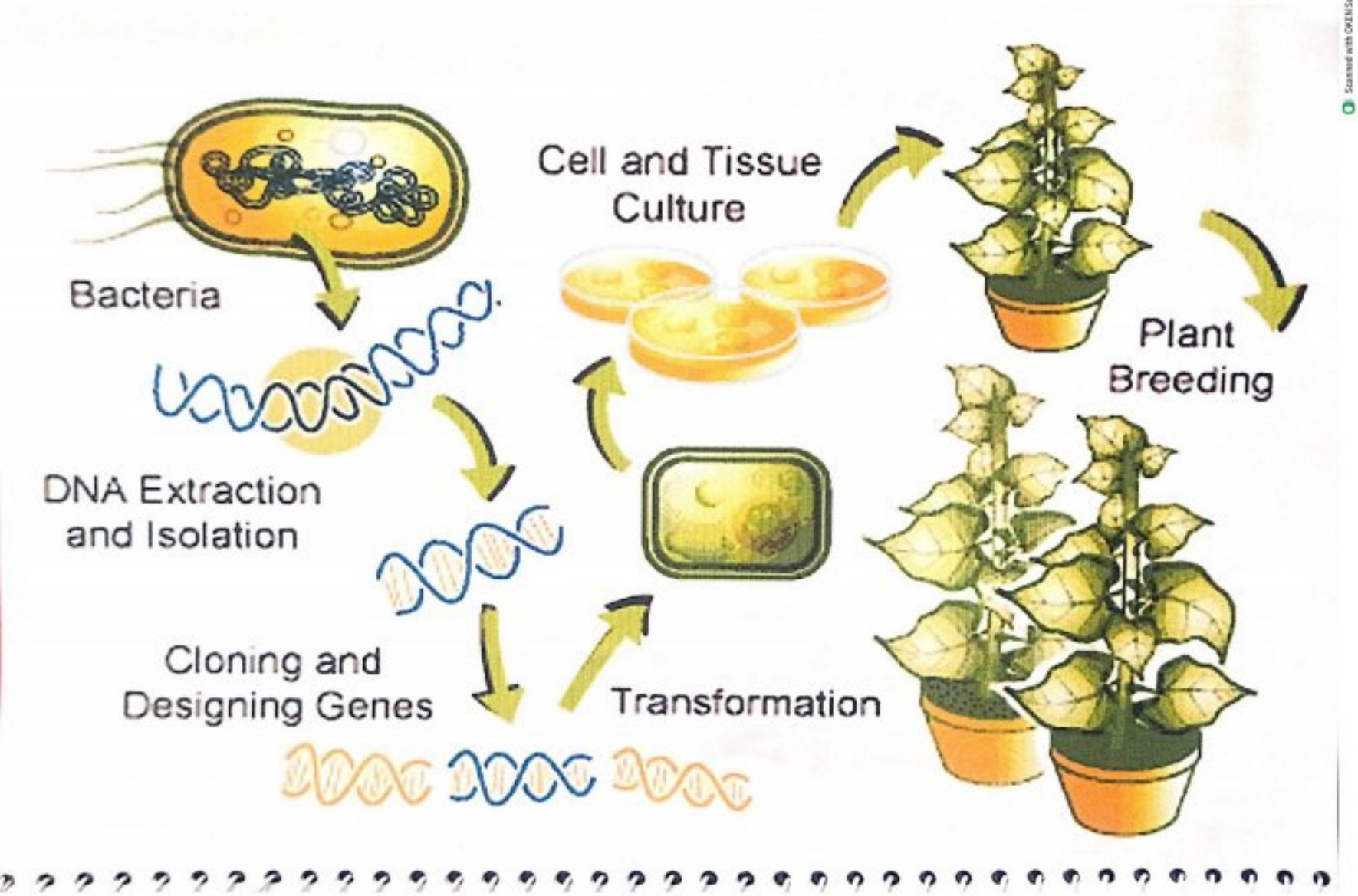

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V M K S R VASTRAD ARTS, SCIENCE &

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HUNGUND

AIMS & STRATERIES FOR DEVELOPMENT OF TRANSGENIC PLANT

PROJECT DONE BY

KAVITA S MADAR

BSc 5th Sem

Botany

Rani Chennamma University Belagavi

2021-2022

V M K S R VASTRAD ARTS, SCIENCE, V S BELLIHAL COMMERCE COLLEGE HUNGUND

PROJECT REPORT

College roll no: 04

Examination seat no: S1937037

CERTIFICATE

This is to certify that Mr: KAVITA S MADAR of BSc 5th semester has satisfactory completed the project report in Botany subject as prescribed by Rani Chennamma University Belagavi.

During year 2021-2022

Examiner: Head Dept of Botany

1) 15/2/22

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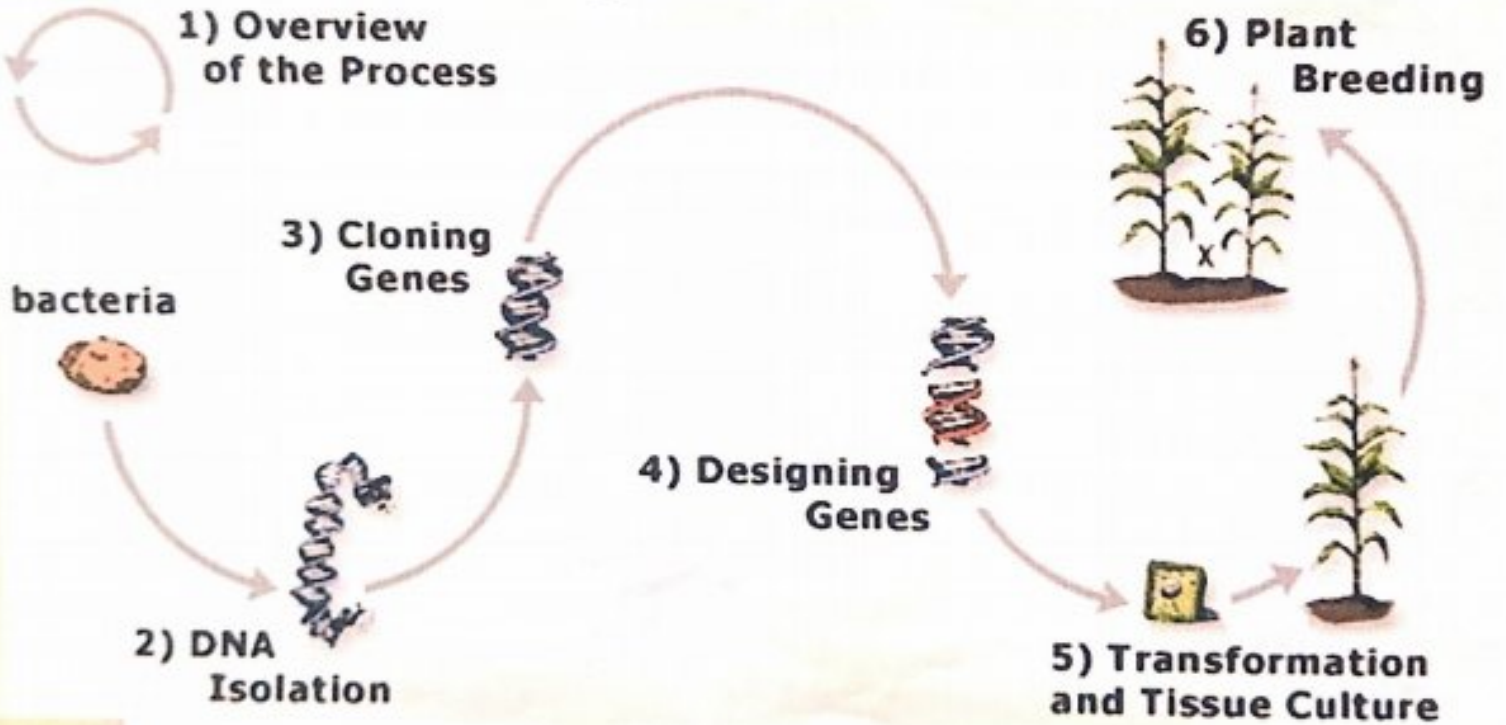

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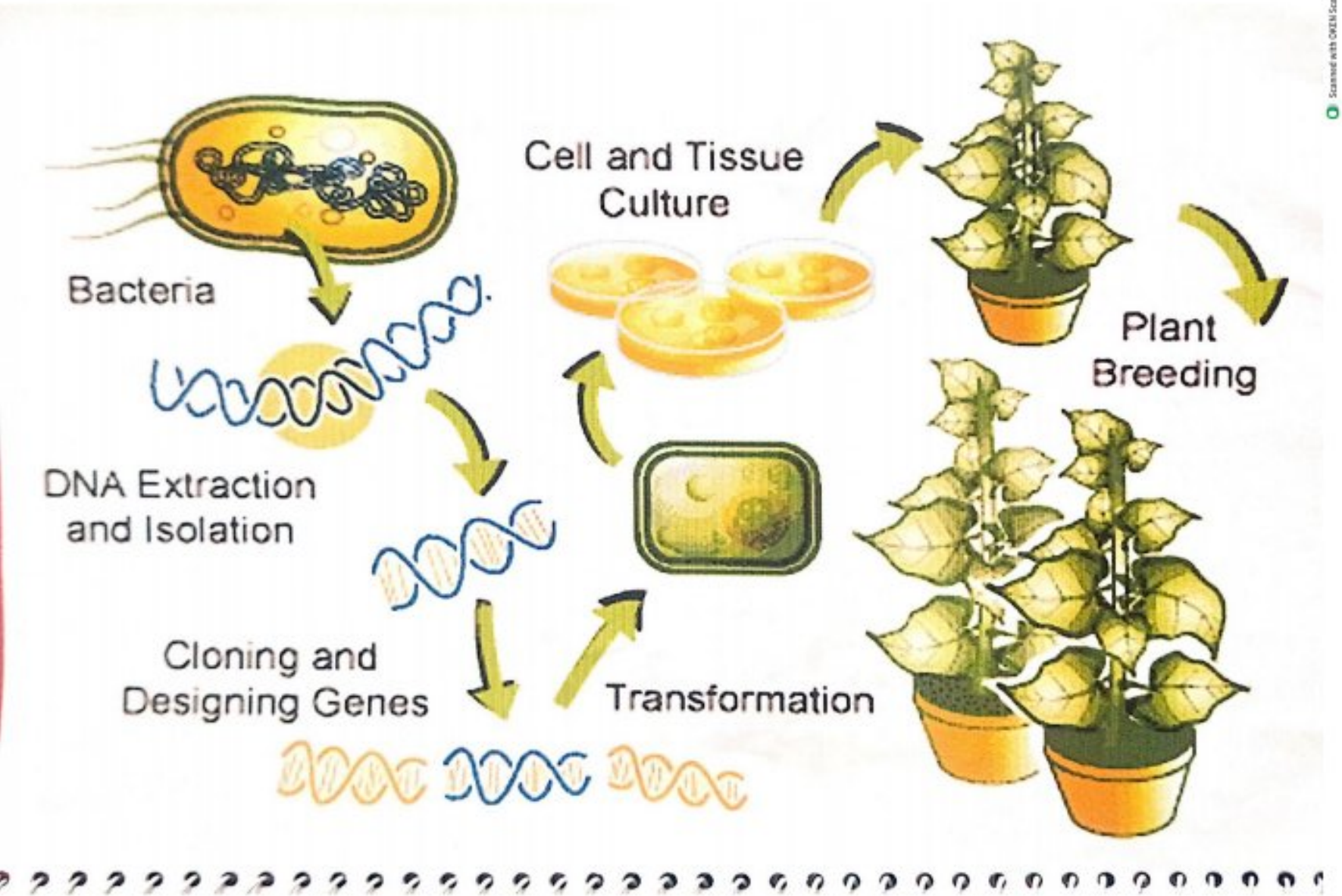

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HUNGUND

PROJECT REPORT

College roll no: 85

Examination seat no: S1937022

CERTIFICATE

This is to certify that Miss: Deepa Hampannavar of BSc 5th semester has satisfactory completed the project report in Botany subject as prescribed by Rani Chennamma University Belagavi.

During year 2021-2022

Head Dept of Botany

Examiner:

1)

2) 16/12/22

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PROJECT DONE BY

DEEPA HAMPANNAVAR

BSc 5th Sem

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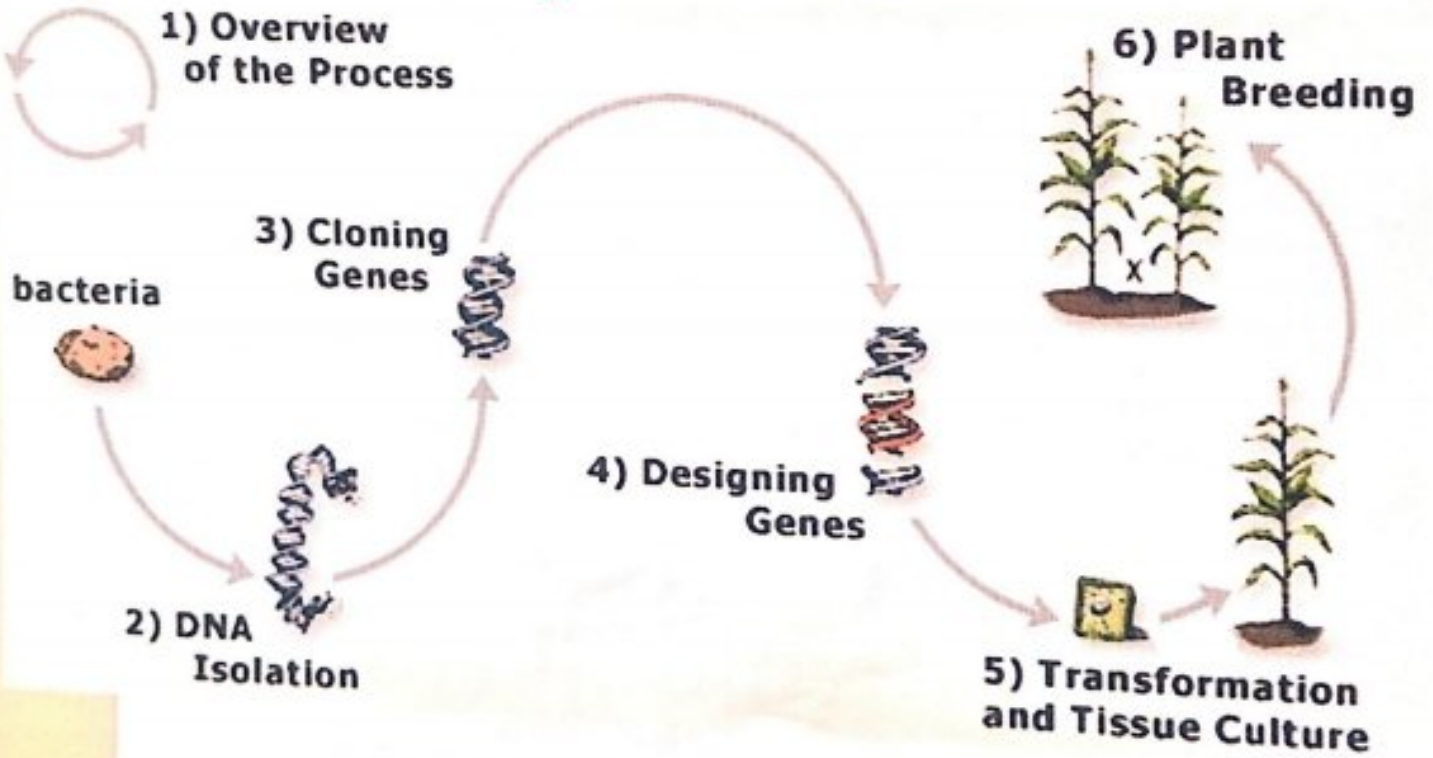

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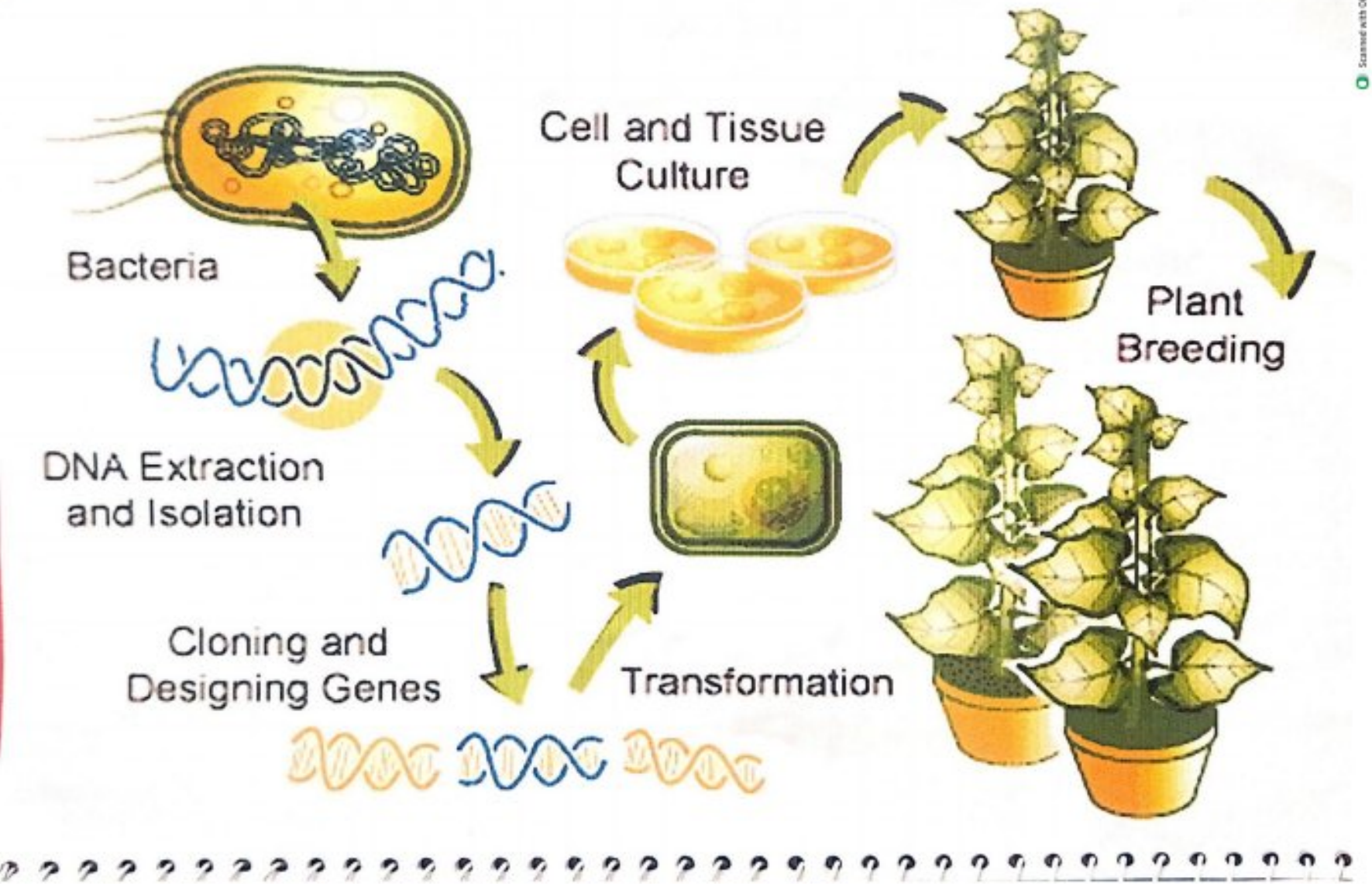

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V M K S R VASTRAD ARTS, SCIENCE,
V S BELLIHAL COMMERCE COLLEGE
HUNGUND

PROJECT REPORT

College roll no: 53

Examination seat no: S1937020

CERTIFICATE

This is to certify that Miss:chanchalaS Vaishnavof BSc 5th semester has satisfactory completed the project report in Botany subject as prescribed by Rani Chennamma University Belagavi.

During year 2021-2022

Head Dept of Botany

Examiner:

1) 15/2/22

2) 15/2

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V M K S R VASTRAD ARTS, SCIENCE &
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HUNGUND

AIMS & STRATERIES FOR DEVELOPMENT OF TRANSGENIC PLANT

PROJECT DONE BY

CHANCHAL S VAISHNAV

BSc 5th Sem

Botany

Rani Chennamma University Belagavi

2021-2022

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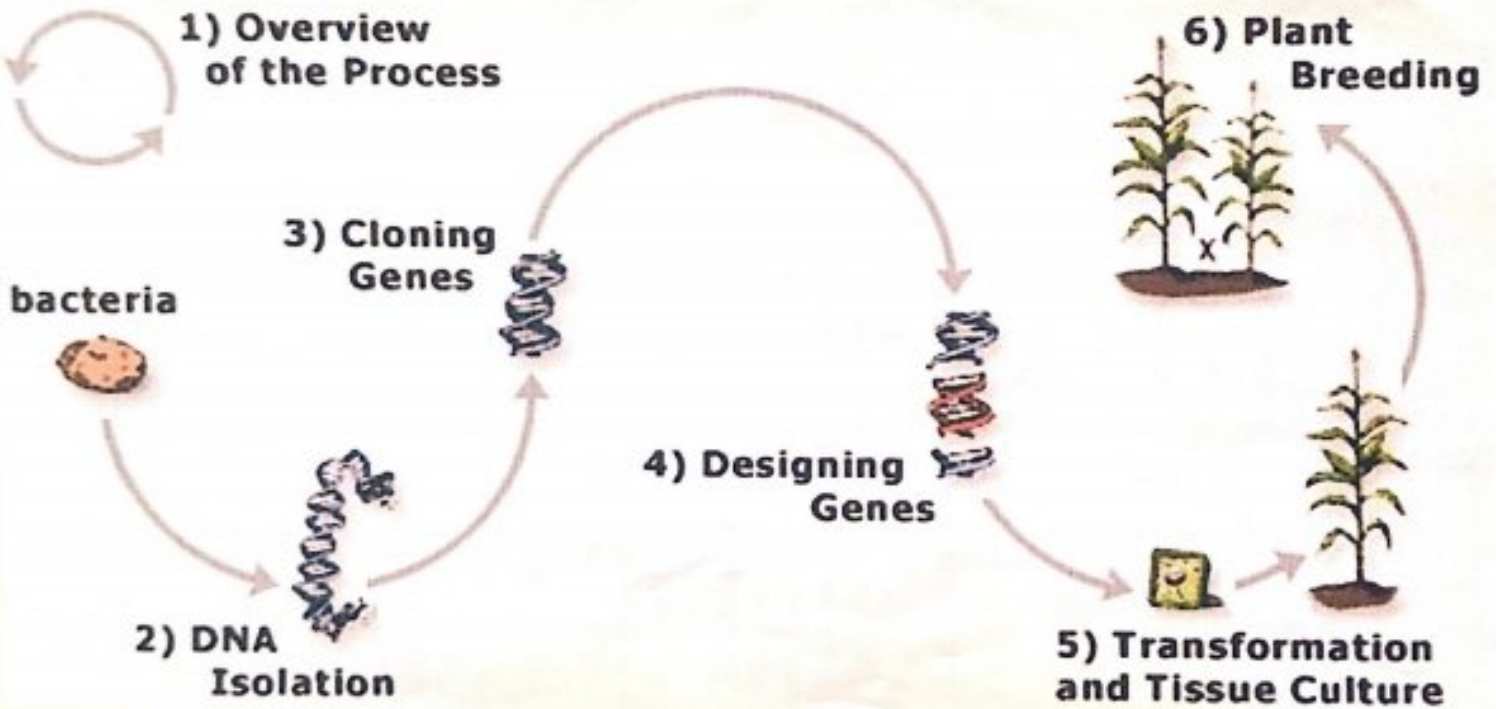

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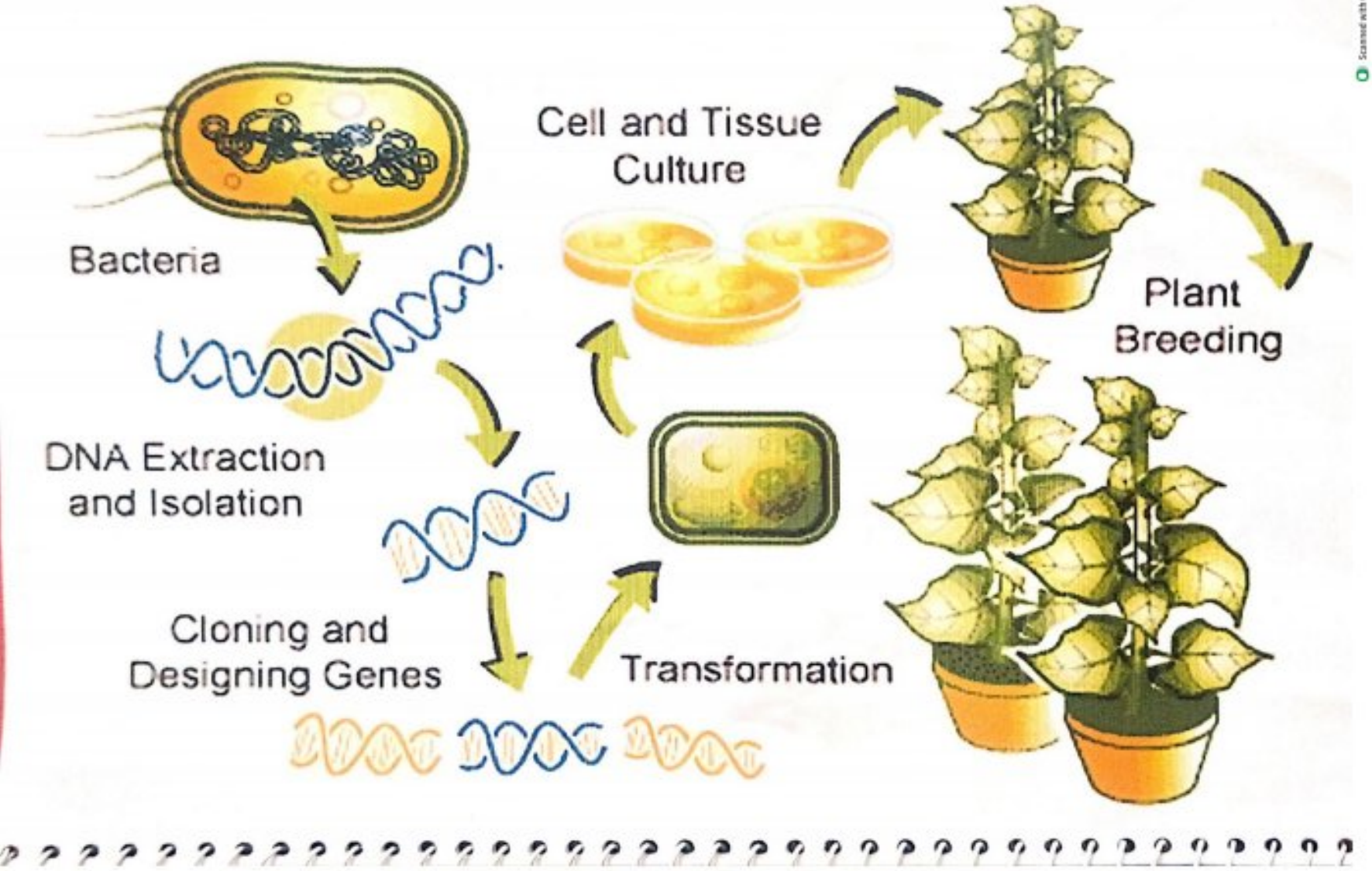

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HUNGUND

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PROJECT DONE BY

Meharunnisa Talikoti

BSc 5th Sem

Botany

Rani Chennamma University Belagavi

2021-2022

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PROJECT REPORT

College roll no: 56

Examination seat no: S1937051

CERTIFICATE

This is to certify that Miss: Meharunnisa Talikoti of BSc 5th semester has satisfactory completed the project report in Botany subject as prescribed by Rani Chennamma University Belagavi.

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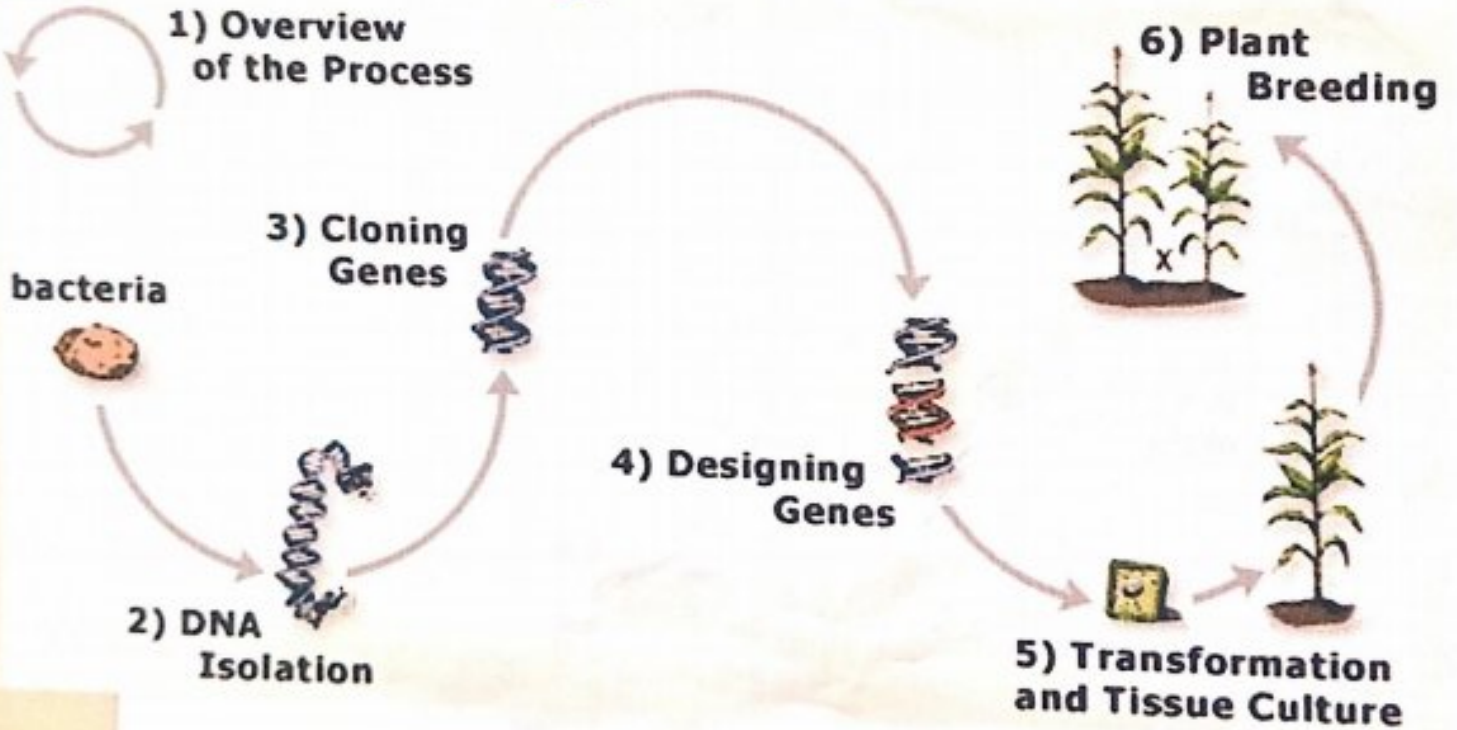

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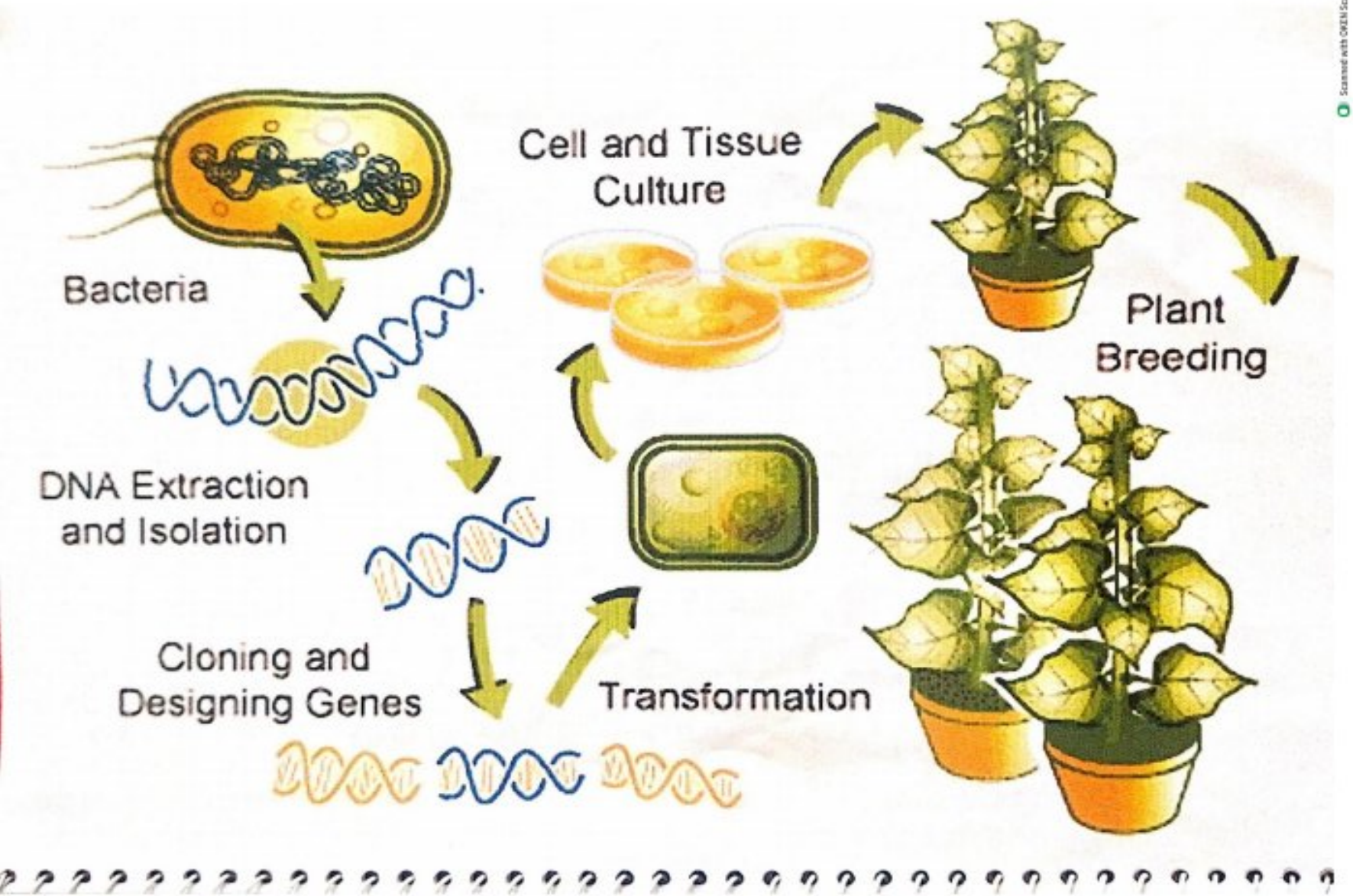

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PROJECT REPORT

College roll no: 48

Examination seat no: S1937054

CERTIFICATE

This is to certify that Mr: Nagaraj B shilavantarof BSc 5th semester has satisfactory completed the project report in Botany subject as prescribed by Rani Chennamma University Belagavi.

During year 2021-2022

Examiner:

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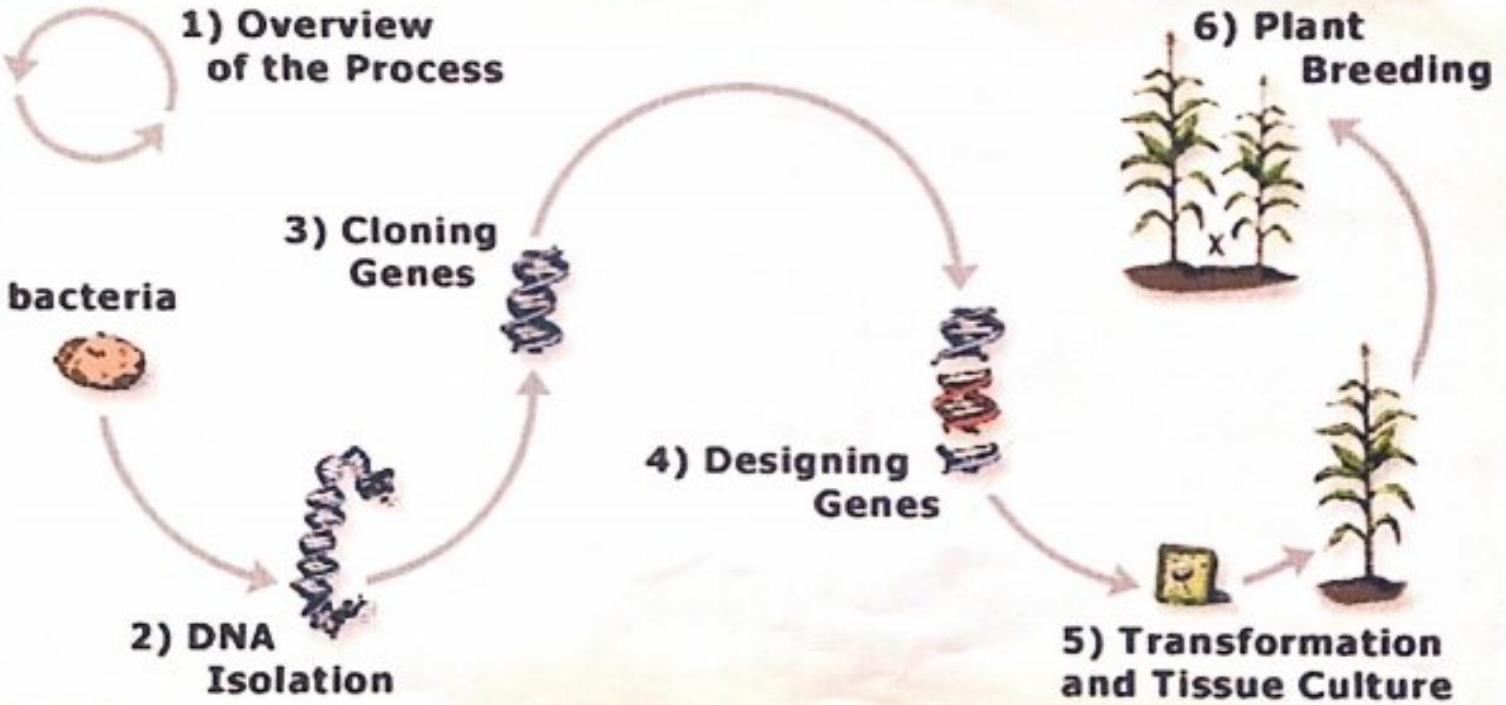

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V M K S R VASTRAD ARTS, SCIENCE, V S BELLIHAL COMMERCE COLLEGE HUNGUND

PROJECT REPORT

College roll no: 22

Examination seat no: S1937072

CERTIFICATE

This is to certify that Miss: Reshma S Hosamath of BSc 5th semester has satisfactory completed the project report in Botany subject as prescribed by Rani Chennamma University Belagavi.

During year 2021-2022

Examiner: Head Dept of Botany

1) 15/2

2) 15/2/22

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V M K S R VASTRAD ARTS, SCIENCE &

V S BELLIHAL COMMERCE COLLEGE

HUNGUND

AIMS & STRATERIES FOR DEVELOPMENT OF TRANSGENIC PLANT

PROJECT DONE BY

RESHMA S HOSAMATH

BSc 5th Sem

Botany

Rani Chennamma University Belagavi

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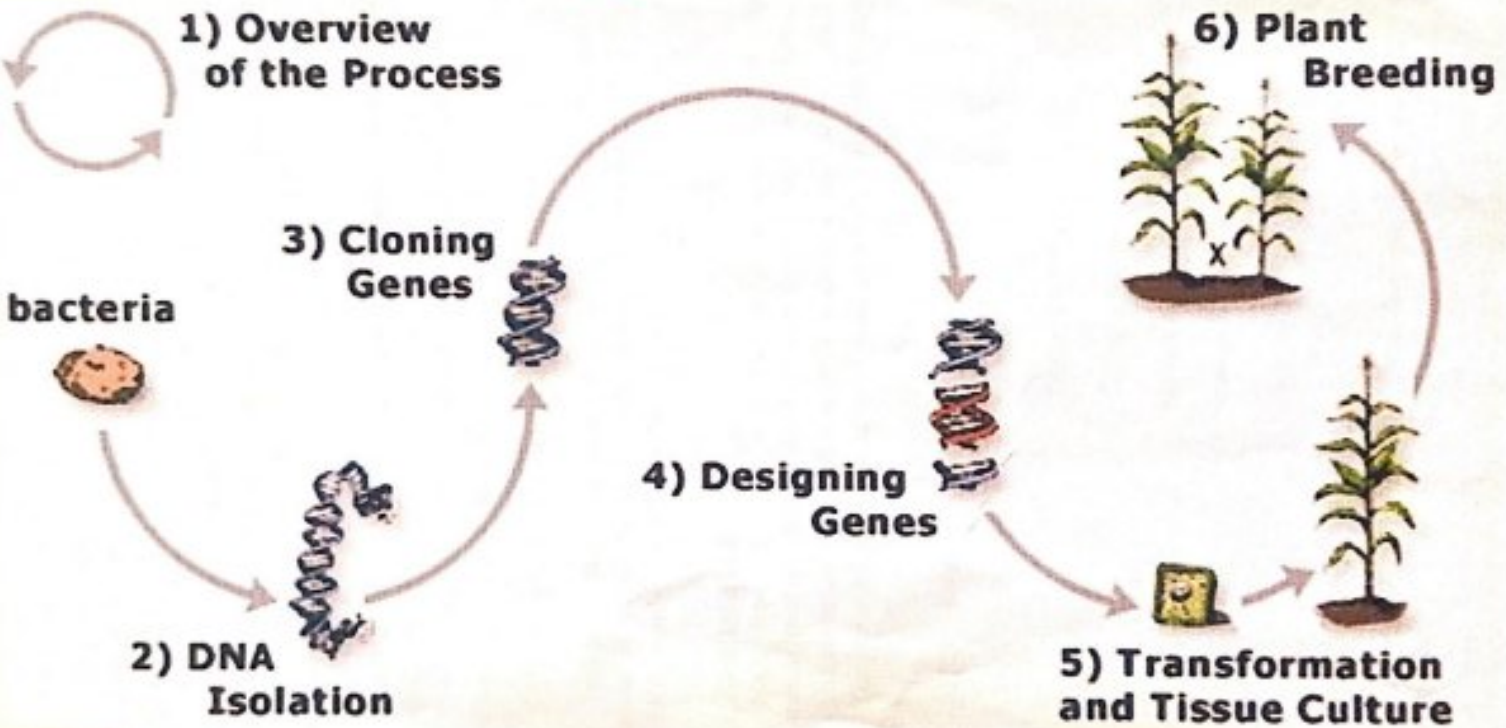

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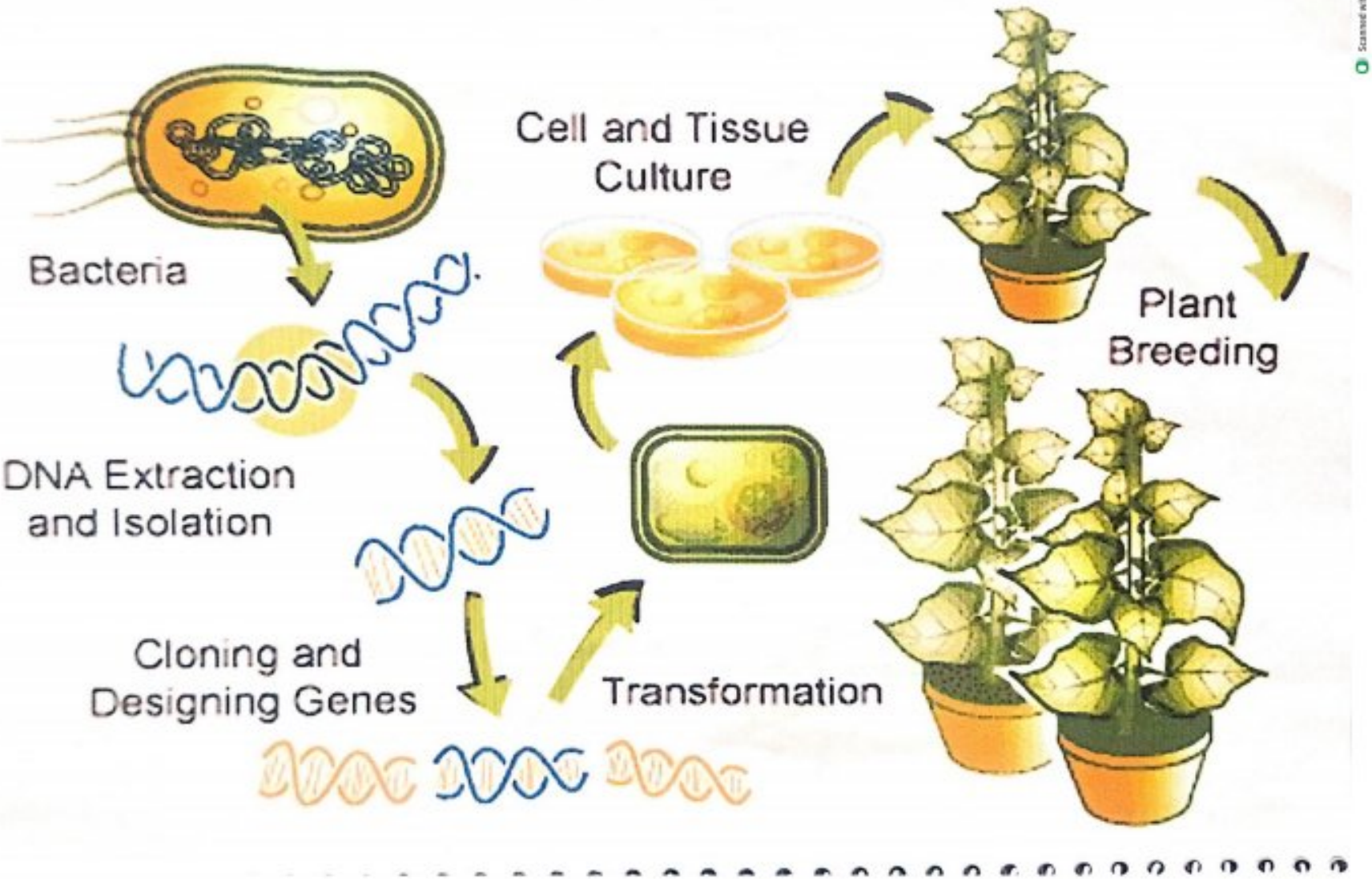

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V M K S R VASTRAD ARTS, SCIENCE &
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HUNGUND

AIMS & STRATERIES FOR DEVELOPMENT OF TRANSGENIC PLANT

PROJECT DONE BY

SANGEETA Y WALIKAR

BSc 5th Sem

Botany

Rani Chennamma University Belagavi

2021-2022

/ M K S R VASTRAD ARTS, SCIENCE,
V S BELLIHAL COMMERCE COLLEGE
HUNGUND

PROJECT REPORT

College roll no: 51

Examination seat no: S1937076

CERTIFICATE

This is to certify that Miss:Sangeeta y walikar of BSc 5th semester has satisfactory completed the project report in Botany subject as prescribed by Rani Chennamma University Belagavi.

During year 2021-2022

Head Dept of Botany

Examiner:

1) 15/2

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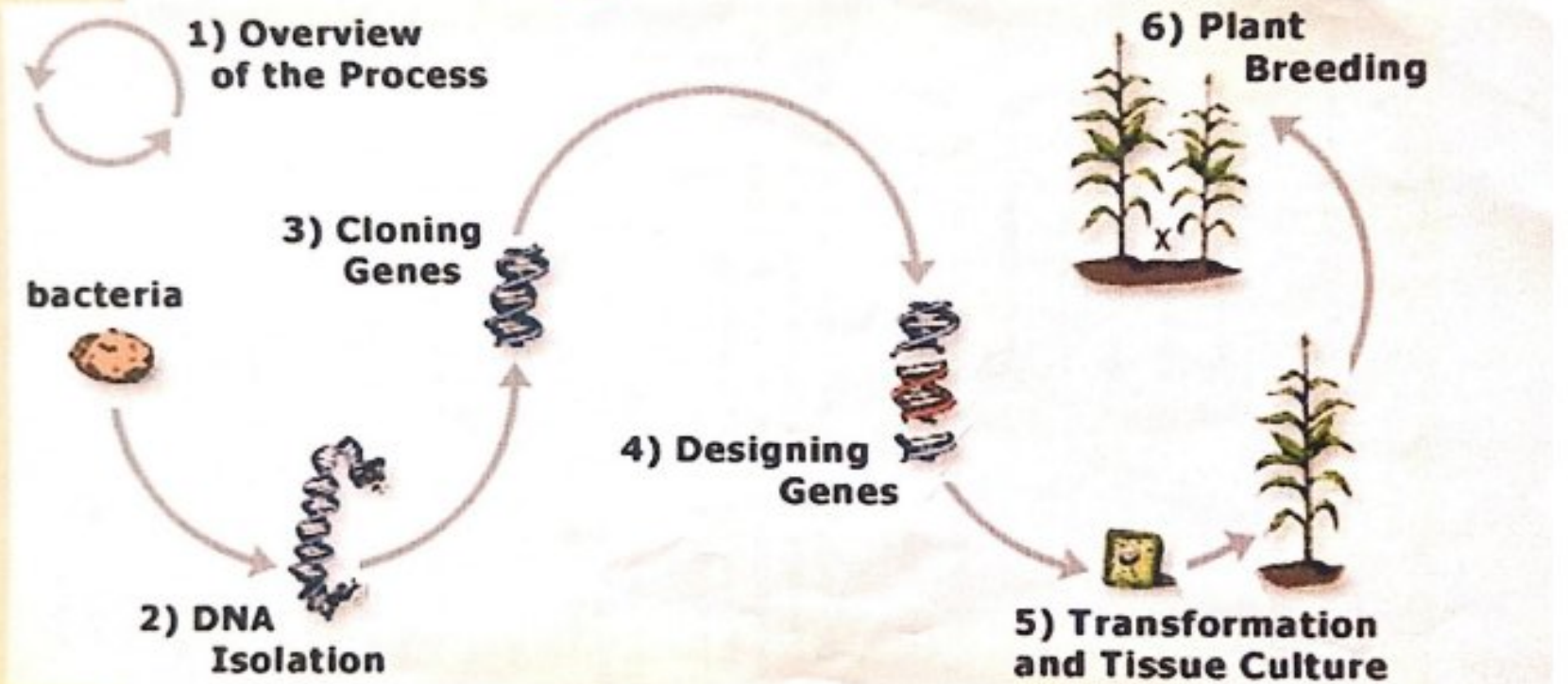

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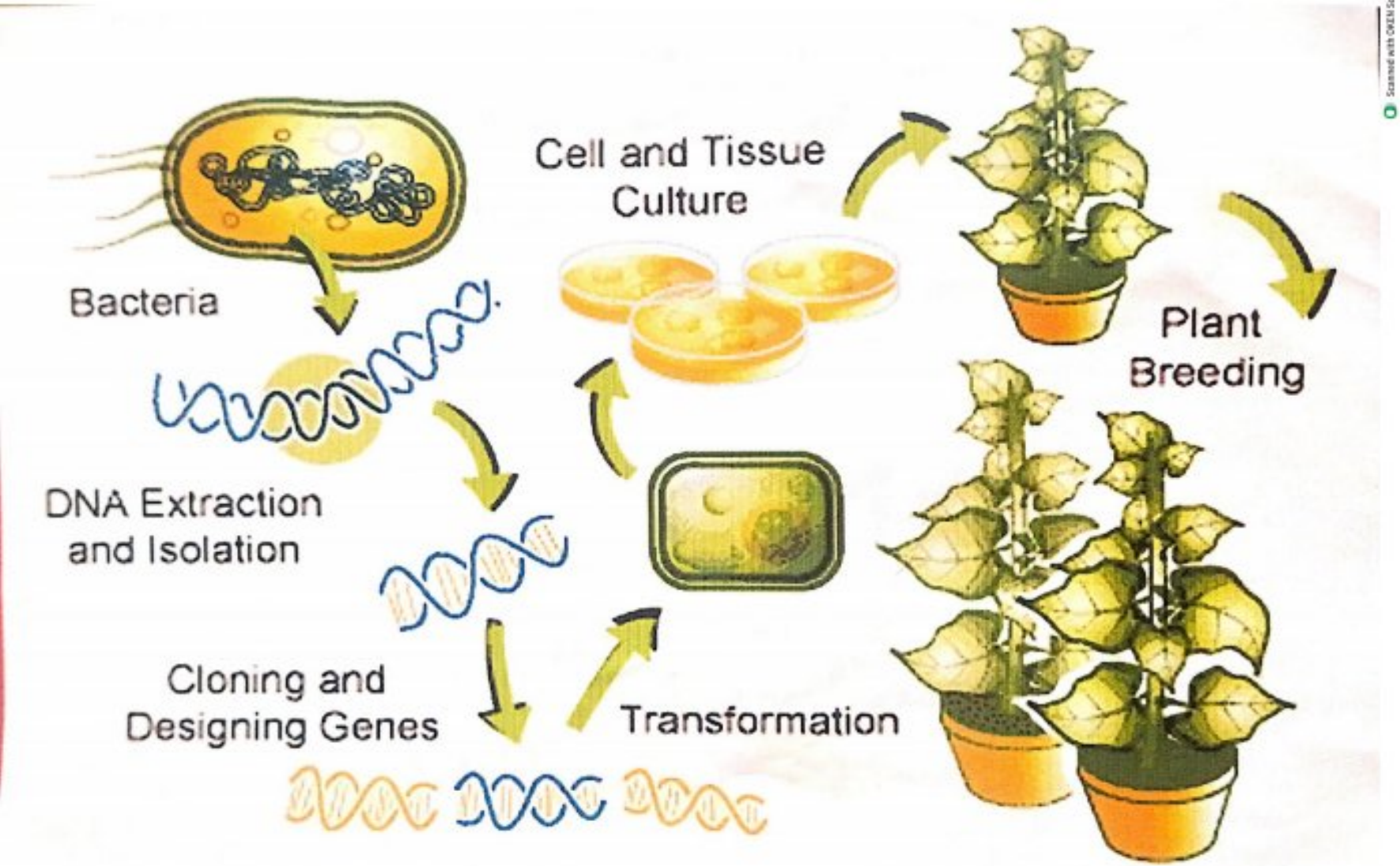

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PROJECT REPORT

College roll no: 47

Examination seat no: S1937078

CERTIFICATE

This is to certify that Mr: Satish H B of BSc 5th semester has satisfactory completed the project report in Botany subject as prescribed by Rani Chennamma University Belagavi.

During year 2021-2022

Examiner:

Head Dept of Botany

1) 14/2/22

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HUNGUND

AIMS & STRATERIES FOR DEVELOPMENT OF TRANSGENIC PLANT

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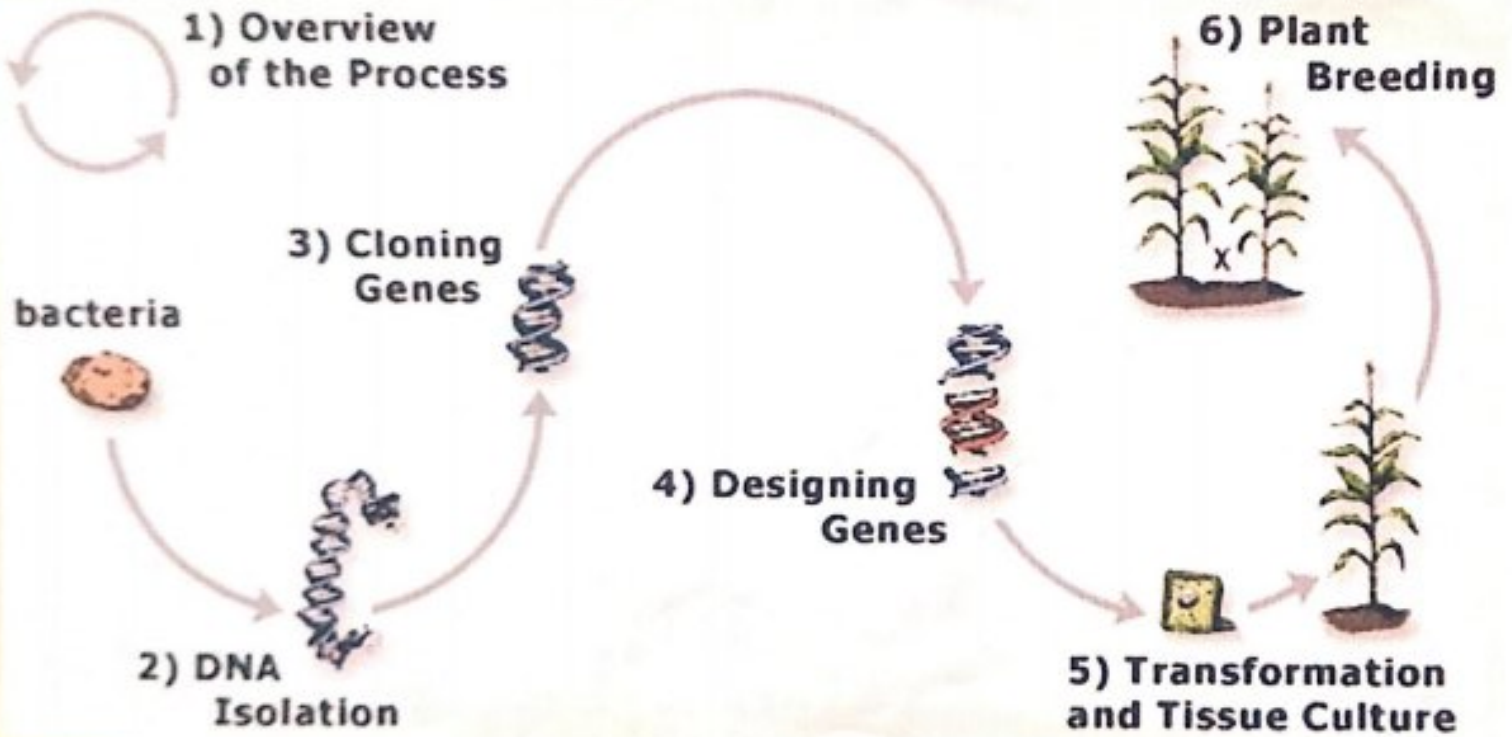

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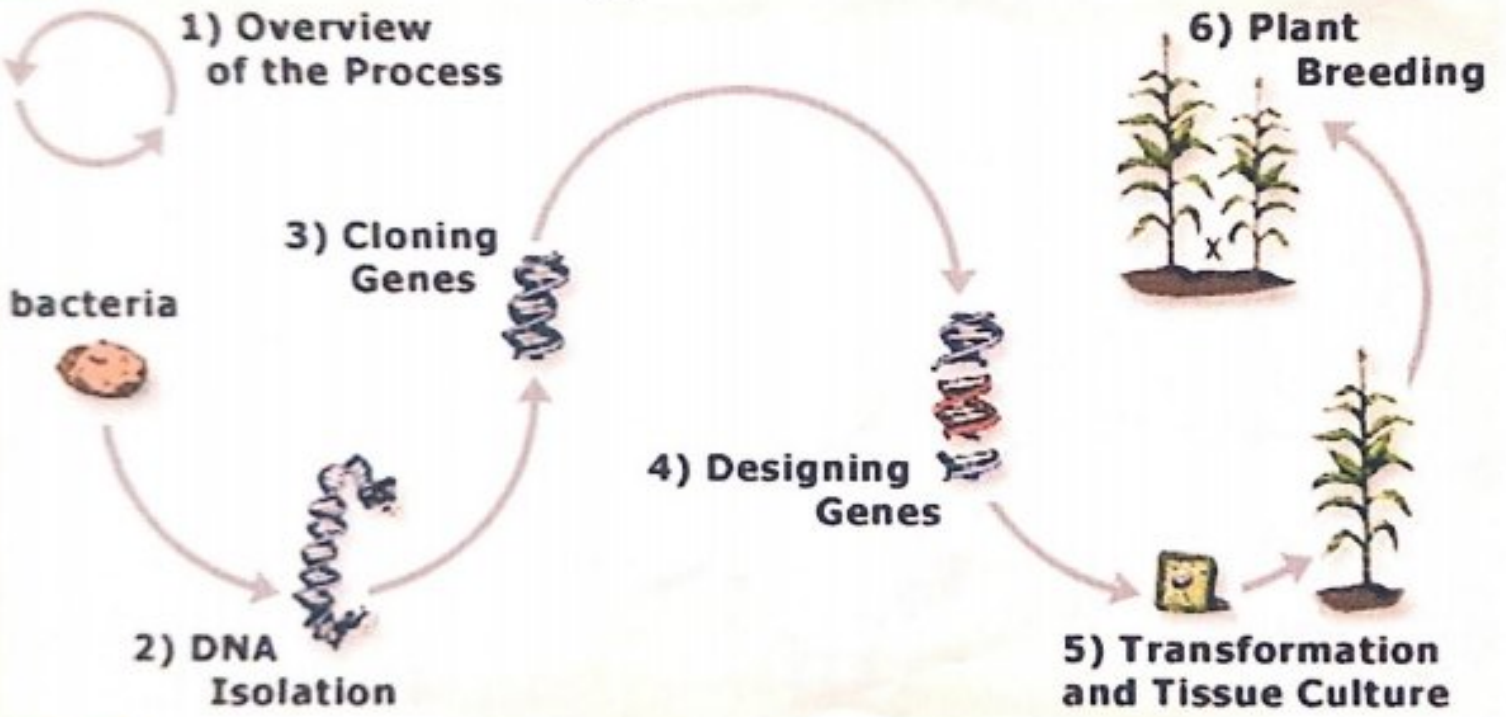

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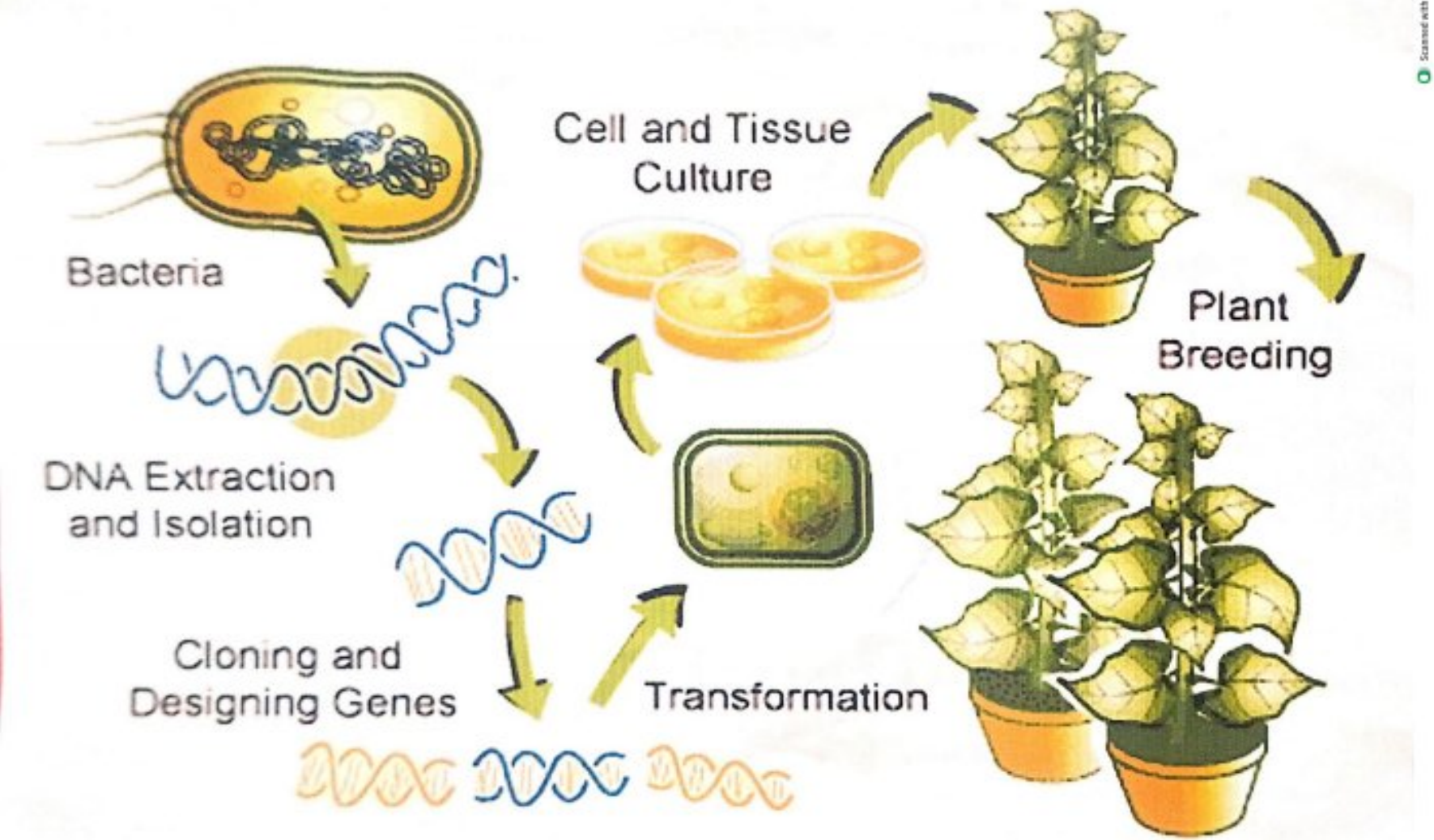

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V M K S R VASTRAD ARTS, SCIENCE, V S BELLIHAL COMMERCE COLLEGE HUNGUND

PROJECT REPORT

College roll no: **78**

Examination seat no: **S1937082**

CERTIFICATE

This is to certify that **Mr: Sharanbasava S Hiremath** of **BSc 5th** semester has satisfactory completed the project report in Botany subject as prescribed by Rani Chennamma University Belagavi.

During year 2021-2022

Examiner: Head Dept of Botany

1) 14/2/22

2) 14/2/22

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V M K S R VASTRAD ARTS, SCIENCE & V S BELLIHAL COMMERCE COLLEGE HUNGUND

AIMS & STRATERIES FOR DEVELOPMENT OF TRANSGENIC PLANT

PROJECT DONE BY

SHARANABASAVA S HIREMATH

BSc 5th Sem

Botany

Rani Chennamma University Belagavi

2021-2022

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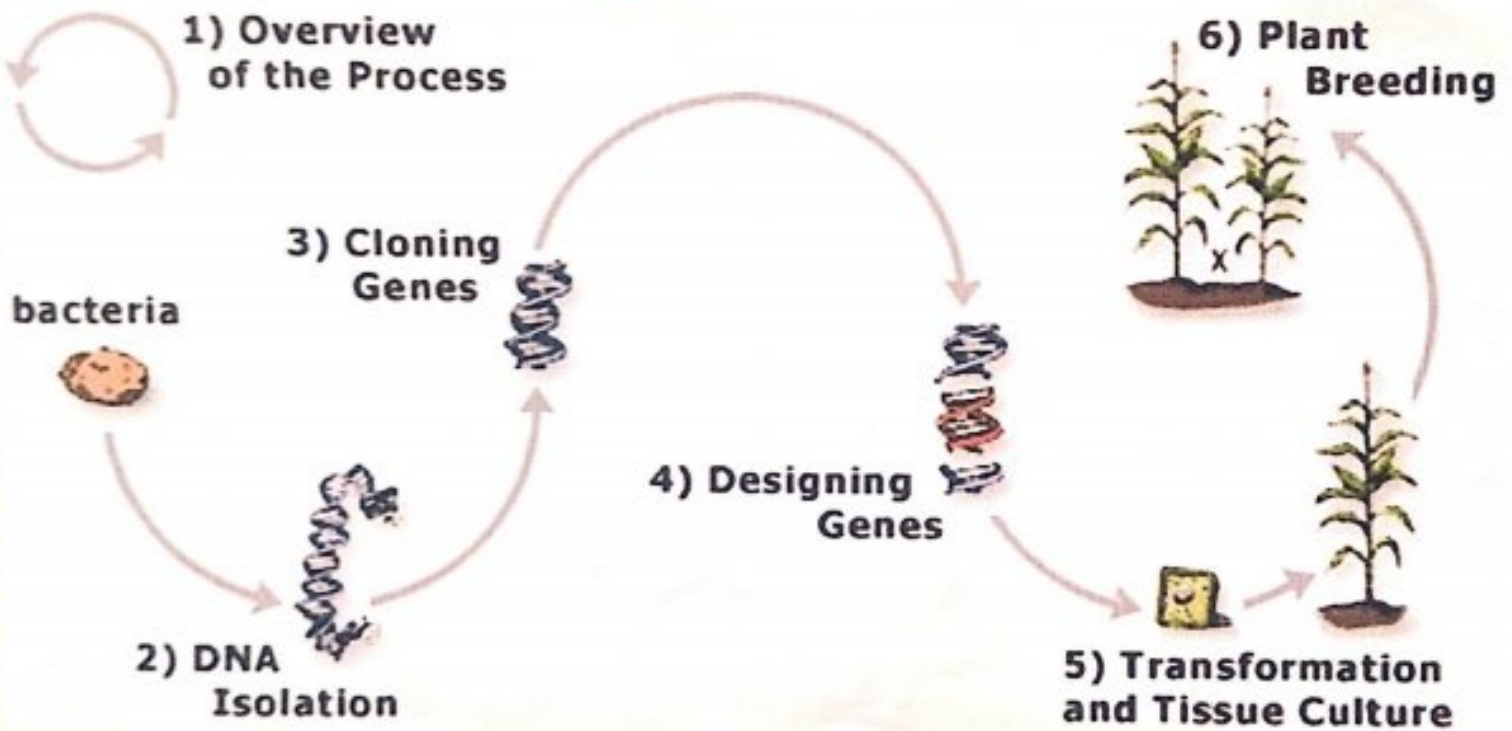

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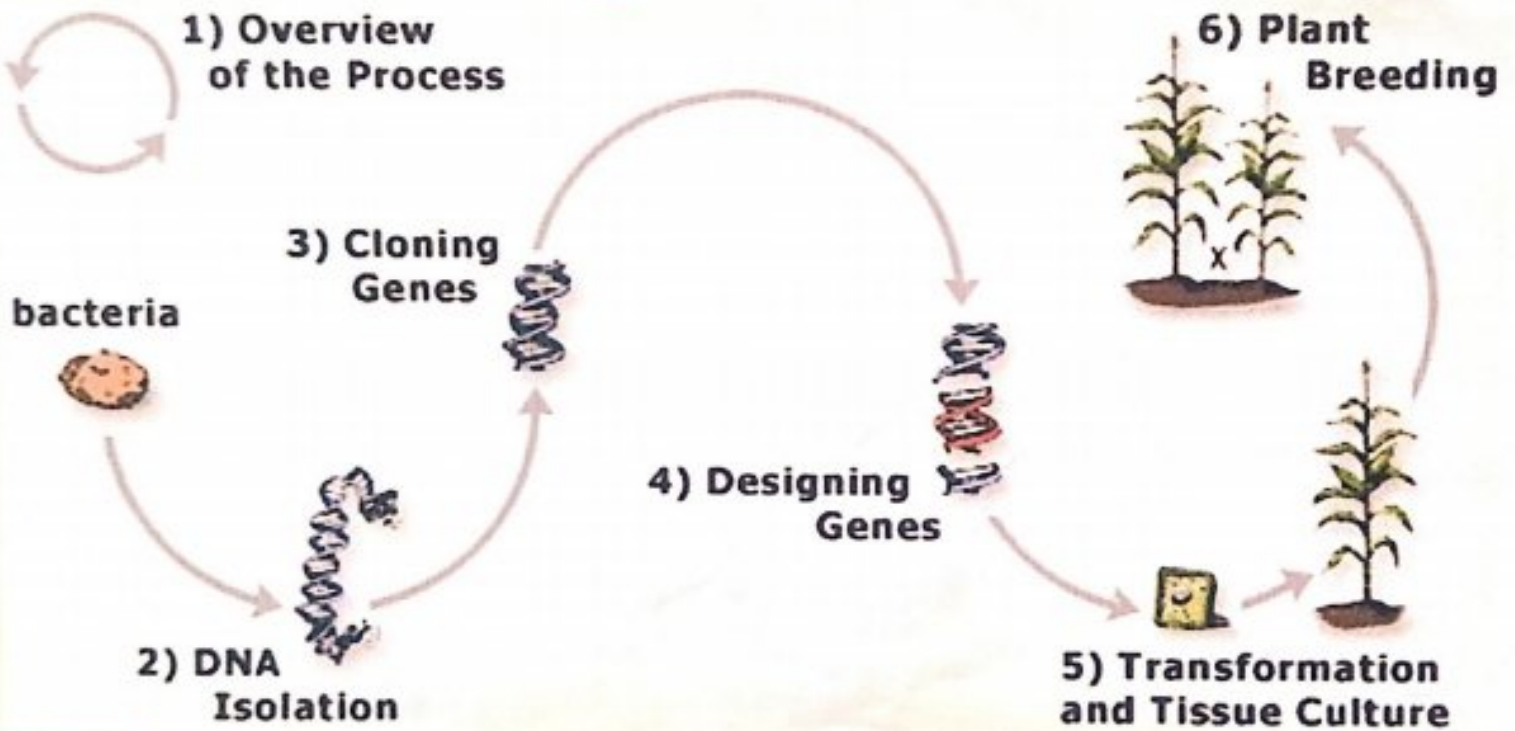

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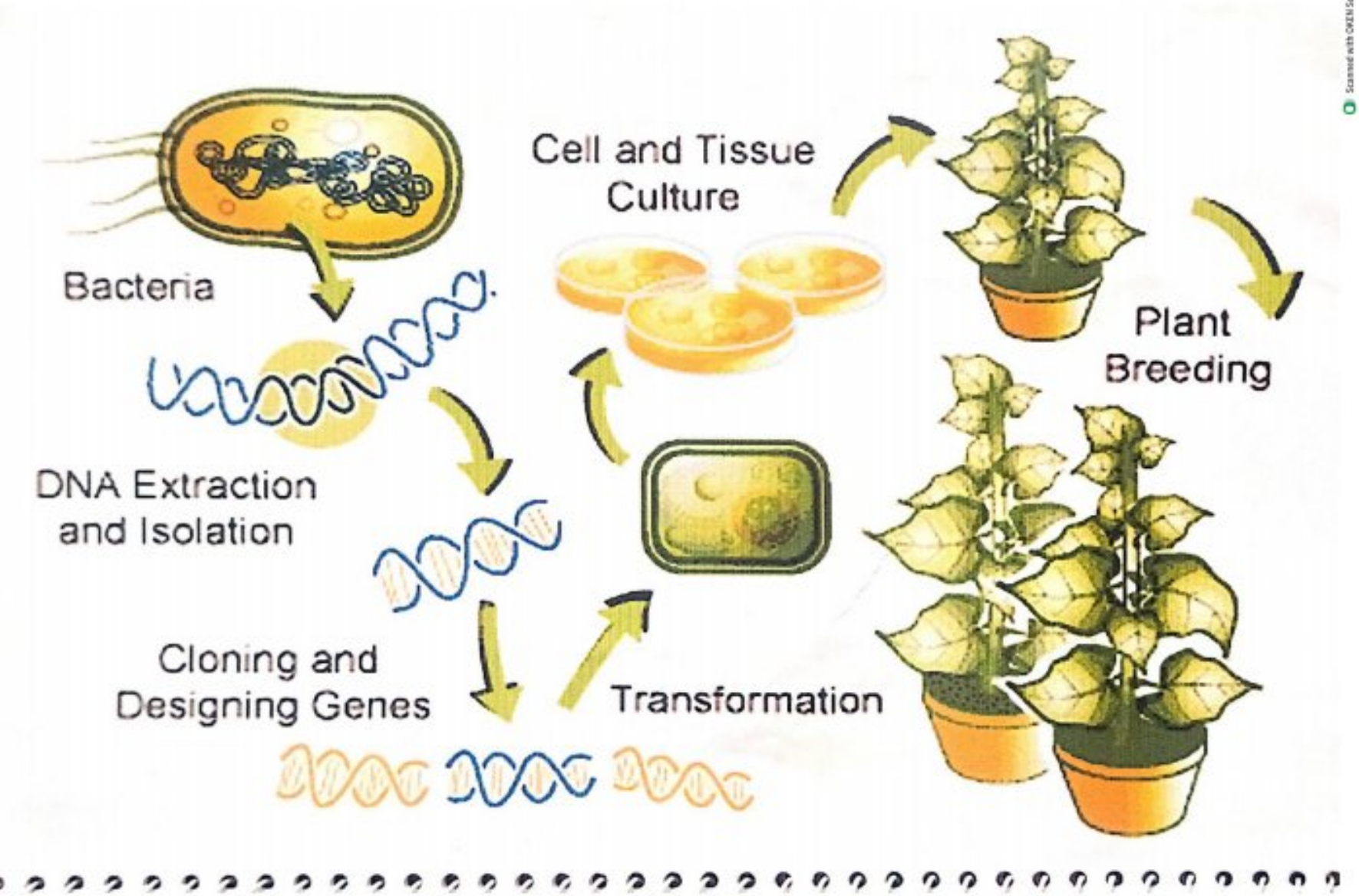

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PROJECT REPORT

College roll no: 01

Examination seat no: S1937085

CERTIFICATE

This is to certify that Miss: Shilpa S Tarival of BSc 5th semester has satisfactory completed the project report in Botany subject as prescribed by Rani Chennamma University Belagavi.

During year 2021-2022

Examiner: Head Dept of Botany

1) 15/2

2) 15/2/22

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V M K S R VASTRAD ARTS, SCIENCE &

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HUNGUND

AIMS & STRATERIES FOR DEVELOPMENT OF TRANSGENIC PLANT

PROJECT DONE BY

SHILPA S TARIVAL

BSc 5th Sem

Botany

Rani Chennamma University Belagavi

2021-2022

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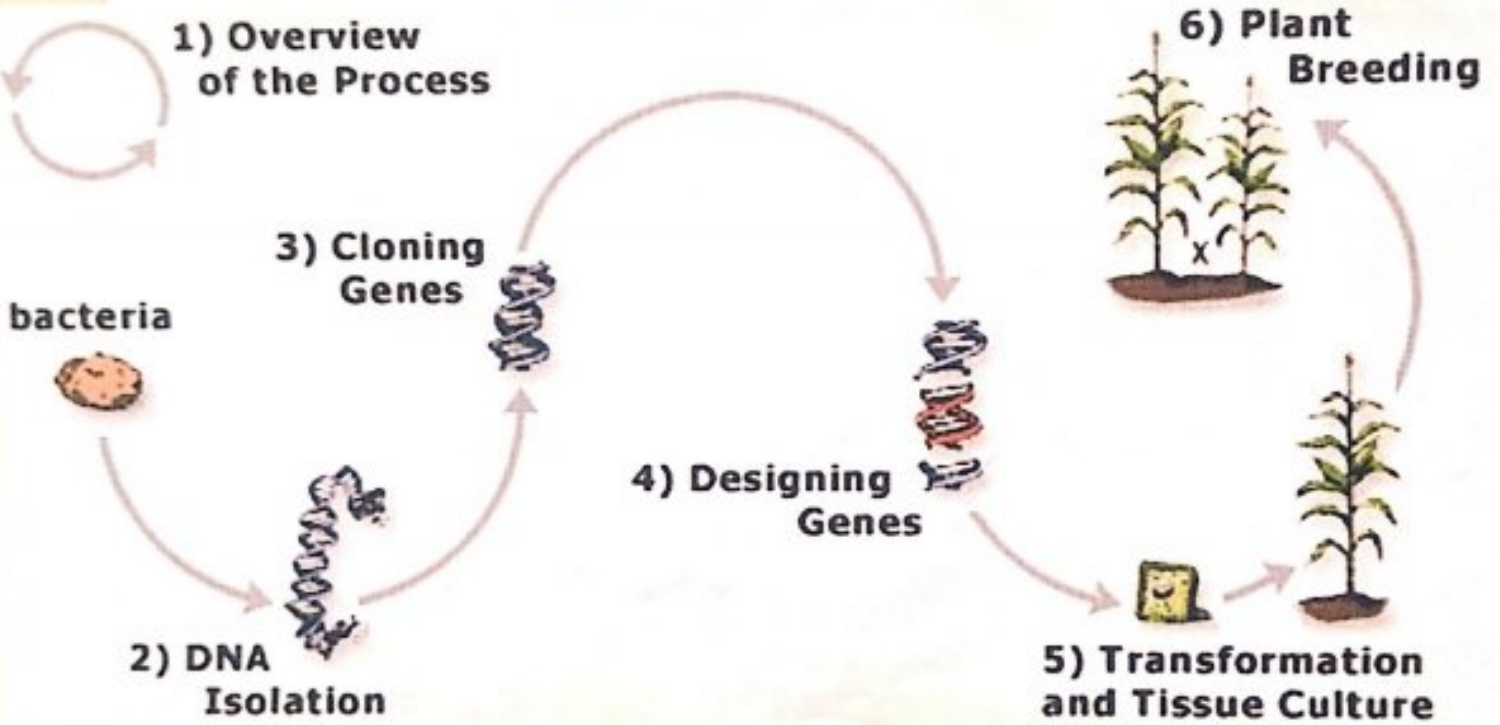

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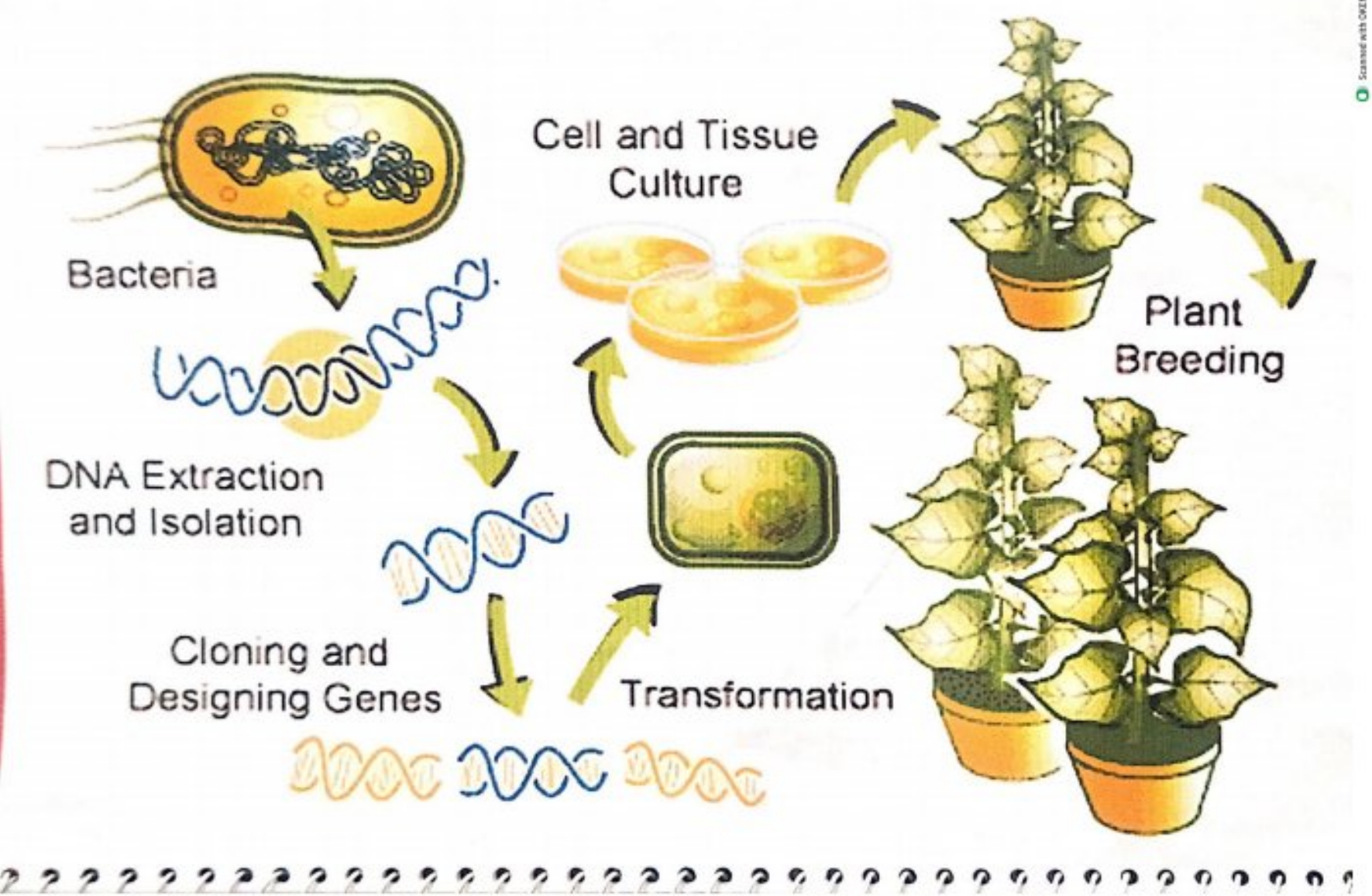

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V M K S R VASTRAD ARTS, SCIENCE, V S BELLIHAL COMMERCE COLLEGE HUNGUND

PROJECT REPORT

College roll no: 25

Examination seat no: **S1937089**

CERTIFICATE

This is to certify that **Mr: Shridhar Patil** of **BSc 5th** semester has satisfactory completed the project report in Botany subject as prescribed by Rani Chennamma University Belagavi.

During year 2021-2022

Head Dept of Botany

Examiner:

1) 15/12/22

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HUNGUND

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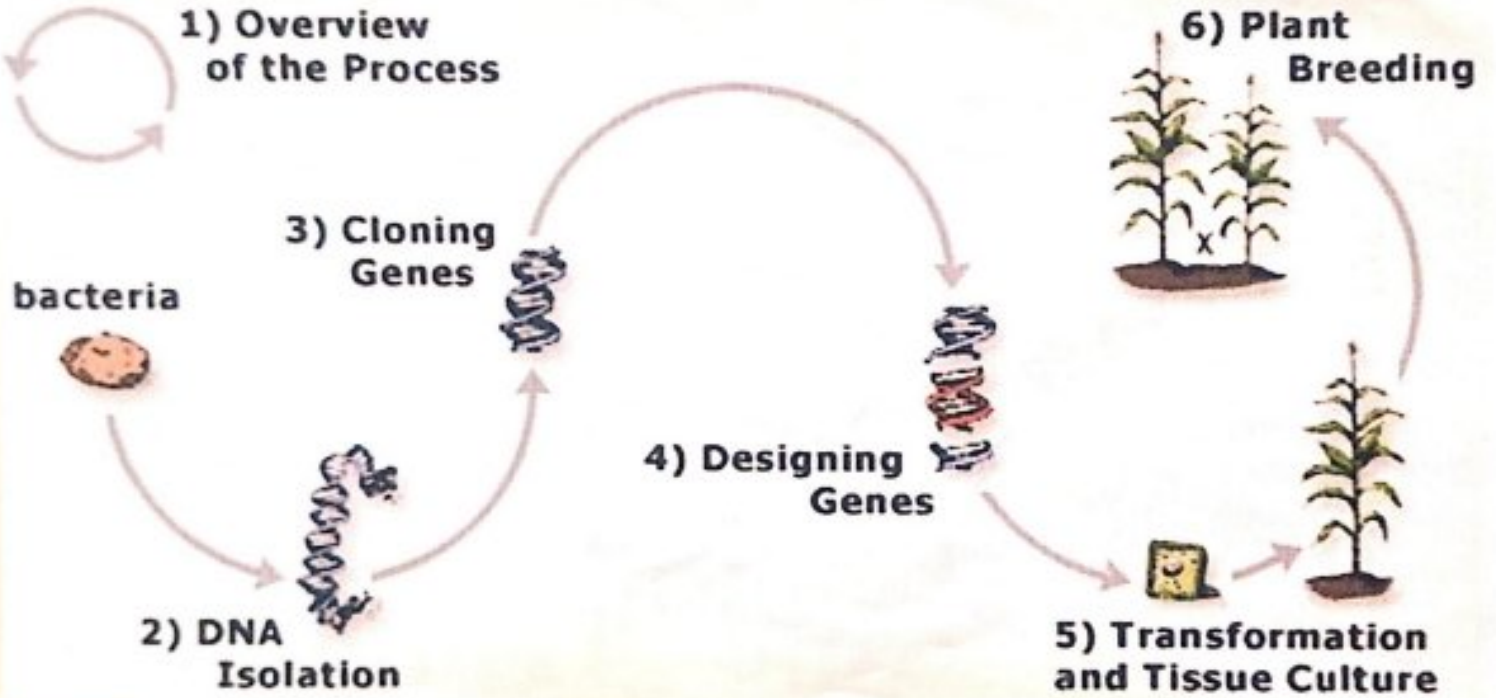

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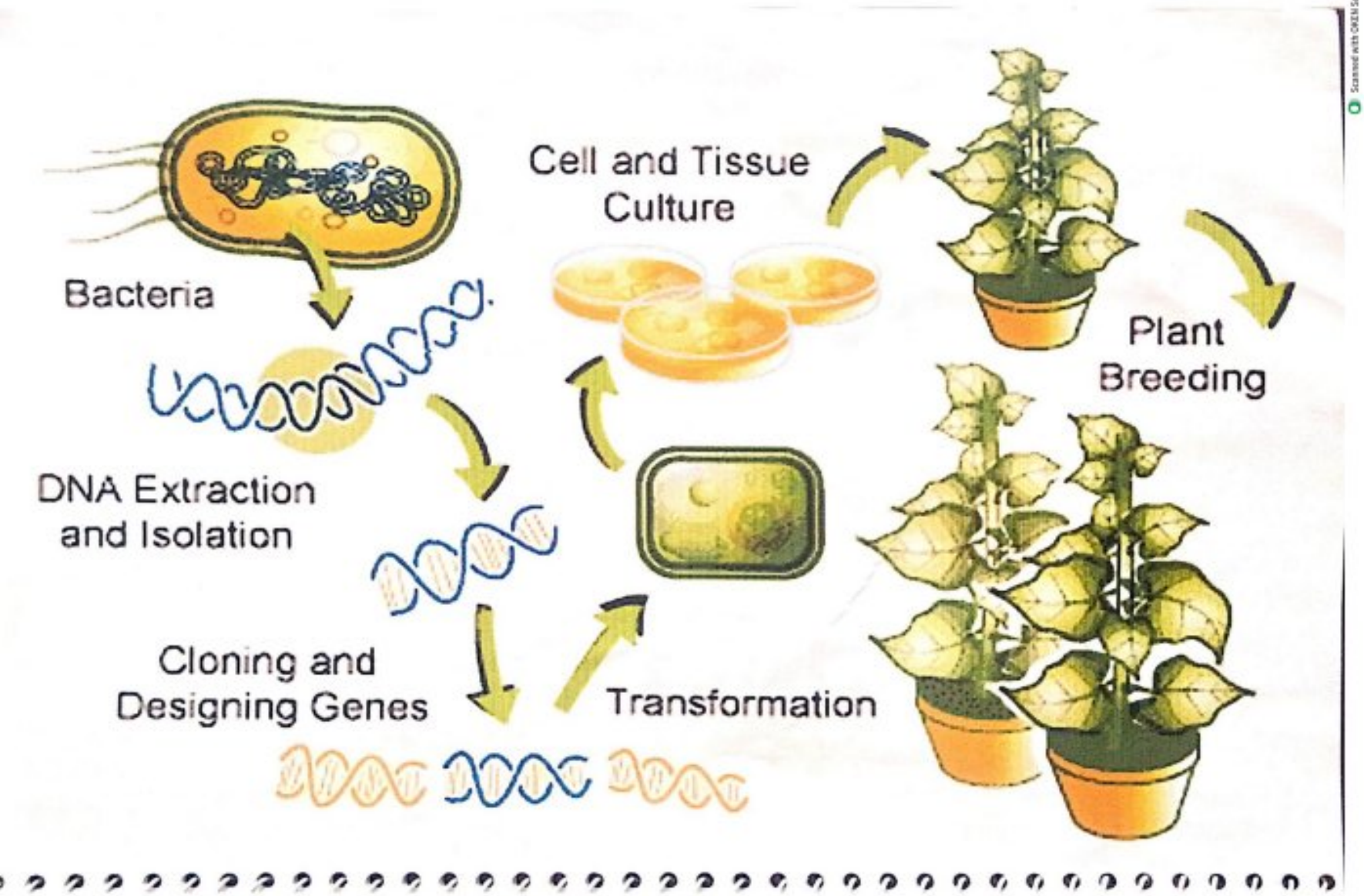

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V M K S R VASTRAD ARTS, SCIENCE, V S BELLIHAL COMMERCE COLLEGE HUNGUND

PROJECT REPORT

College roll no: 21

Examination seat no: S1937098

CERTIFICATE

This is to certify that Miss: Tejashwini S Kirasur of BSc 5th semester has satisfactory completed the project report in Botany subject as prescribed by Rani Chennamma University Belagavi.

During year 2021-2022

Head Dept of Botany

Examiner:

1) 15/2

2) 15/2/22

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V M K S R VASTRAD ARTS, SCIENCE &

V S BELLIHAL COMMERCE COLLEGE

HUNGUND

AIMS & STRATERIES FOR DEVELOPMENT OF TRANSGENIC PLANT

PROJECT DONE BY

TEJASWINI S KIRASUR

BSc 5th Sem

Botany

Rani Chennamma University Belagavi

2021-2022

Aims and stratergies For Development Transgenic Plant

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The inserted Sequence is known as the transgene

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Transgenic technology enables plant breeders together in one plant useful genes form a wide range of living sources

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Transgenic plant

The plant containing an inserted foreign DNA is called transgenicplant .

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The Following are some transgenic plants

- Transgenic plants with nif genes
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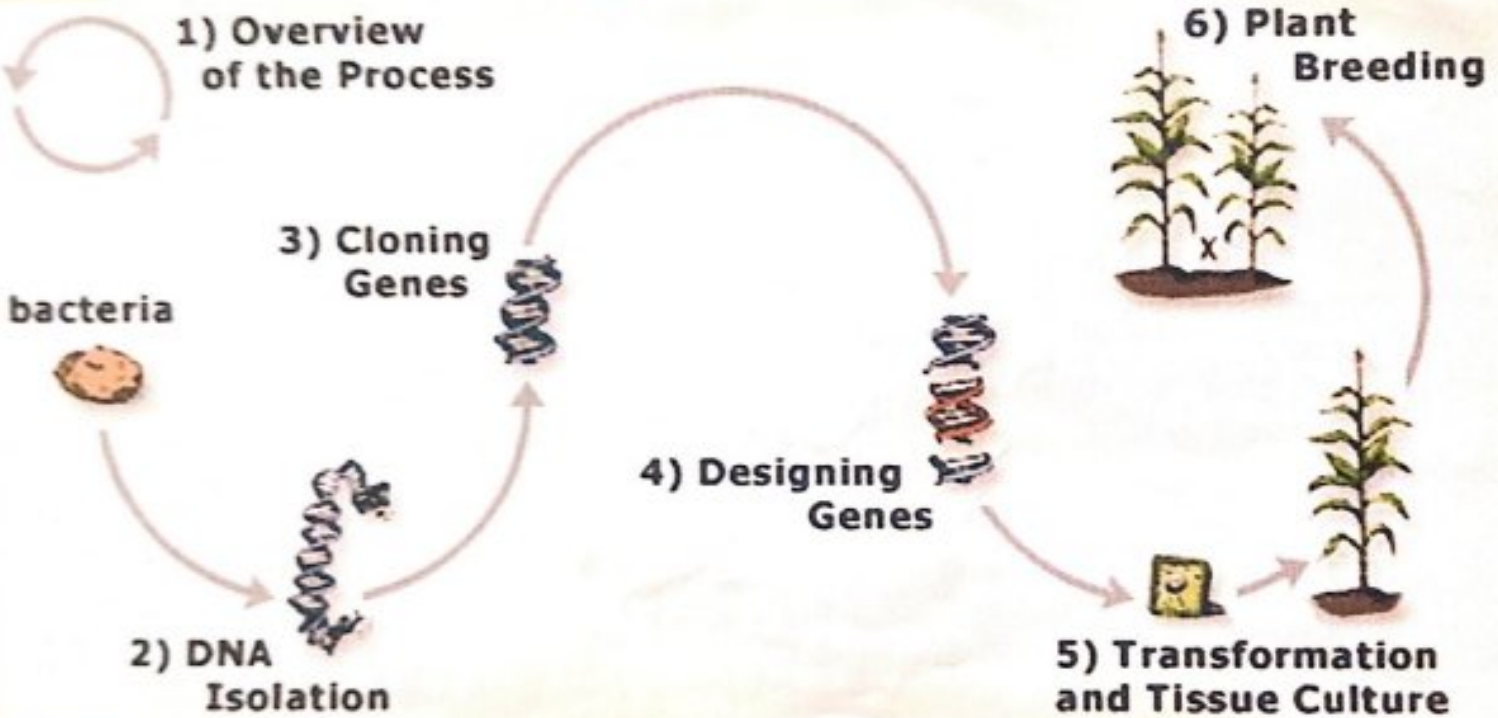

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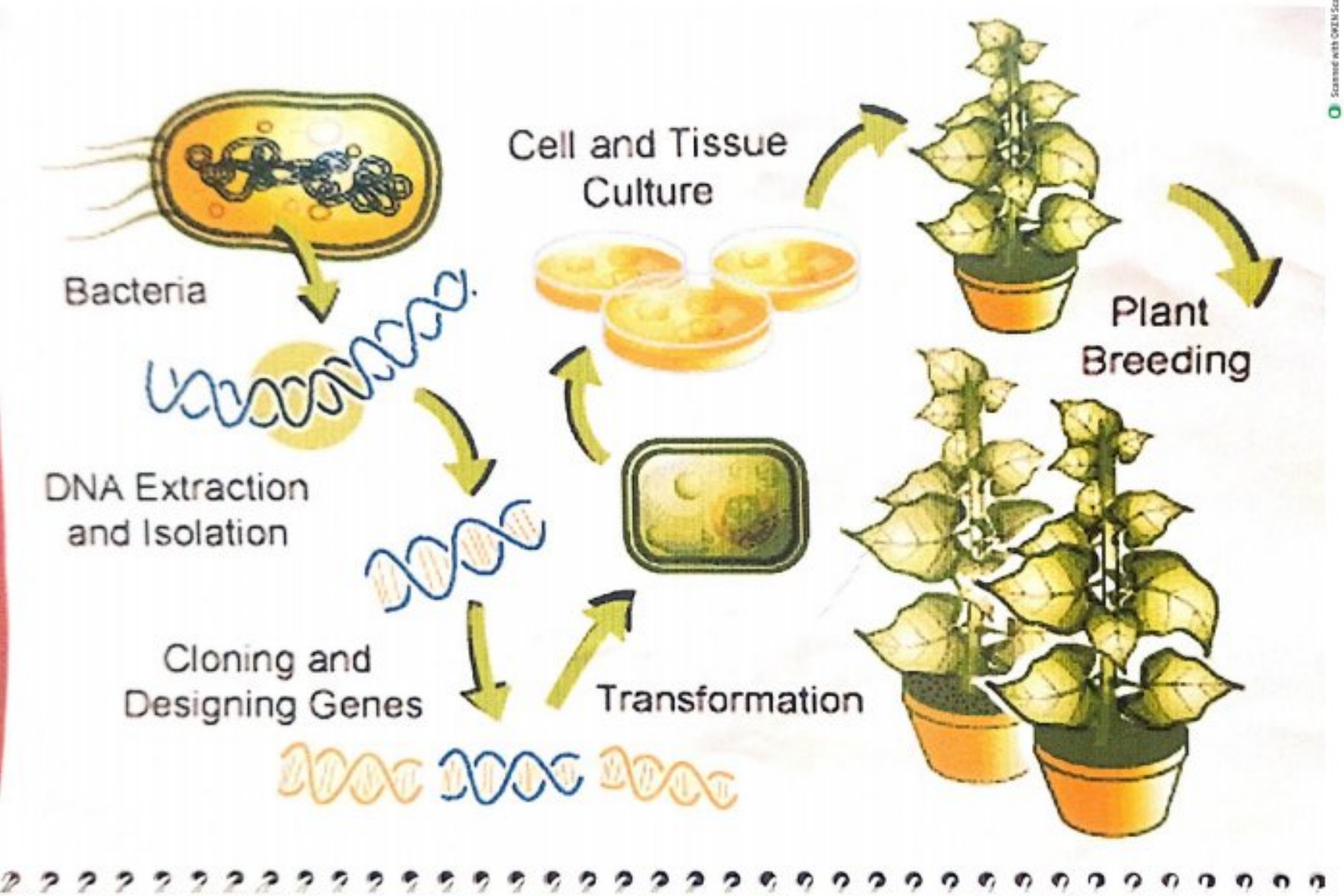

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V M K S R VASTRAD ARTS, SCIENCE &

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HUNGUND

AIMS & STRATERIES FOR DEVELOPMENT OF TRANSGENIC PLANT

PROJECT DONE BY

VIJAYALAXMI PATTAR

BSc 5th Sem

Botany

Rani Chennamma University Belagavi

2021-2022

V M K S R VASTRAD ARTS, SCIENCE, V S BELLIHAL COMMERCE COLLEGE HUNGUND

PROJECT REPORT

College roll no: 66

Examination seat no: S1937104

CERTIFICATE

This is to certify that Mrs: Vijayalaxmi Pattar of BSc 5th semester has satisfactory completed the project report in Botany subject as prescribed by Rani Chennamma University Belagavi.

During year 2021-2022

Examiner:

Head Dept of Botany

1) 14/2

2) 14/2/22

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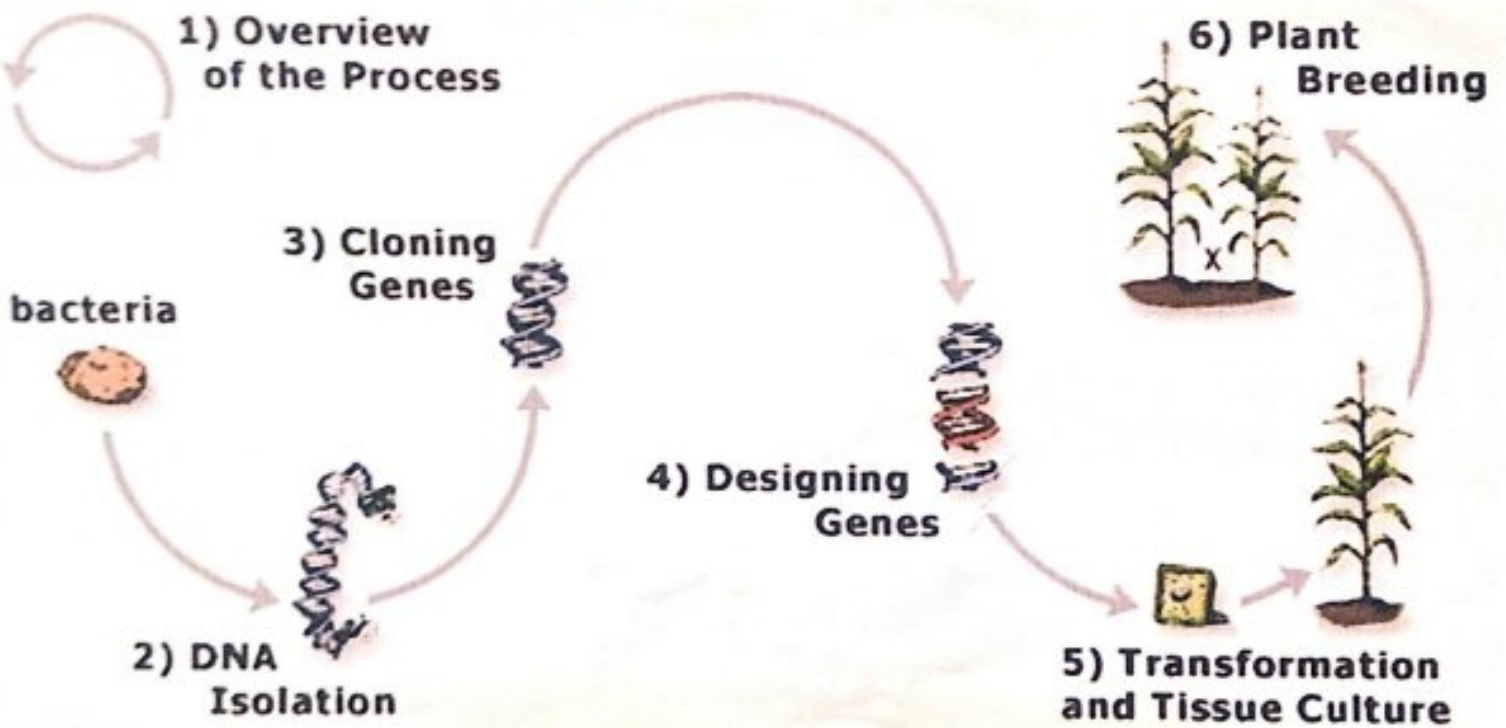

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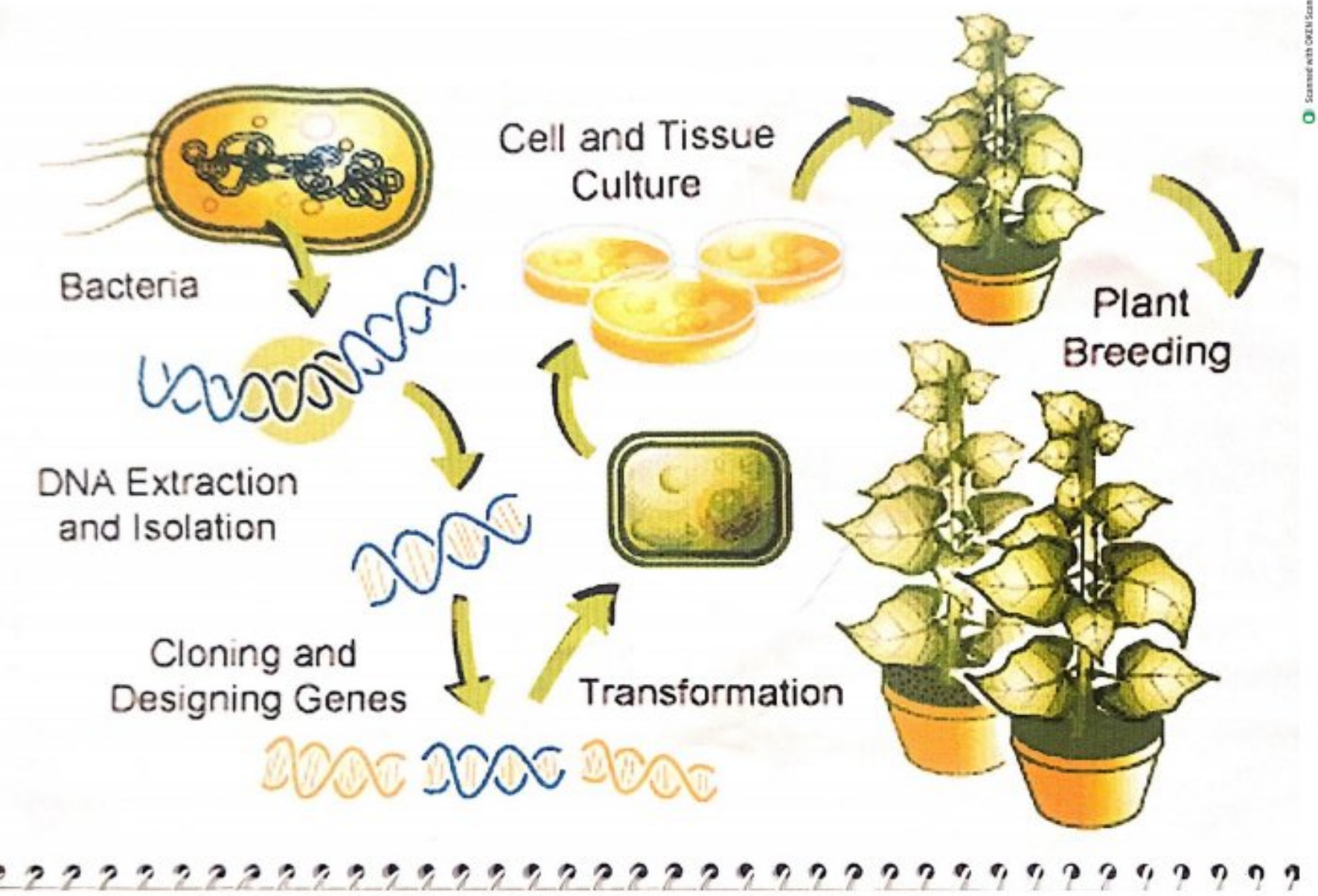

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PROJECT REPORT

College roll no: 58

Examination seat no: S1937009

CERTIFICATE

This is to certify that Miss: Aruna k Gantiof BSc 5th semester has satisfactory completed the project report in Botany subject as prescribed by Rani Chennamma University Belagavi.

During year 2021-2022

Examiner: Head Dept of Botany

1) 15/2

2) 15/2/22

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AIMS & STRATERIES FOR DEVELOPMENT OF TRANSGENIC PLANT

PROJECT DONE BY

ARUNA K GANTI

BSc 5th Sem

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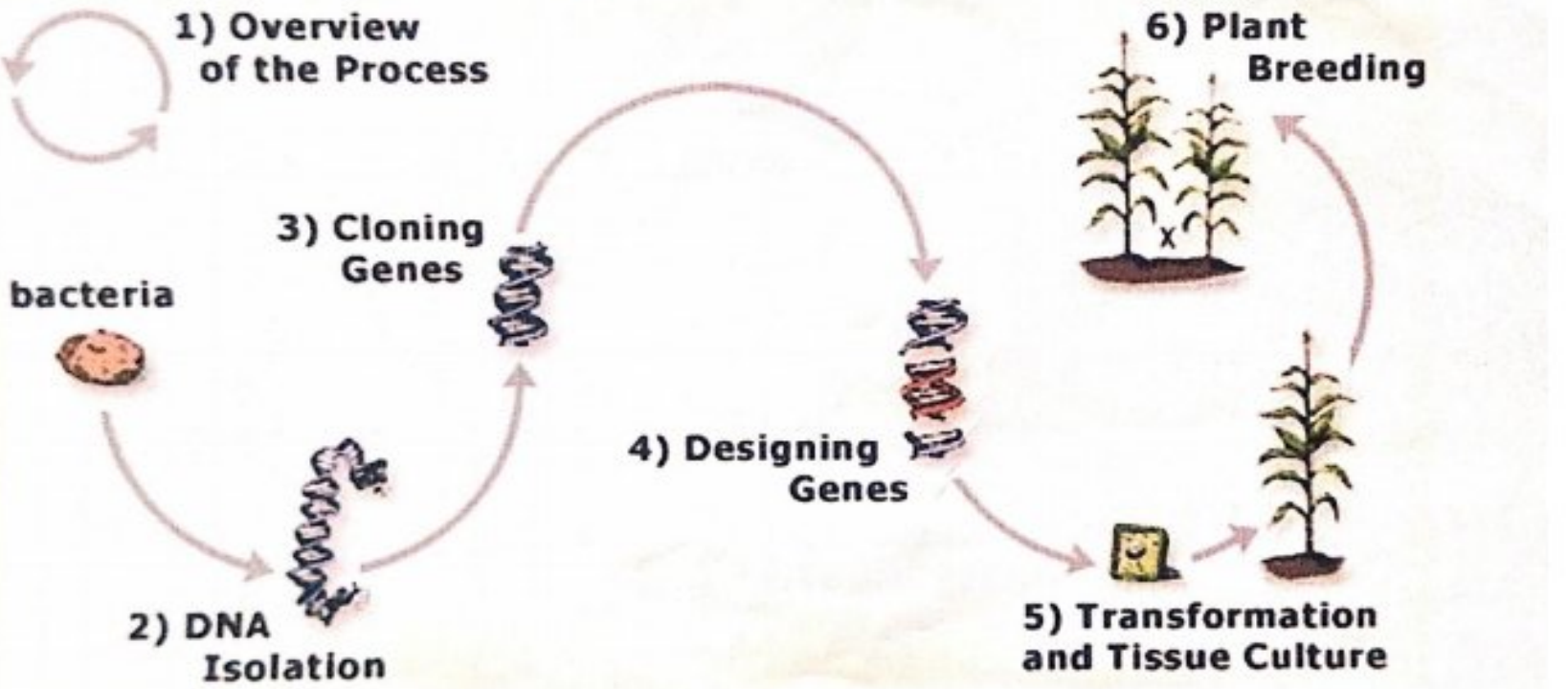

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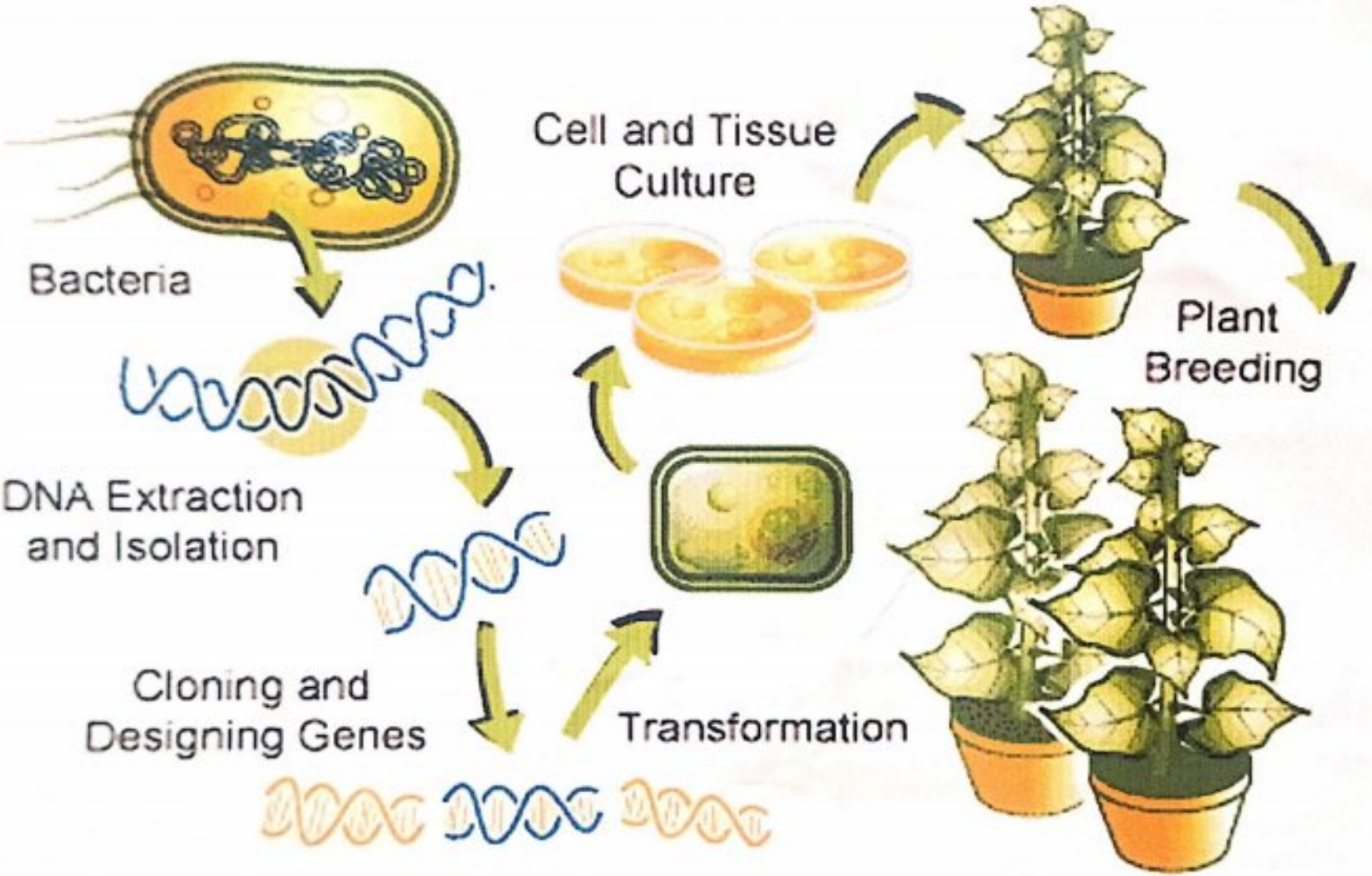

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VMKSR VASTRAD ARTS, SCIENCE & VS BELLIHAL COMMERCE COLLEGE HUNGUND

POLYMERASE CHAIN REACTION

PROJECT DONE BY

ARUNA GANTI

BSC 6TH SEMESTER

BOTANY

RANI CHENNAMMA UNIVERSITY BELAGAVI

2021-2022

POLYMERASE CHAIN REACTION

INTRODUCTION: The polymerase chain reaction technique developed by Kary Mullis in1985. Is extremely powerful. It generates microgram quantities of DNA copies of desired DNA. DNA segment present even as

15/2/22

single copy in the intial preparation in matter of few hours. The PCR process has been completely attomated & compact thermal cyclers are available in market. The PCR carried out in invitro technique. It utilizes a DNA preparation containing the desired segment to be amplified 2 nucleotide primers., specific i.e complementary to the 3' borders. Triphosphates viz. TTP, DCTP, DATP, TGTP & heat stabled DNA polymerase. Ex: Taq(isolated from bacterium thermos acquaticus), Pfu(from pirococcus Furioses),& Vent(from thermococus litoralis) polymerases. Pfu &Vent polymerase are more efficient than Taq polymerase.

PCR is cell free amplification technique for synthesizing multiple identical copies of any DNA of interest. The double stranded DNA of interest is denatured to separate into 2 individual strands. Each strand is allowed to hybridize with a primer (renaturation). The primer template duplex is used for DNA synthesis (DNA polymerase). Denaturation, renaturation & synthesis are repeated again & again to generate multiple forms of target DNA.

DEFINITION OF PCR: *PCR is laboratory technique for rapidly producing (amplifying) millions to billions of copies of specific segment of DNA.*

COMPONENTS OF PCR:

1) DNA Template: DNA template is DNA target sequence. DNA template is DNA molecule that contains DNA region to be amplified, segment we are concerned which is target sequence.

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2) DNA Polymerase: DNA polymerase sequentially adds nucleotides complimentary to template strand at 3' –OH of bound primers & synthesizes new strands of DNA complementary to target sequence. The most commonly used DNA polymerase is Taq DNA polymerase (from Thermus aquaticus, a therophillic bacterium) because of high temperature stability. Pfu DNA polymerase (from pyrococcus furiosus) also used widely because of higher fidelity.

3) Oligonucleotide primer: Oligonucleotide made up of 2'-deoxyribonucleotides are molecules used in polymerase chain reaction. These are referred to as primers & are used to massively amplify a small amount of DNA. The primer binds to specific DNA sequence & DNA polymerase is used to extend the oligonucleotide & replicate the complementary strand.

4) Deoxyribonucleotide triphosphate: dNTP stands for deoxyribonucleotide triphosphate employed in PCR to expand the growing DNA strand. dATP , dTTP , dGTP , dTTP ,are four common dNTP's used in PCR. dNTP are used in the chain termination method to stop expansion of DNA synthesis. The ingredients of PCR , RT-PCR, DNA sequencing that helps to grow the DNA or DNA amplification.

5) Buffer system: PCR is carried out in a buffer that provides a suitable chemical environment for activity of DNA polymerase. PCR buffer consist 3 ingredients namely; a)tris hcl: which control the ph.

b)kcl : which help the primer in attachment on DNA single strand in annealing step. c) Gelatin: work on DNA stability.

TYPES OF PCR

1) Real time PCR 2) Quantitative PCR 3) Single cell PCR 4) Multiplex PCR 5) Nested PCR 6) Fast cycling PCR

1) REAL TIME PCR STEPS

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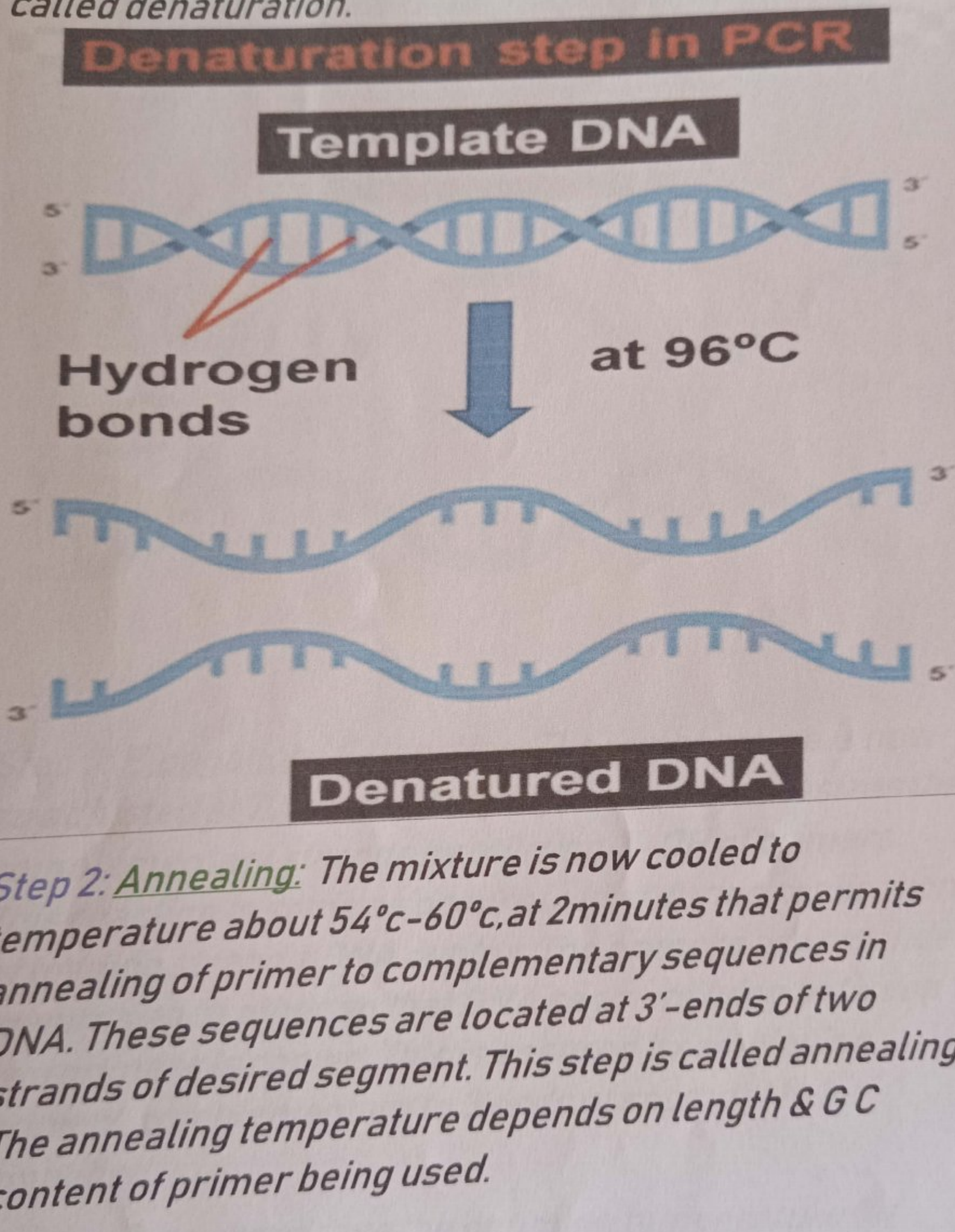

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Annealing step in PCR

Annealing

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In case Taq polymerase the optimum temperature for synthesis between 70°c-75°c the temperature of reaction mixture is adjusted to temperature.

This situation has following additional advantages between 70°c-75°c base pairing between about 20bases

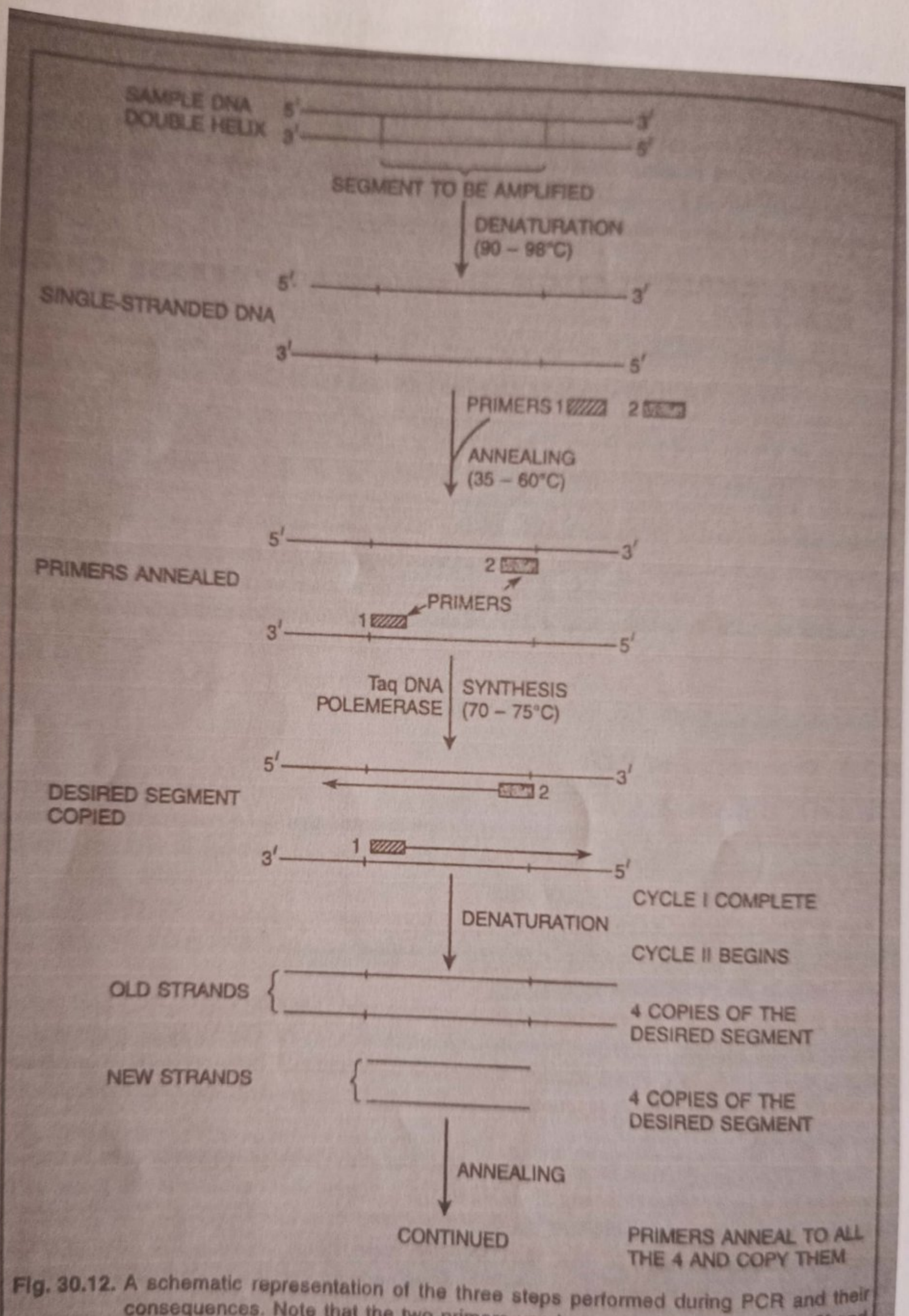

Fig. 30.12. A schematic representation of the three steps performed during PCR and their consequences. Note that the two primers used are complementary to the 3′-end sequences of the DNA segment to be amplified.

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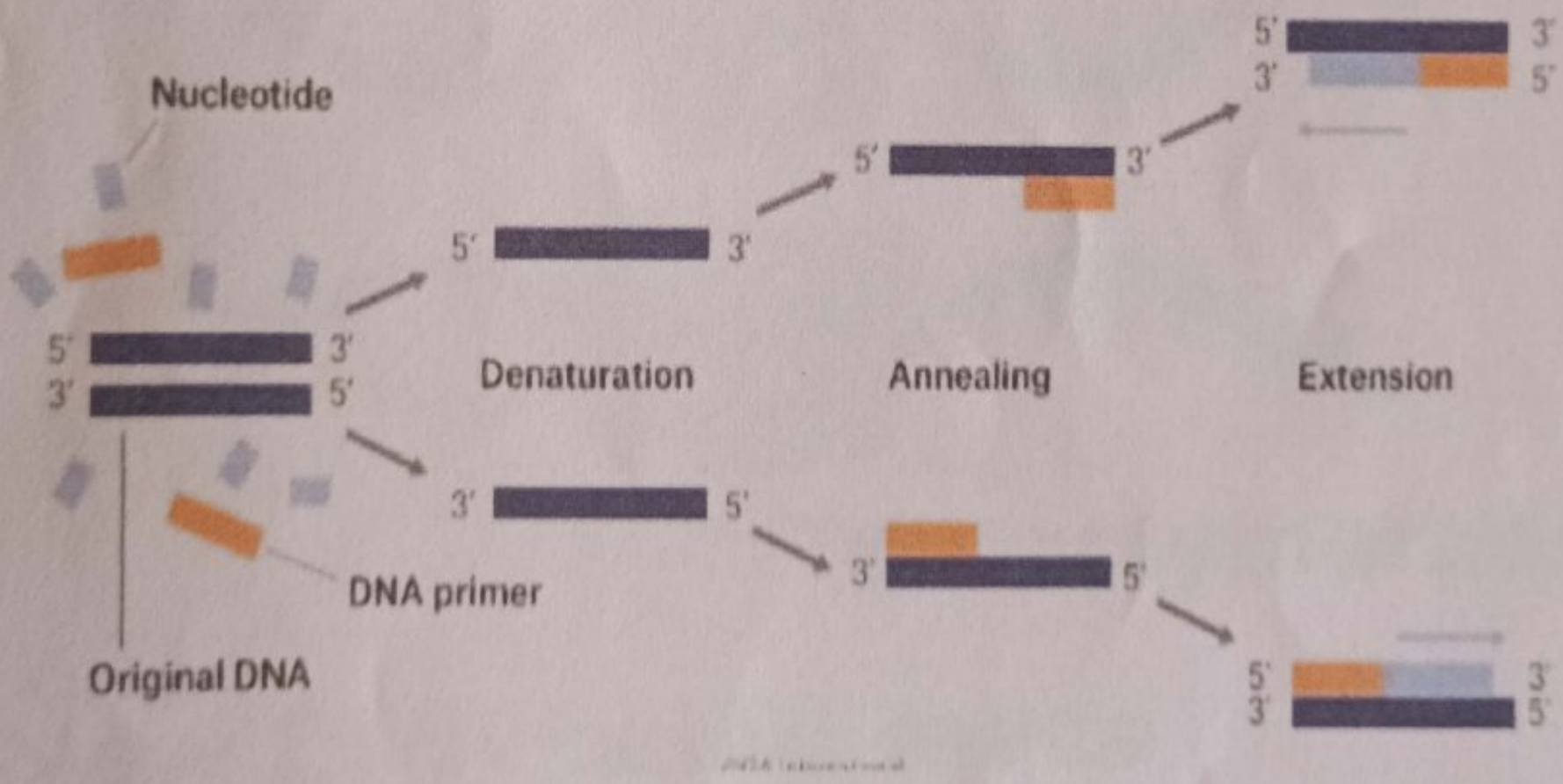
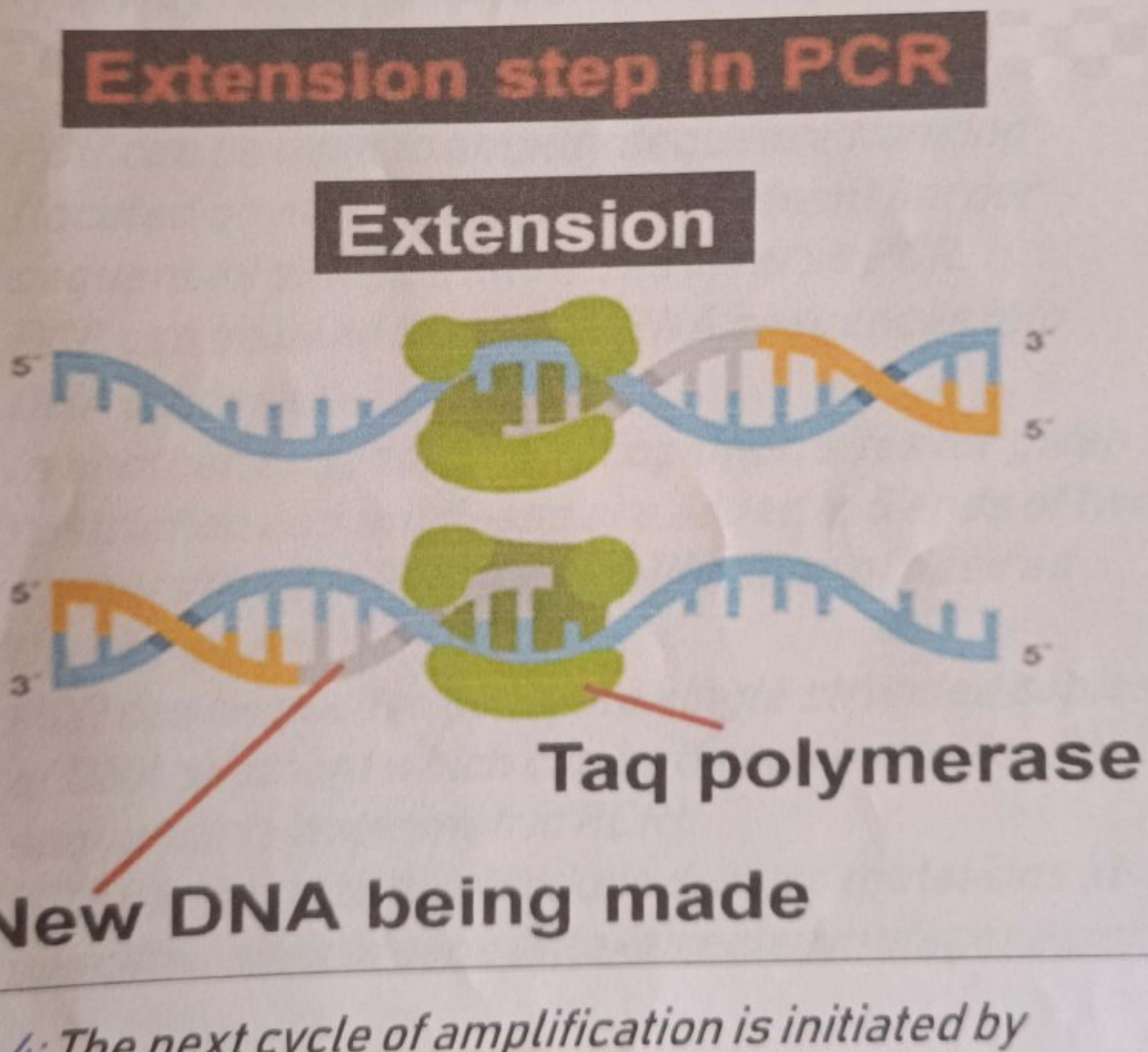
Thus at each cycle, both new & old strands anneal to primers & each cycle number of copies of desired segment becomes twice number present at end of previous cycle. Thus at end of n cycles, 2n copies of segment are expected. The real values are quite close to but lower than this expectation. The cycle may be repeated up to 6otimes, but usually 20-40 cycles are adequate.



long primers & DNA is much more specific than at 37°c, the optimal temperature for E-coli DNA polymerase. This minimizes chances of annealing of primers to imperfectly matched sequences & there by amplification of unwanted DNA ; the specificity of annealing is further increased by selecting appropriate conditions like ionic strength primer length. The completion of step 3 completes 1st cycle of amplification each cycle may take few minutes.



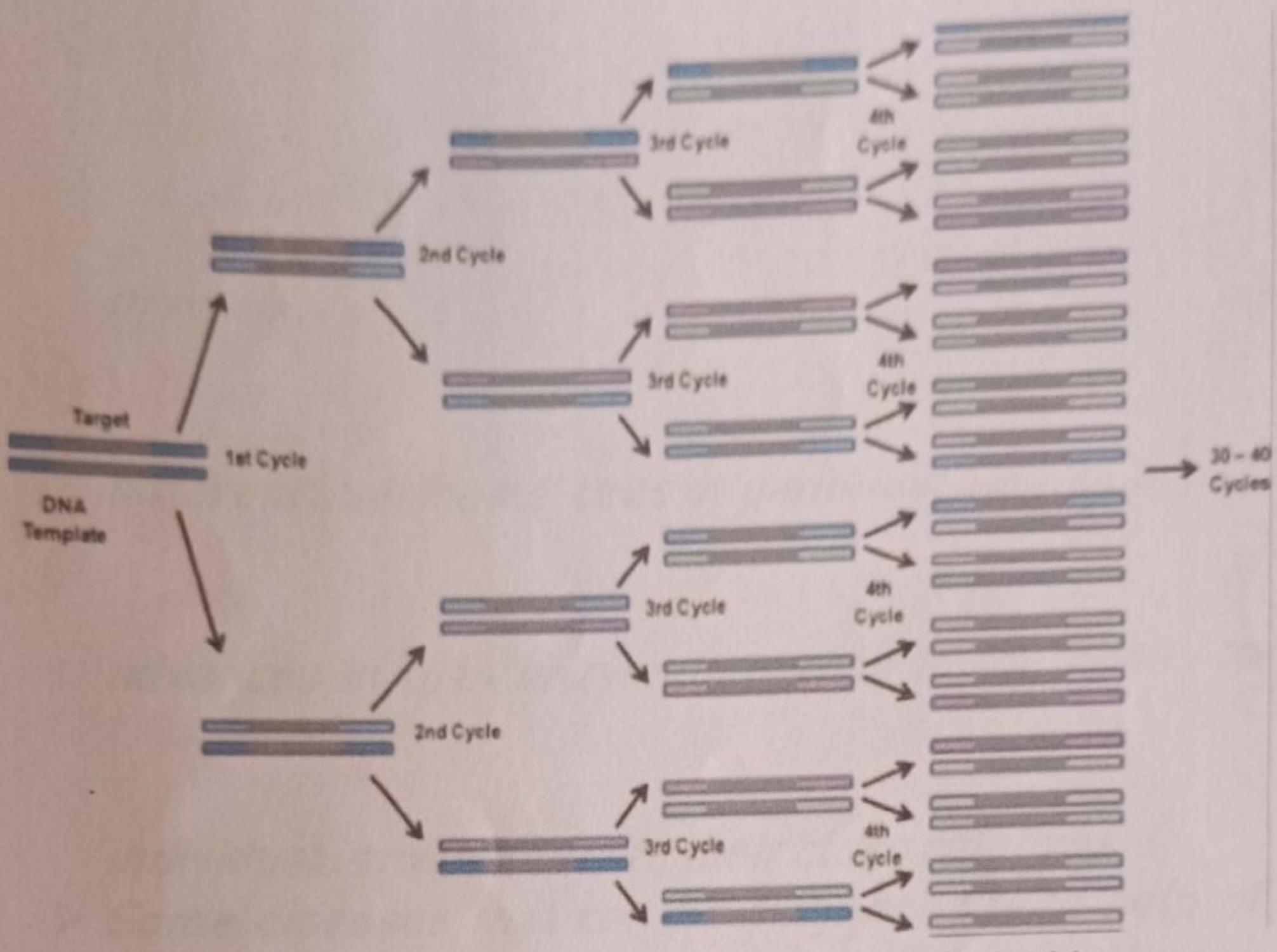
Step 4: The next cycle of amplification is initiated by denaturation which separates newly synthesized DNA strands from old DNA strands

In researcher has to only specify number & duration of cycles etc. After placing complete reaction mixture for incubation & machine performs the entire operation precisely. After PCR cycles amplified DNA segment is purified by gel electrophoresis & can be used for desired purpose.

VARIATION OF PCR

PCR is highly versatile technique it has been modified in variety of way to suit specific situation & appreciations. Some important variations of PCR as follows:-

- PCR can be used to amplify sequence flanking (located on either side) a DNA segment border sequences of which known as inverse PCR.
- PCR can be used to amplify RNA sequences into DNA duplexes.
- In another variation, the recognition sites for given restriction endonuclease are added to 5'ends of two primers used in PCR for amplification of desired DNA segment.
- PCR can be used to generate single stranded copies of DNA segment which can be directly used for DNA sequencing (asymmetric PCR).
- PCR can be used to introduce desired mutations at specified sites in gene (site-directed mutagenesis).



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APPLICATIONS OF PCR

- PCR can be used to determine sex of embryos.
- DNA amplification of individual sperms used to estimate frequency of recombination between specified genes.
- Micro dissected segments of chromosomes of drosophila can be used for PCR amplification of DNA from transgenic organism. Amplification will occur only when transgene present in organism; amplified DNA detected as band on electrophoresis gel.
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CONCLUSION

PCR is highly accurate & rapid method for duplicating genetic material.PCR is not only vital in clinical laboratory by amplifying small amounts of DNA for STD detection, but it also important for genetic predisposing for defects such as factor V Leiden. It is very helpful way to replicate DNA & diagnose certain diseases. It is very realizable way to test & analyze the DNA & is also very efficient in sense that it only takes few hours. The PCR technology can also employed in law enforcement, genetic testing of animal stocks & vegetable hybrids, drug screening along with many more areas.

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V M K S R VASTRAD ARTS, SCIENCE,

V S BELLIHAL COMMERCE COLLEGE

HUNGUND

PROJECT REPORT

College roll no: 01

Examination seat no: S1937085

CERTIFICATE

This is to certify that Ms: Shilpa Tarival of BSc 6th semester has satisfactory completed the project report in Botany subject as prescribed by Rani Chennamma University Belagavi.

During year 2021-2022

Examiner:

1) Rohpol 14/2/22

2) Hulsoor

Head Dept of Botany

Botany
Head of the Department
V.M.K.S.R.Vastrad Arts, Science and
Science College, Hungund Dist: Bagalkot

VMKSR VASTRAD ARTS, SCIENCE & VS BELLIHAL COMMERCE COLLEGE HUNGUND

POLYMERASE CHAIN REACTION

PROJECT DONE BY

SHILPA TARIVAL

BSC 6TH SEMESTER

BOTANY

RANI CHENNAMMA UNIVERSITY BELAGAVI

2021-2022

POLYMERASE CHAIN REACTION

INTRODUCTION: The polymerase chain reaction technique developed by Kary Mullis in1985. Is extremely powerful. It generates microgram quantities of DNA copies of desired DNA. DNA segment present even as single copy in the intial preparation in matter of few hours. The PCR process has been completely attomated & compact thermal cyclers are available in market. The PCR carried out in invitro technique. It utilizes a DNA preparation containing the desired segment to be amplified 2 nucleotide primers., specific i.e complementary to the 3' borders.
Triphosphates viz, TTP, DCTP, DATP, TGTP & heat stabled DNA polymerase. Ex: Taq(isolated from bacterium thermos acquaticus), Pfu(from pirococcus Furioses),& Vent(from thermococus litoralis) polymerases. Pfu &Vent polymerase are more efficient than Taq polymerase.

PCR is cell free amplification technique for synthesizing multiple identical copies of any DNA of interest. The double stranded DNA of interest is denatured to separate into 2 individual strands. Each strand is allowed to hybridize with a primer (renaturation). The primer template duplex is used for DNA synthesis (DNA polymerase). Denaturation, renaturation & synthesis are

repeated again & again to generate multiple forms of target DNA.

DEFINITION OF PCR: PCR is laboratory technique for rapidly producing (amplifying) millions to billions of copies of specific segment of DNA.

COMPONENTS OF PCR:

1) DNA Template: DNA template is DNA target sequence. DNA template is DNA molecule that contains DNA region to be amplified, segment we are concerned which is target sequence.

2) DNA Polymerase: DNA polymerase sequentially adds nucleotides complimentary to template strand at 3' –OH of bound primers & synthesizes new strands of DNA complementary to target sequence. The most commonly used DNA polymerase is Taq DNA polymerase (from Thermus aquaticus, a therophillic bacterium) because of high temperature stability. Pfu DNA polymerase (from pyrococcus furiosus) also used widely because of higher fidelity.

3) Oligonucleotide primer: Oligonucleotide made up of 2'-deoxyribonucleotides are molecules used in polymerase chain reaction. These are referred to as primers & are used to massively amplify a small amount of DNA. The primer binds to specific DNA sequence & DNA

polymerase is used to extend the oligonucleotide & replicate the complementary strand.

4) Deoxyribonucleotide triphosphate: dNTP stands for deoxyribonucleotide triphosphate employed in PCR to expand the growing DNA strand. dATP , dTTP , dGTP , dTTP ,are four common dNTP's used in PCR. dNTP are used in the chain termination method to stop expansion of DNA synthesis. The ingredients of PCR , RT-PCR, DNA sequencing that helps to grow the DNA or DNA amplification.

5) Buffer system: PCR is carried out in a buffer that provides a suitable chemical environment for activity of DNA polymerase. PCR buffer consist 3 ingredients namely; a)tris hcl: which control the ph.
b)kcl : which help the primer in attachment on DNA single strand in annealing step.
c)
Gelatin: work on DNA stability.

TYPES OF PCR

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2) Quantitative PCR
3) Single cell PCR
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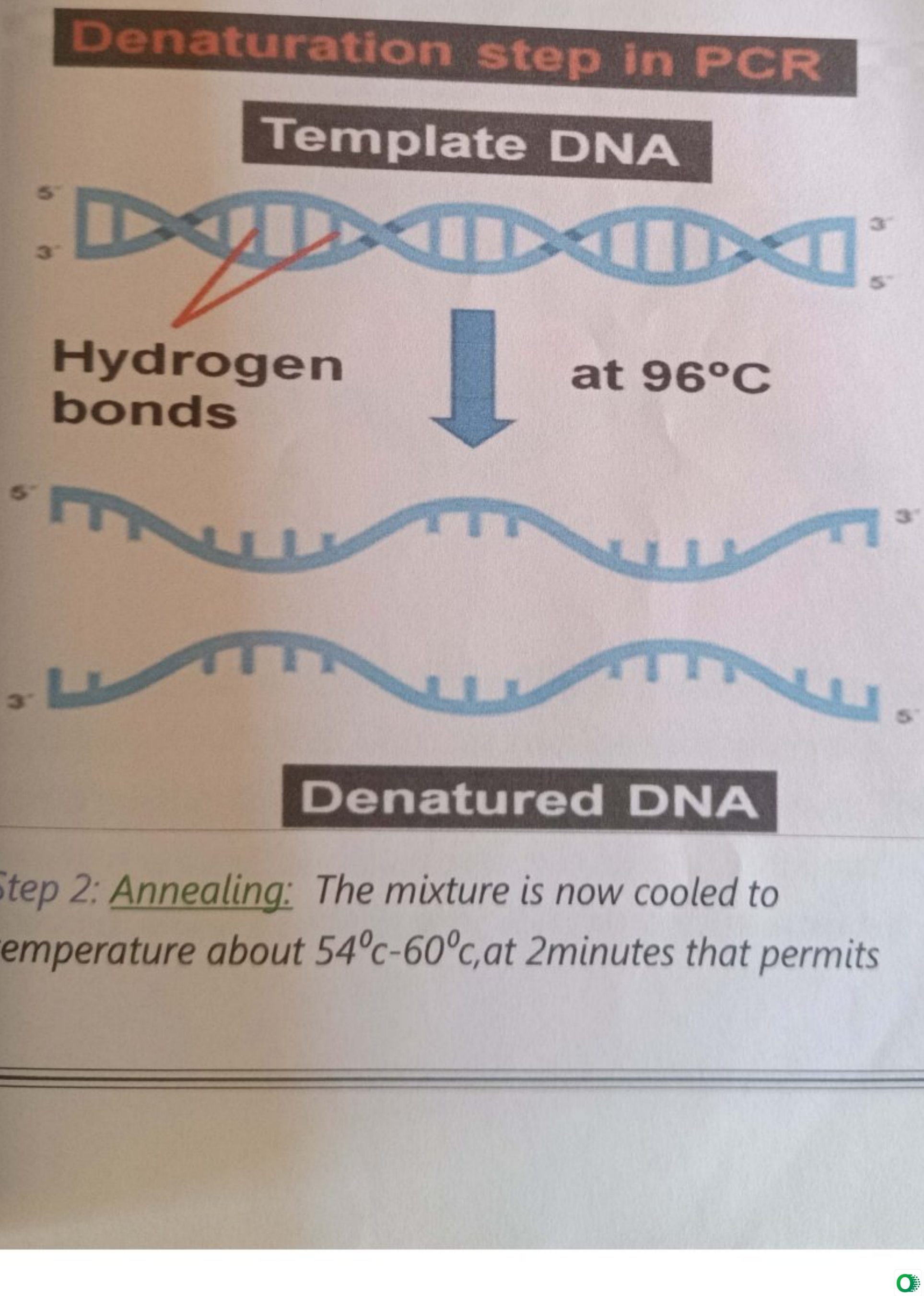

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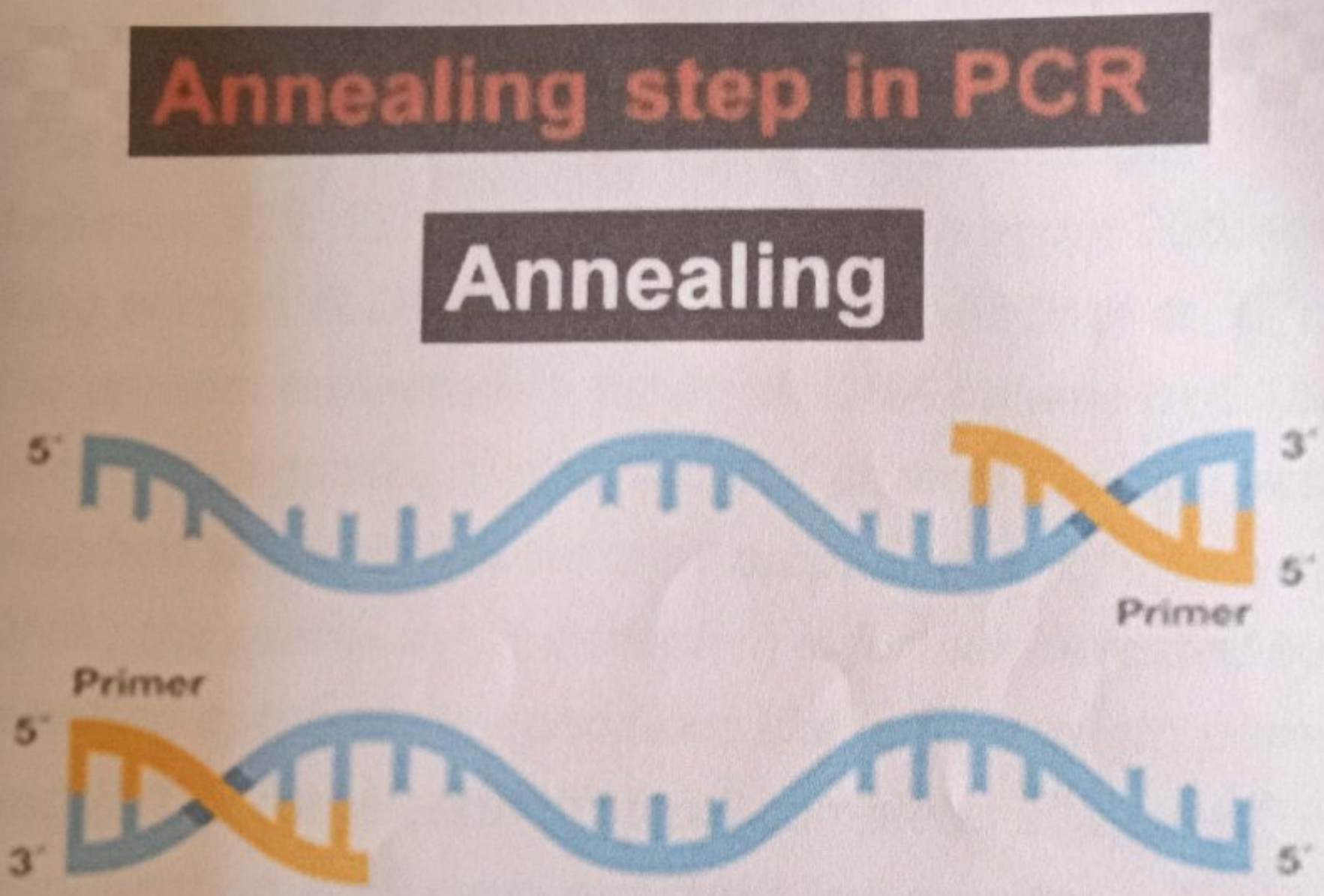

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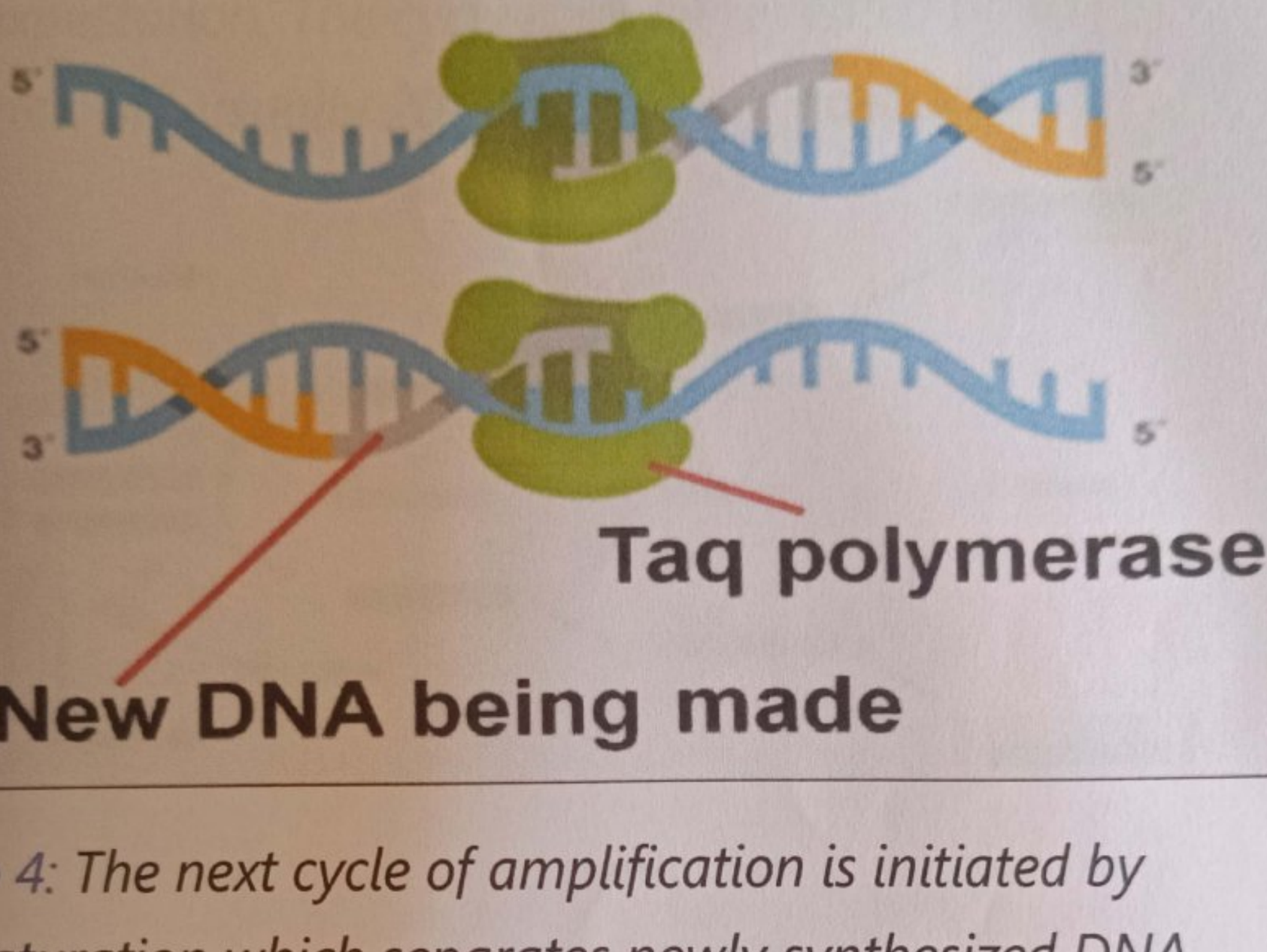

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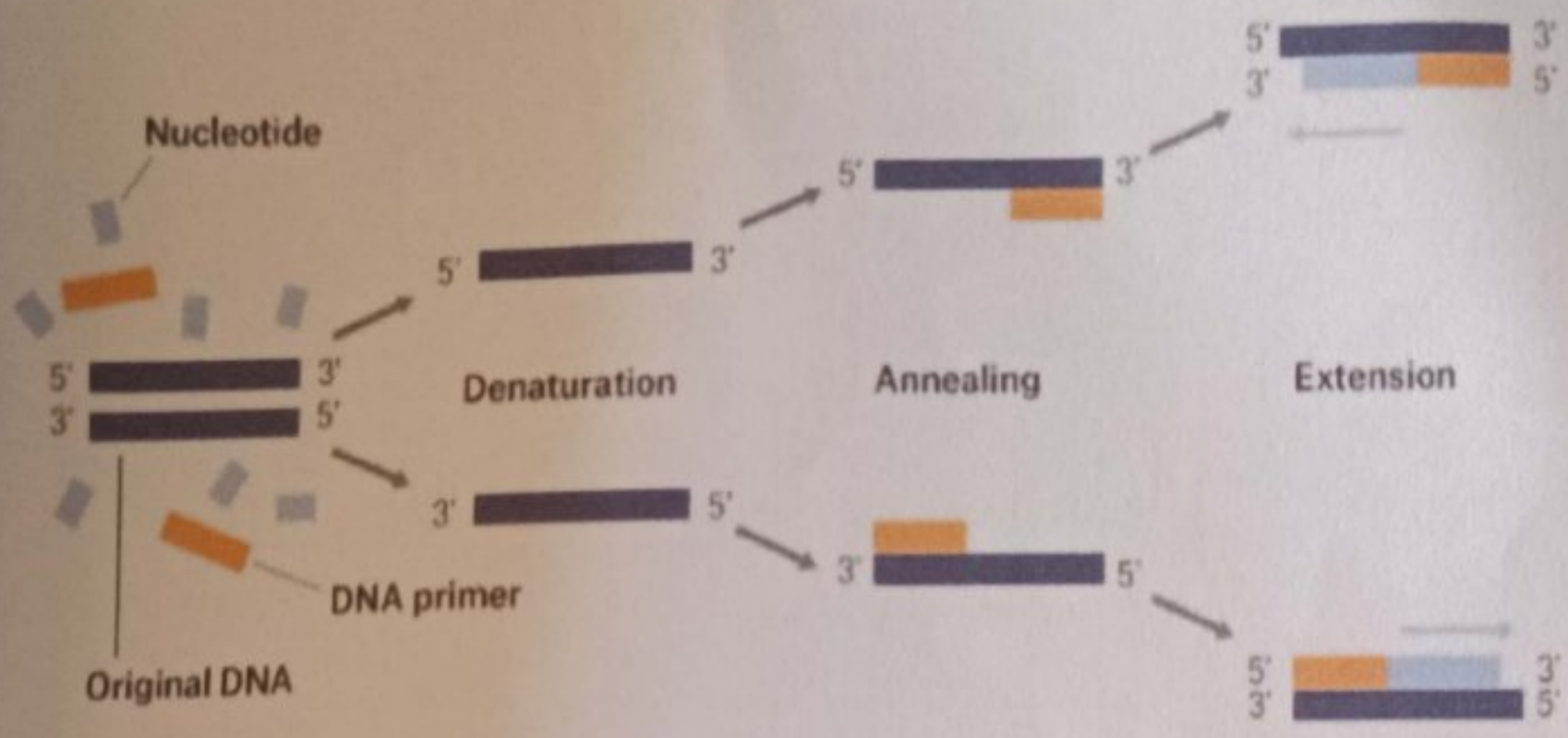

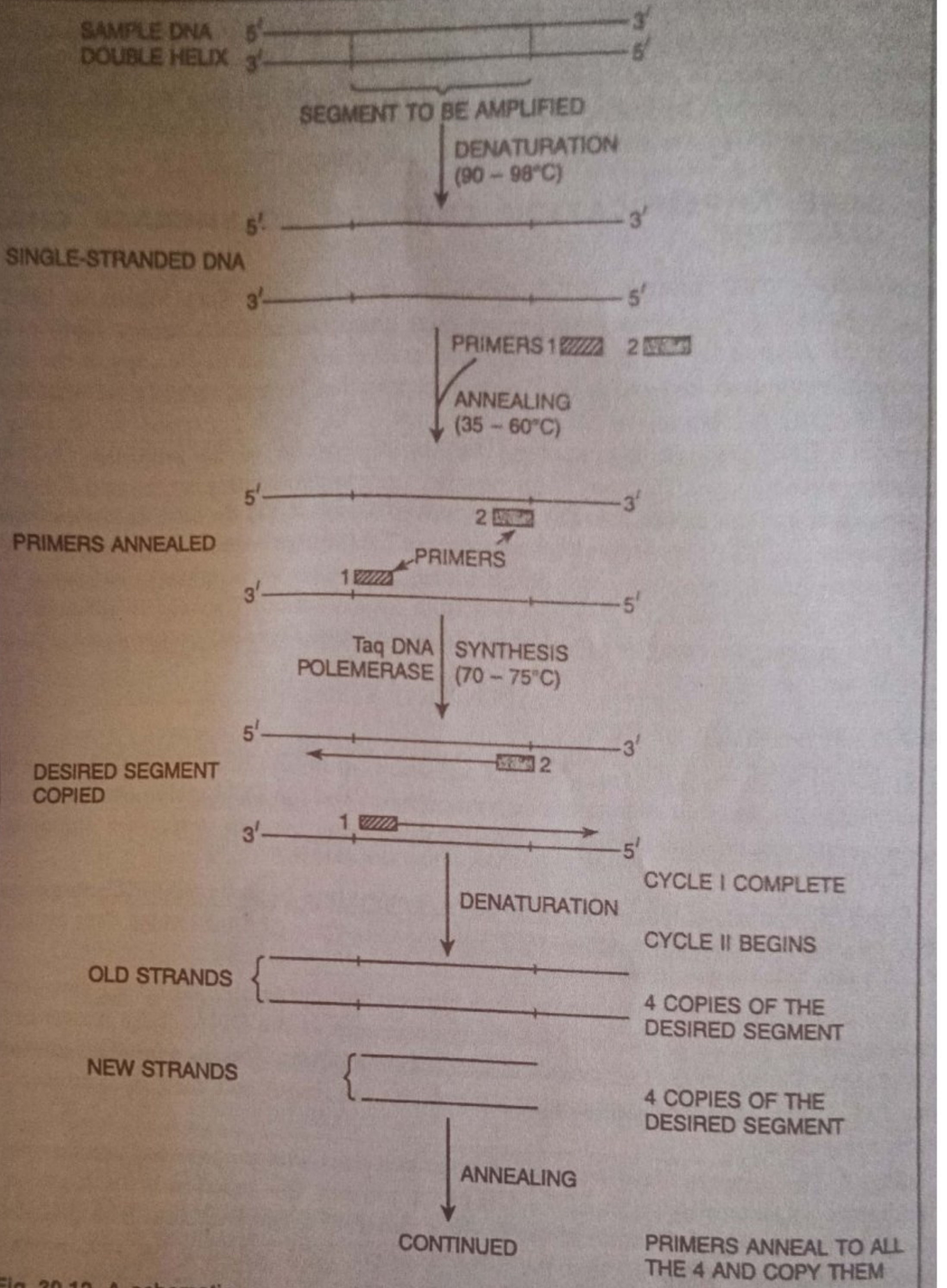

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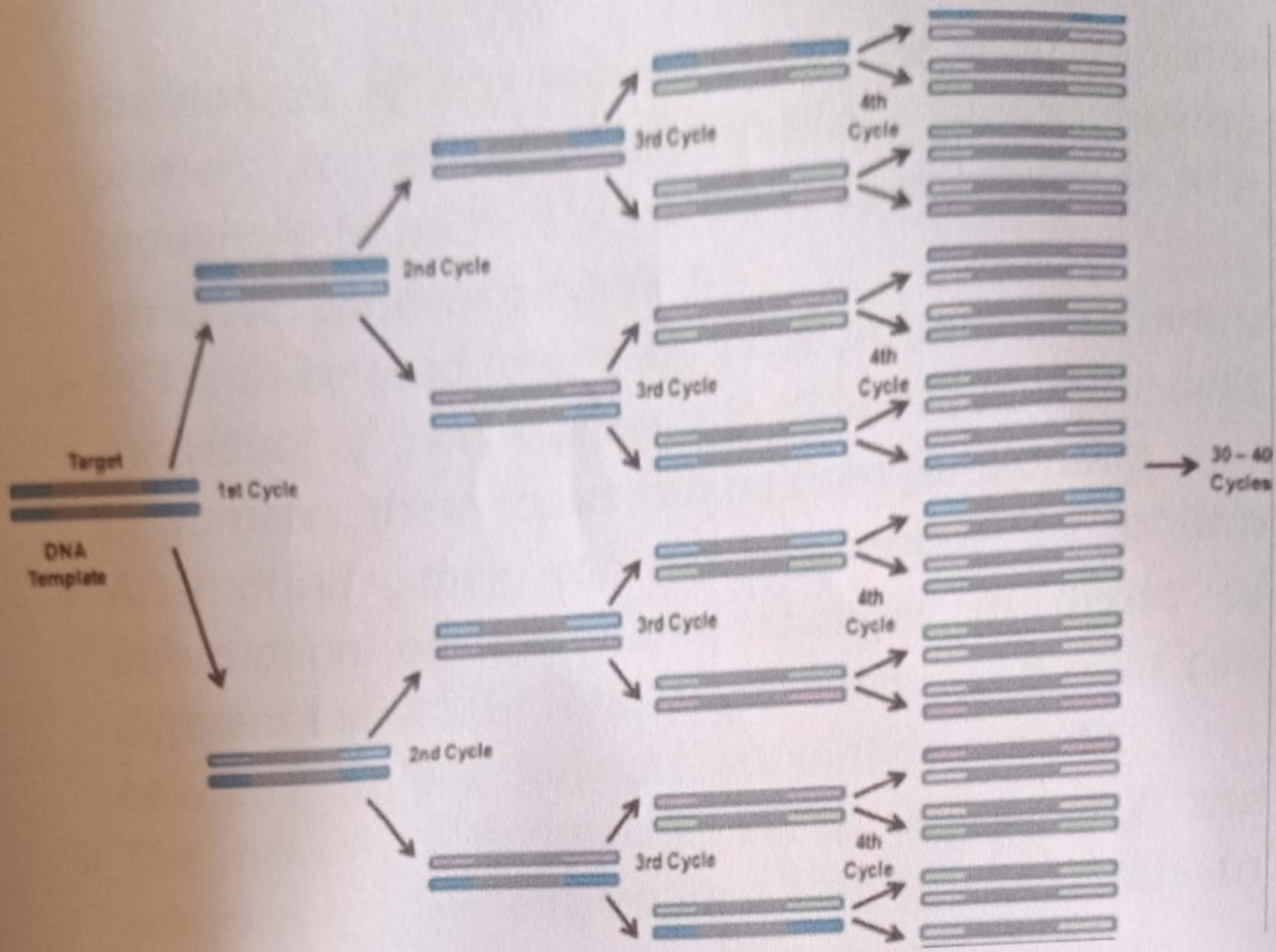

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nucleotides of any sequence can be used random primers to amplify polymorphic DNA's having sequences to primers used. Such application of PCR generates random amplified.

- PCR can be used to amplify gene present in different individual of species & even in different somatic cells or gametes, these copies can be used for cloning.
- Alternatively they can be sequenced to obtain information on mutational changes in genes of different individuals' cells or gametes. Such data can be used in disease diagnosis population growth.
- The ability to synthesize short oligos and the advances in DNA enzymology lead to the ability to amplify DNA sequences.
- PCR can also used in parental testing, where an individual is matched with their close relatives.
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