

TRACHEOPHYTE

HETEROMORPHIC SPORIC LIFE CYCLE

SPORO PHYTE

INITIALLY

GAMETO PHYTE

DEPENDENT



MITOSIS

SPORO CYTES 2N

ZYGOTE 2N

MEIOSIS

SYNGAMY

GAMETE SPERM 1N

GAMETE EGG 1N

SPORES 1N

MITOSIS

GAMETOCYTES 1N

MITOSIS



PLANT SPECIATION

QUESTION

**WHAT DRIVES
SPECIATION?**

QUESTION



ANSWER

MUTATIONS

ANSWER

MUTATION

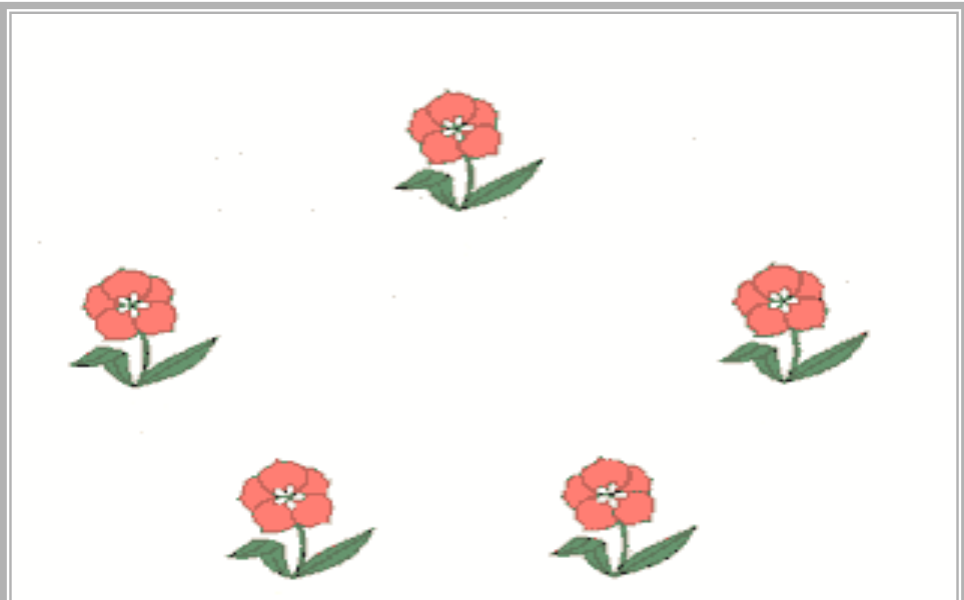
MUTATION

MUTATION

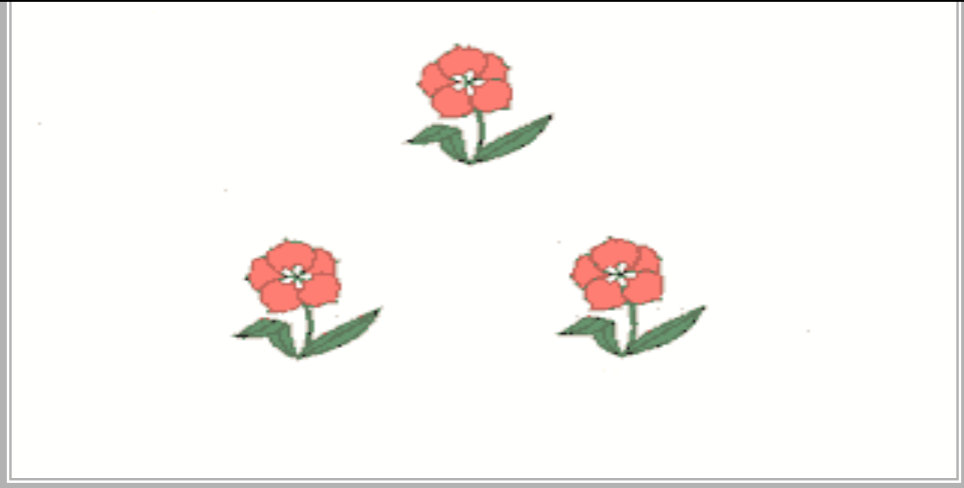


CHANGE IN DNA STRUCTURE

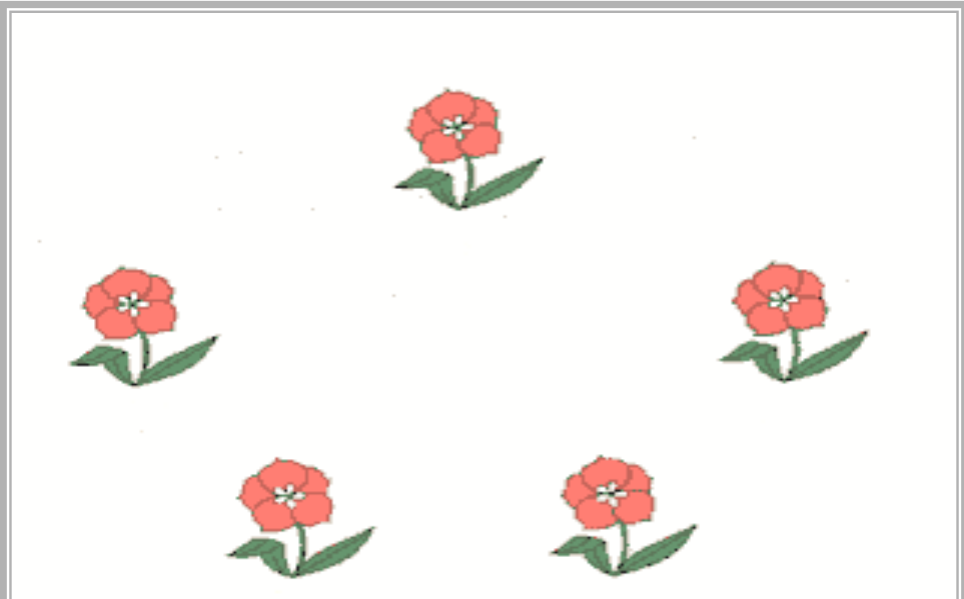
MUTATION



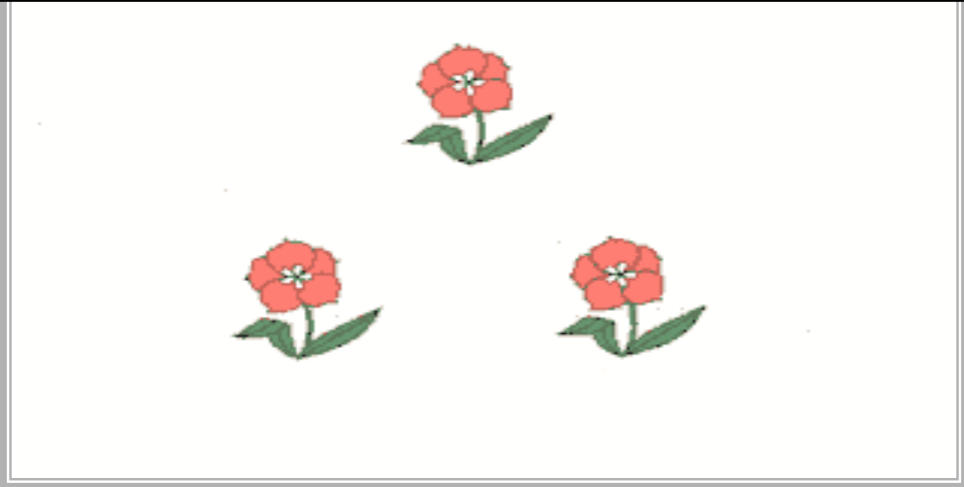
PLANT POPULATION



RED FLOWERED PLANTS



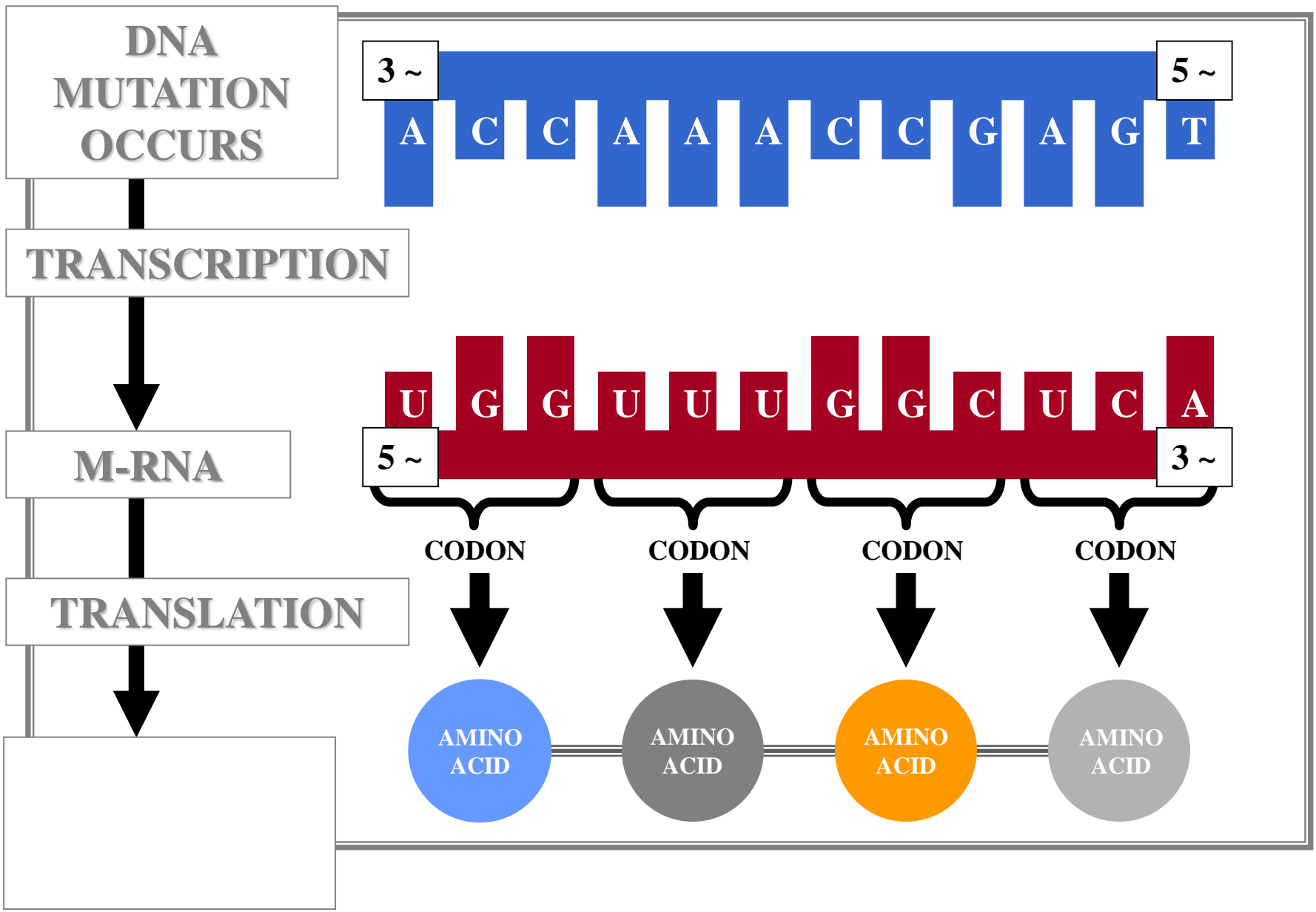
DNA MUTATION OCCURS



RED FLOWERED PLANTS

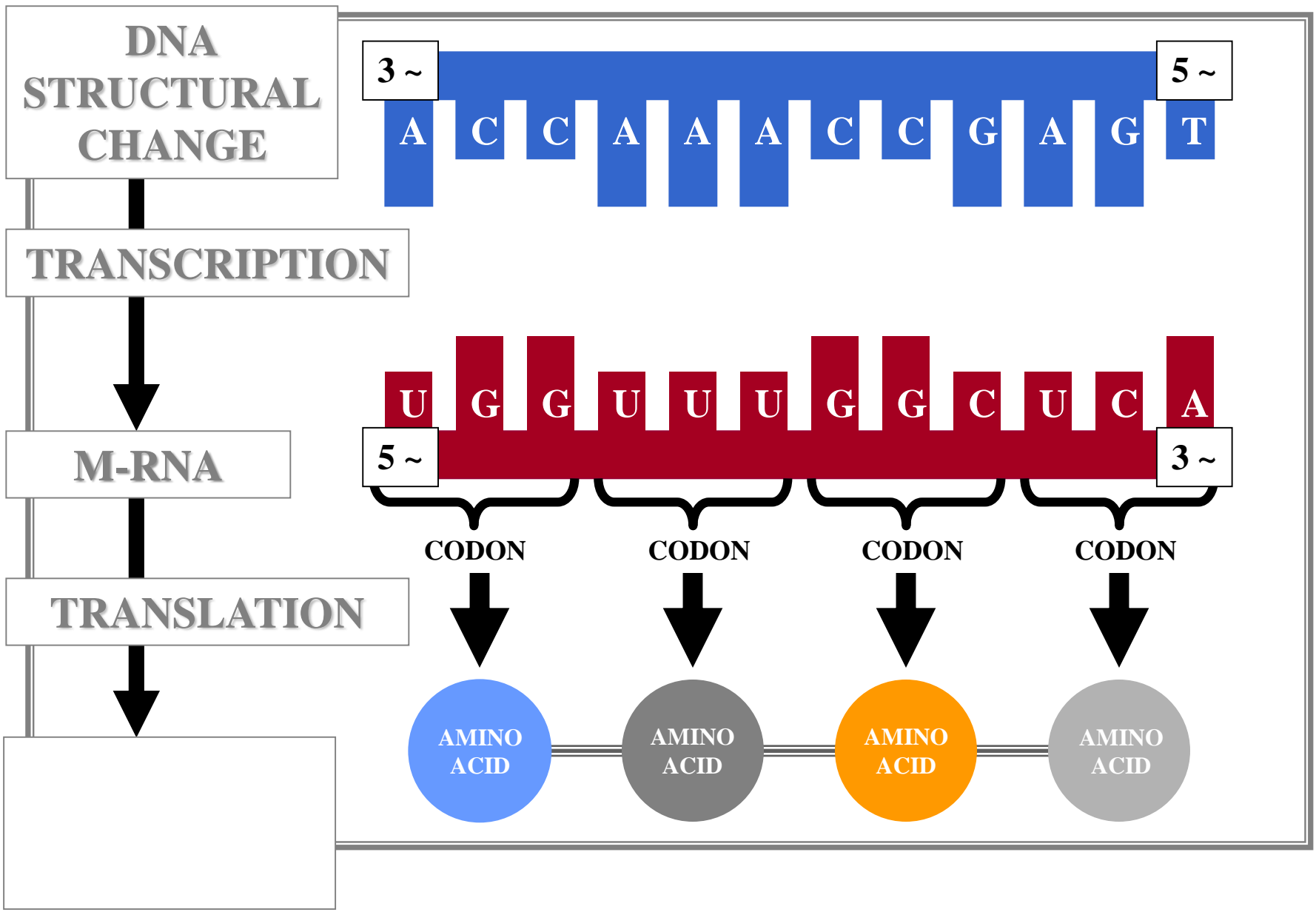


PROTEIN SYNTHESIS



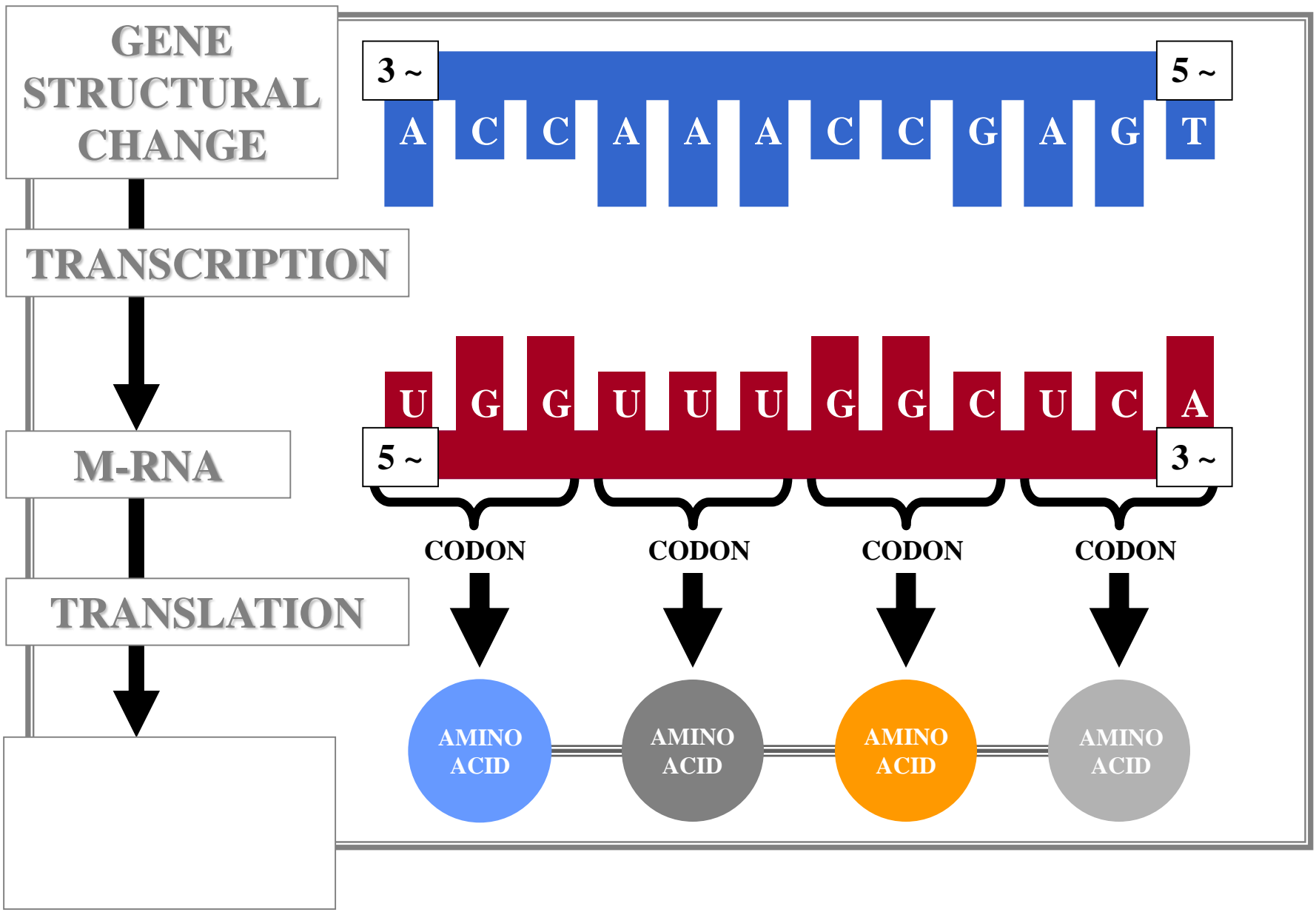


PROTEIN SYNTHESIS



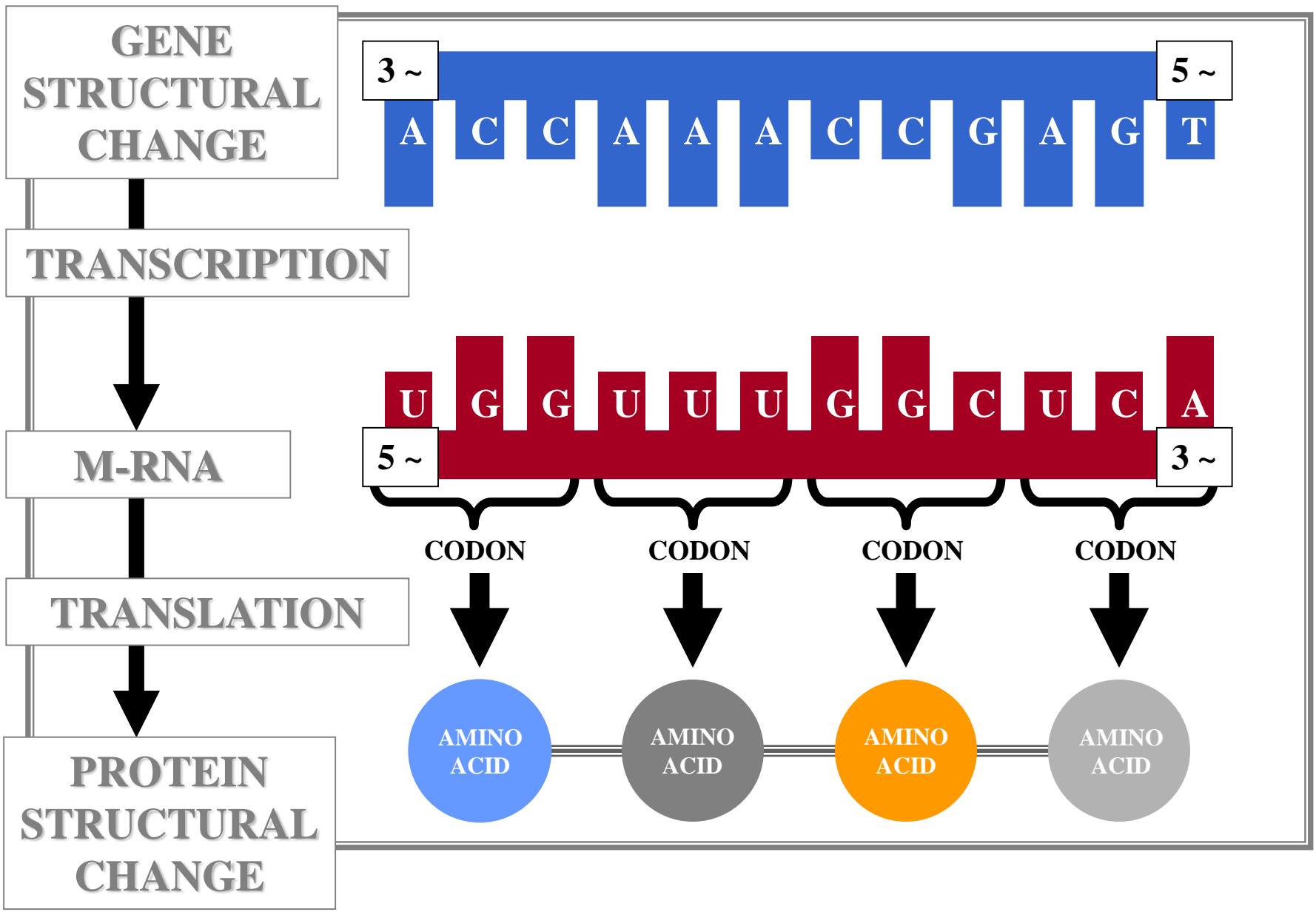


PROTEIN SYNTHESIS



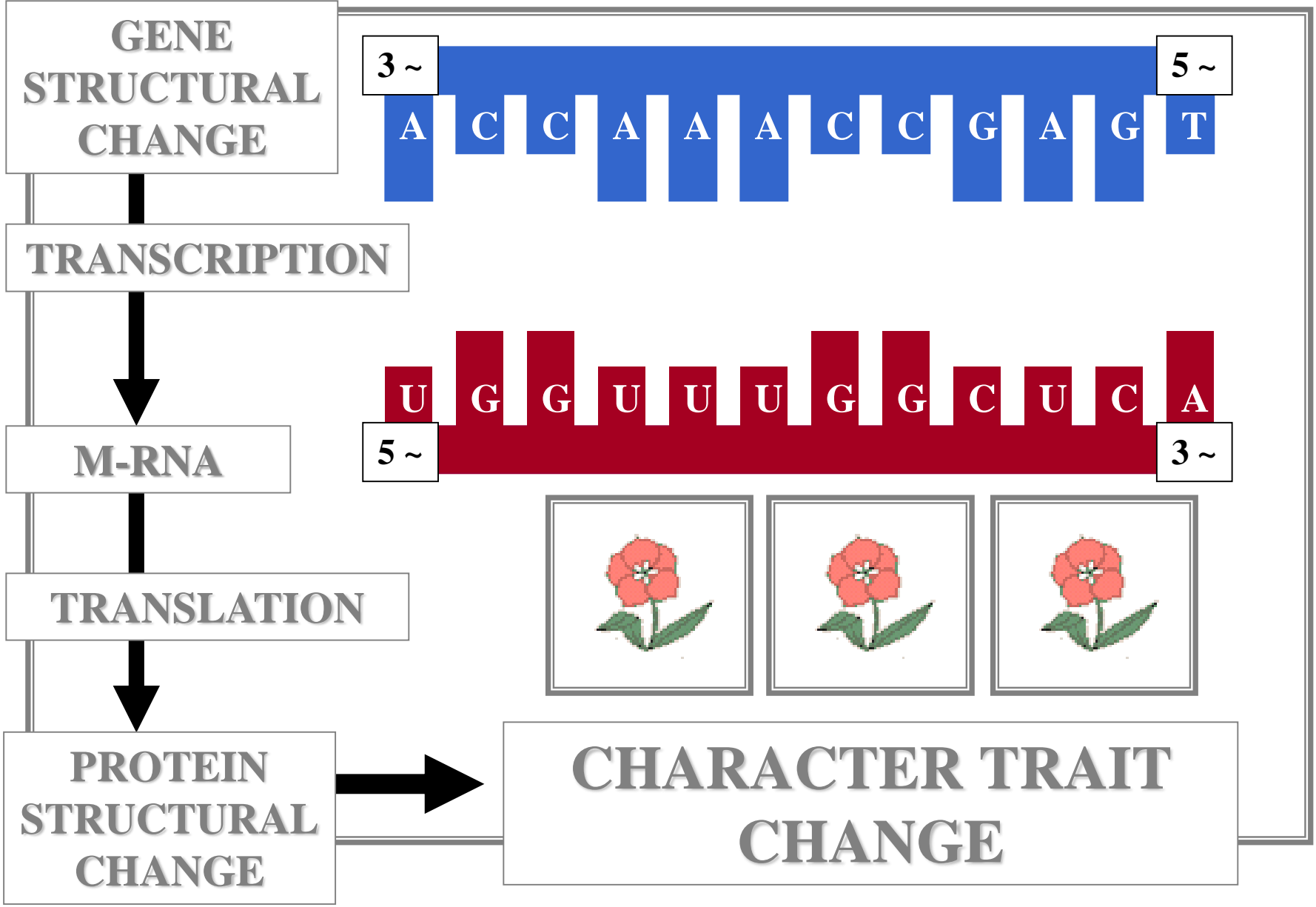


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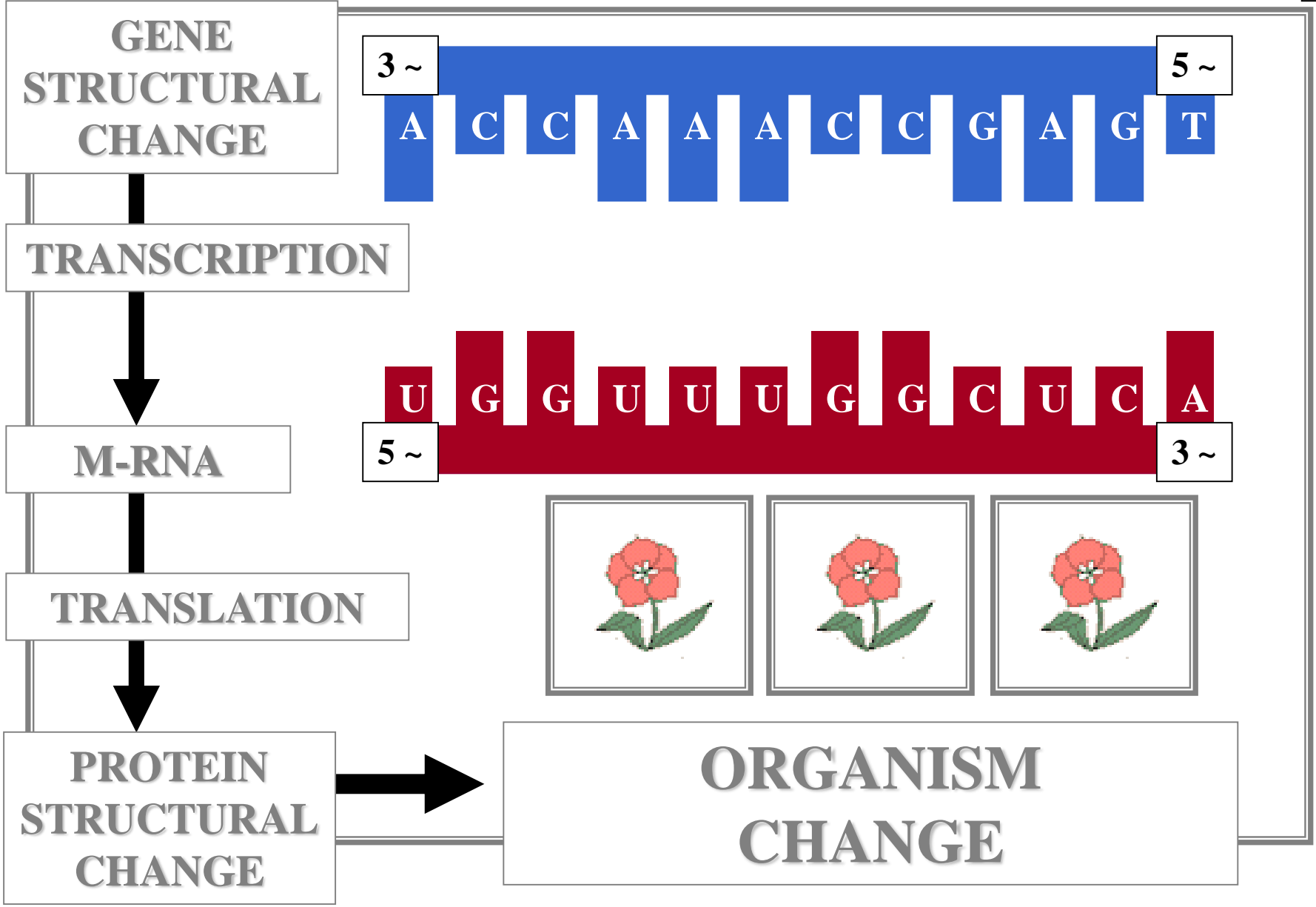


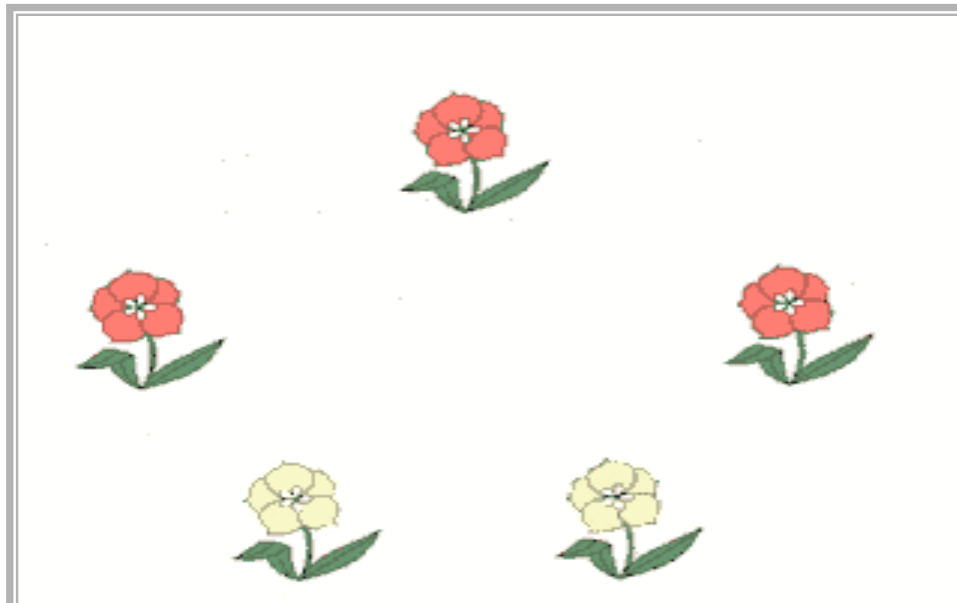
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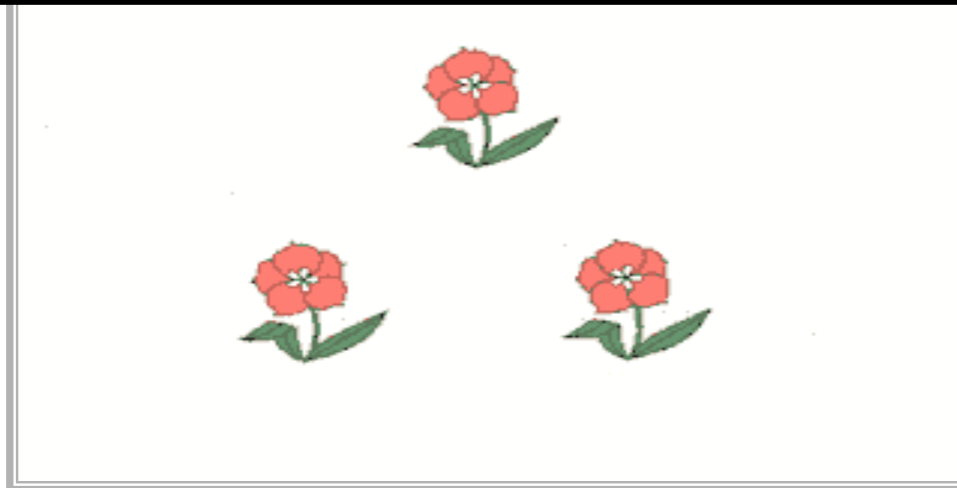


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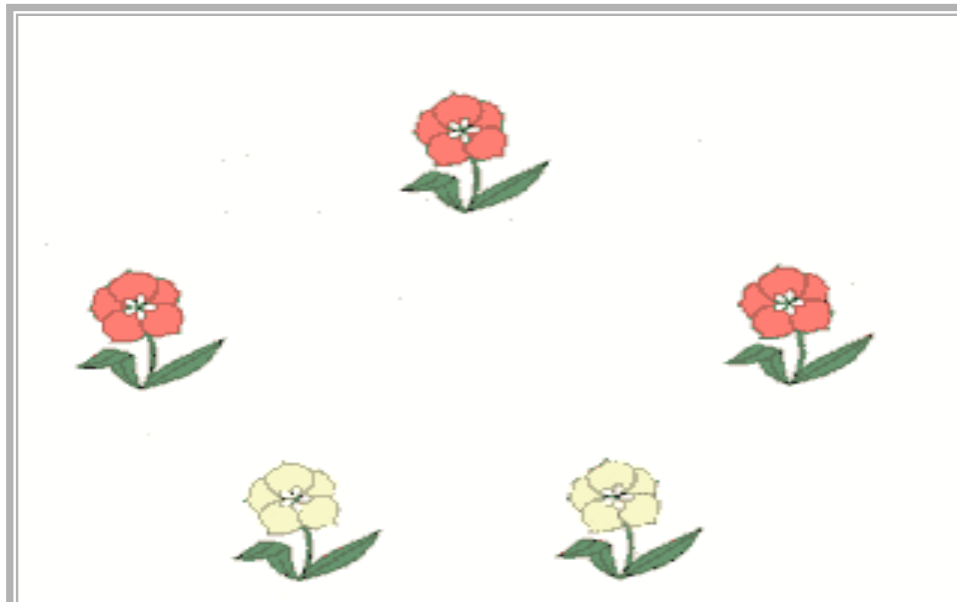




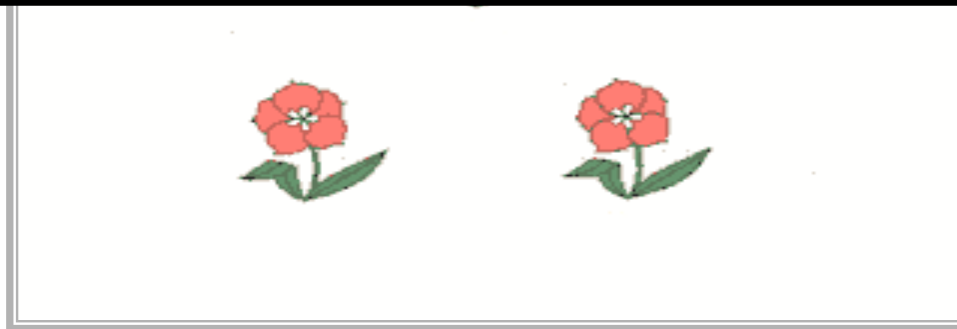
ORGANISM CHANGE



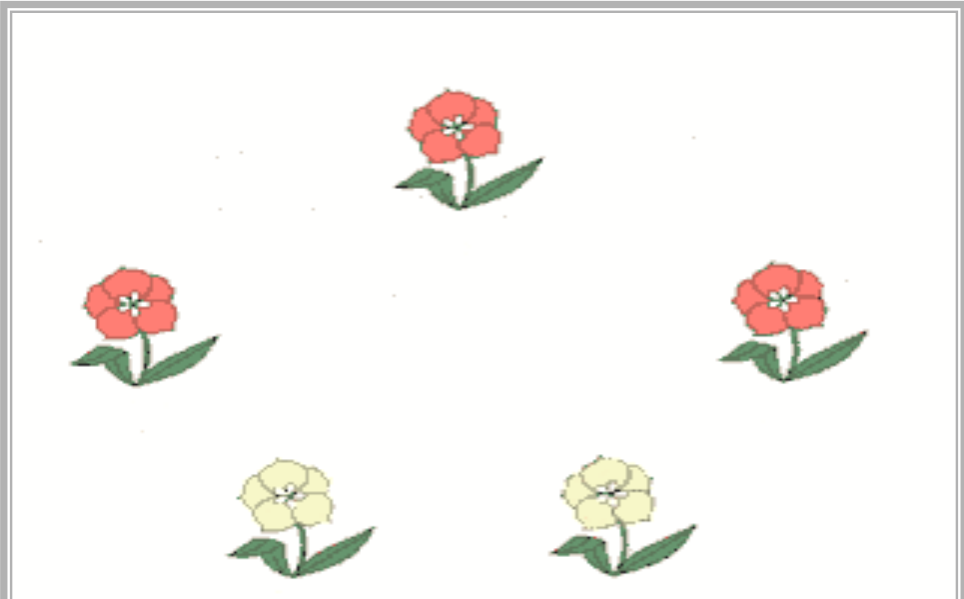
MUTATION: WHITE FLOWERED PLANTS



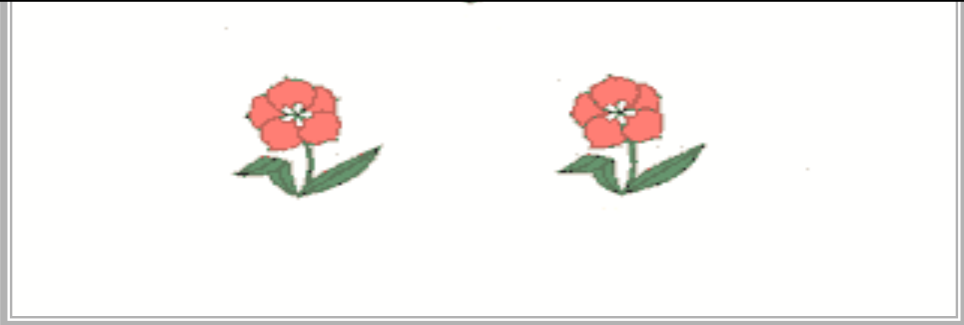
MUTATION UNDERGOES SURVIVAL TEST



MUTATION: WHITE FLOWERED PLANTS



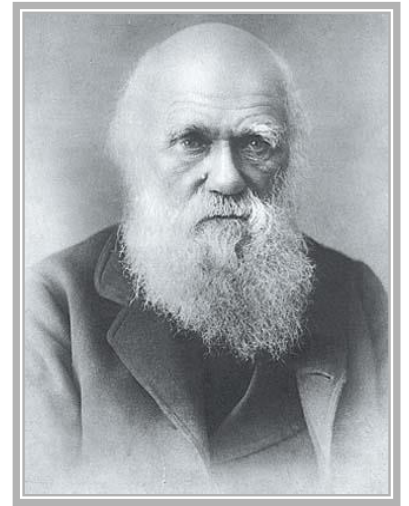
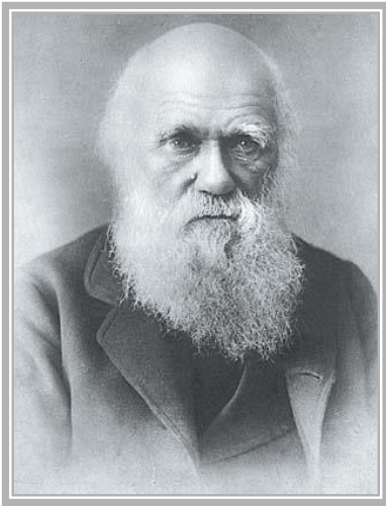
**MUTATION UNDERGOES
NATURAL SELECTION**



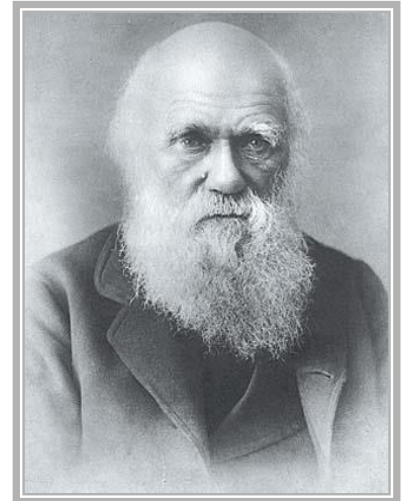
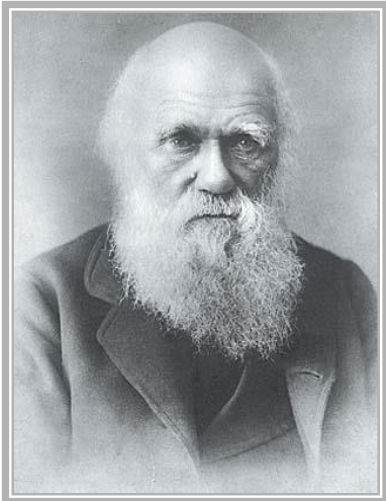
MUTATION: WHITE FLOWERED PLANTS

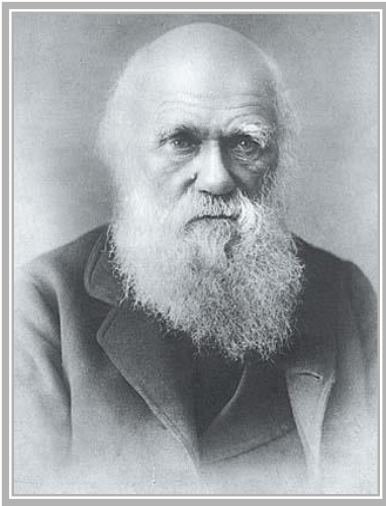


NATURAL SELECTION

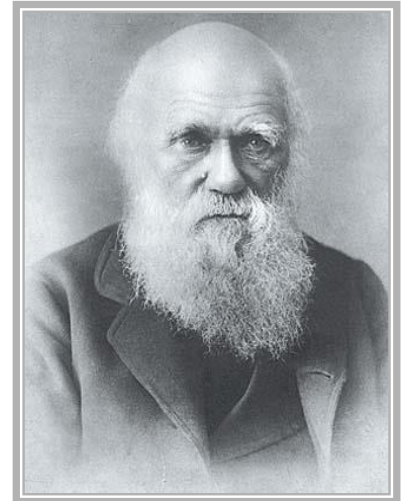
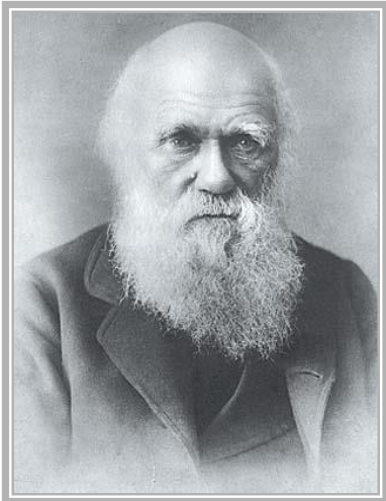
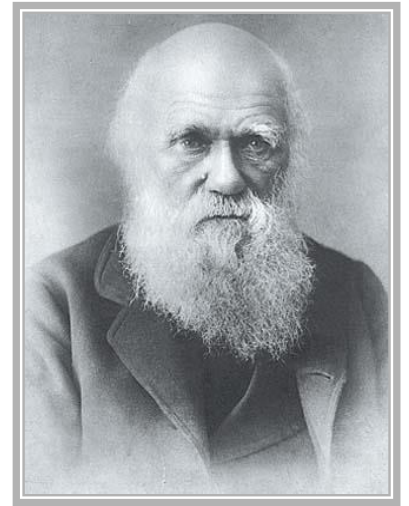


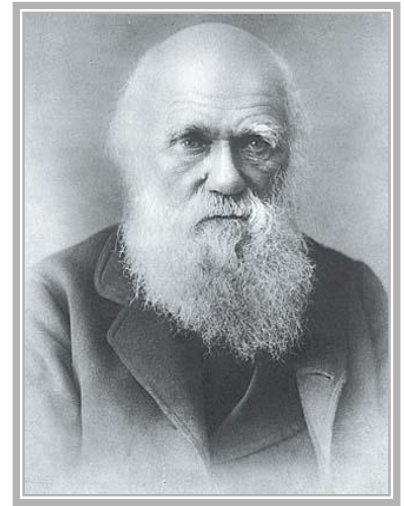
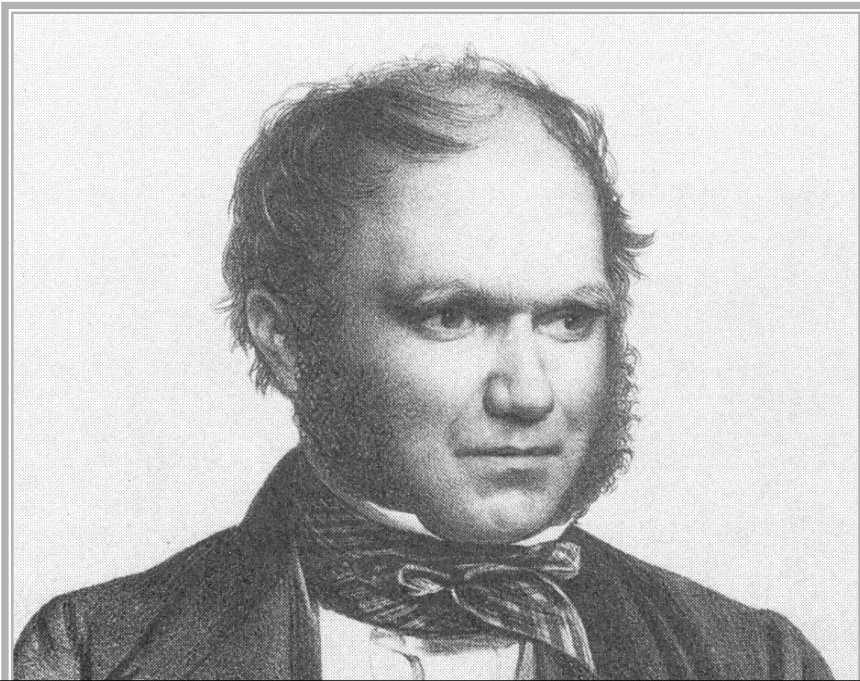
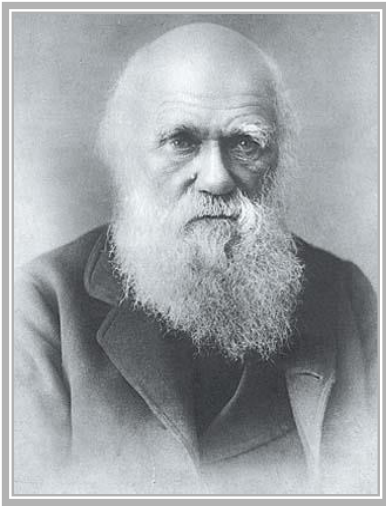
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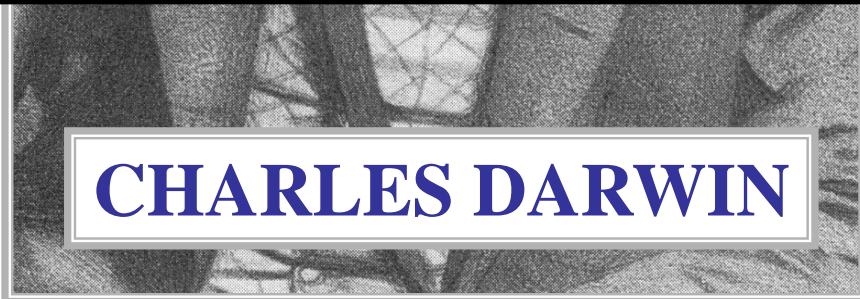
CHARLES DARWIN





N

PROPOSED NATURAL SELECTION



CHARLES DARWIN

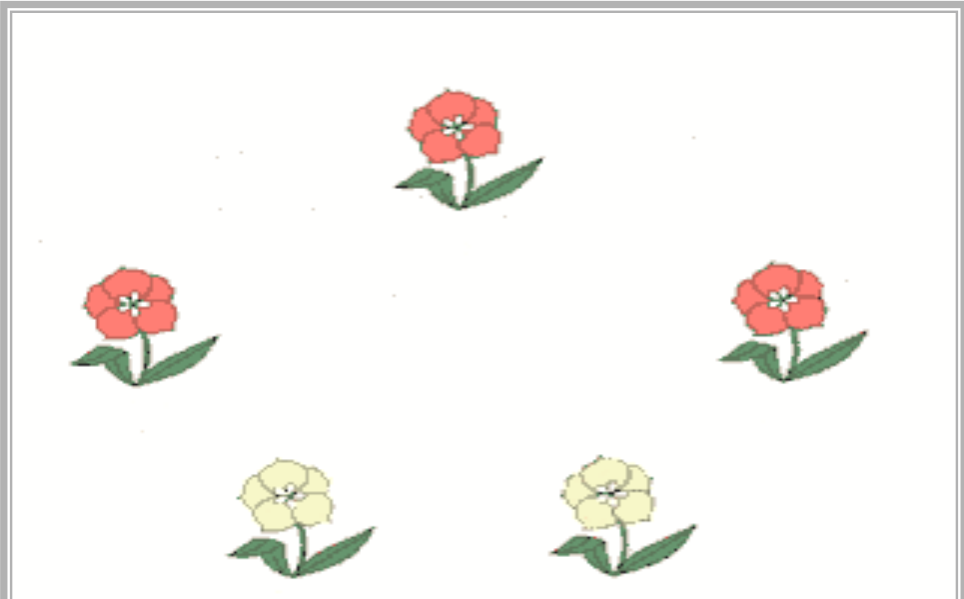
NATURAL SELECTION

NATURAL SELECTION

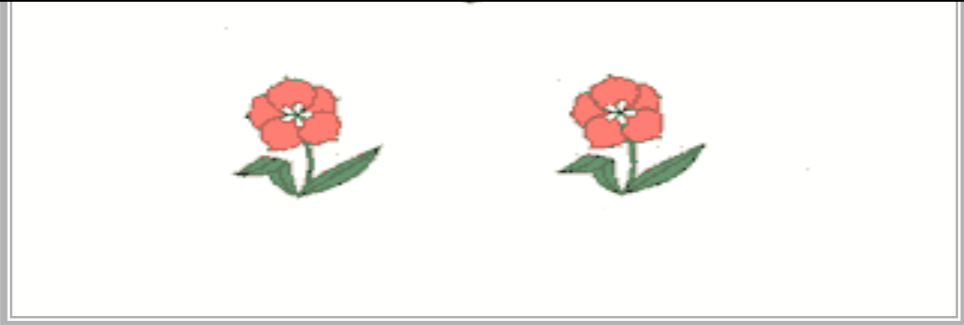


**ENVIRONMENTAL
SURVIVAL TEST**

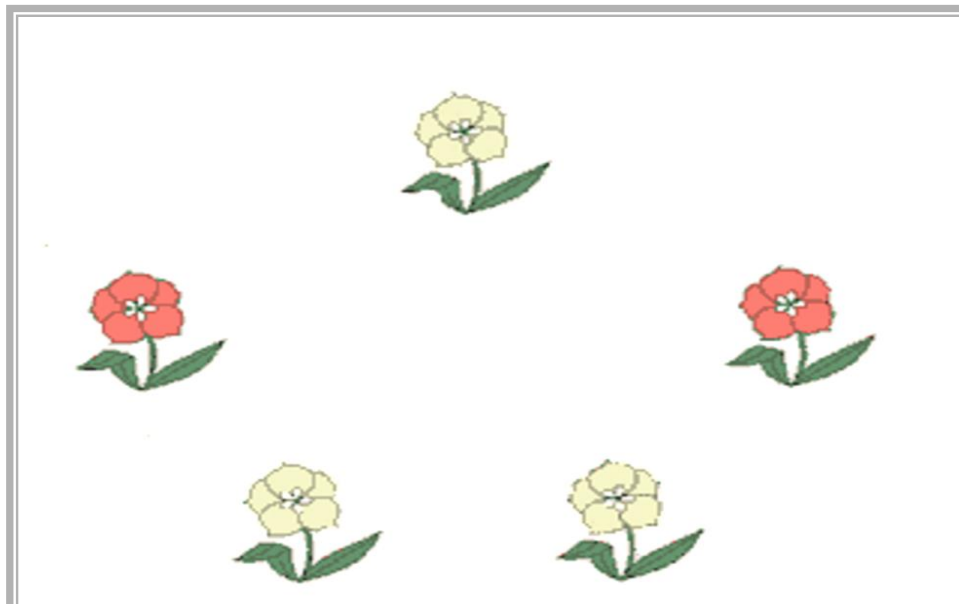
NATURAL SELECTION



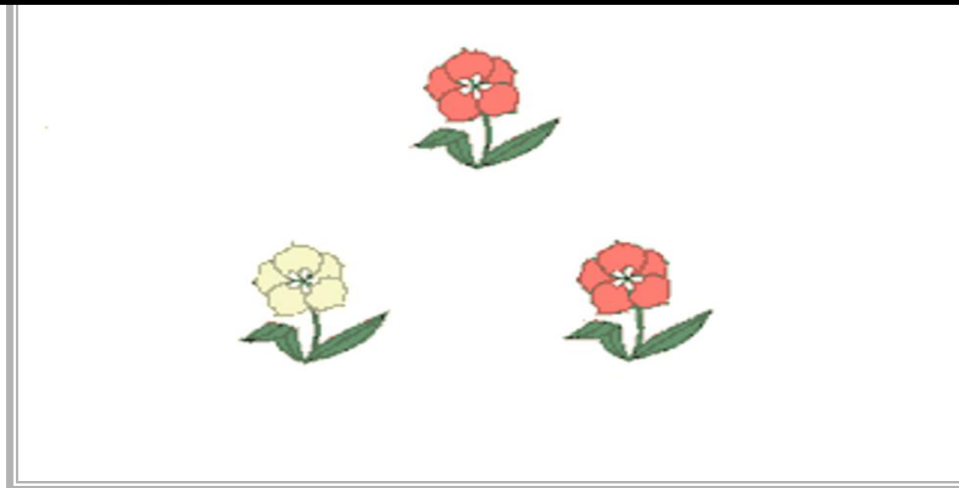
**ORGANISM PASSES
NATURAL SELECTION**



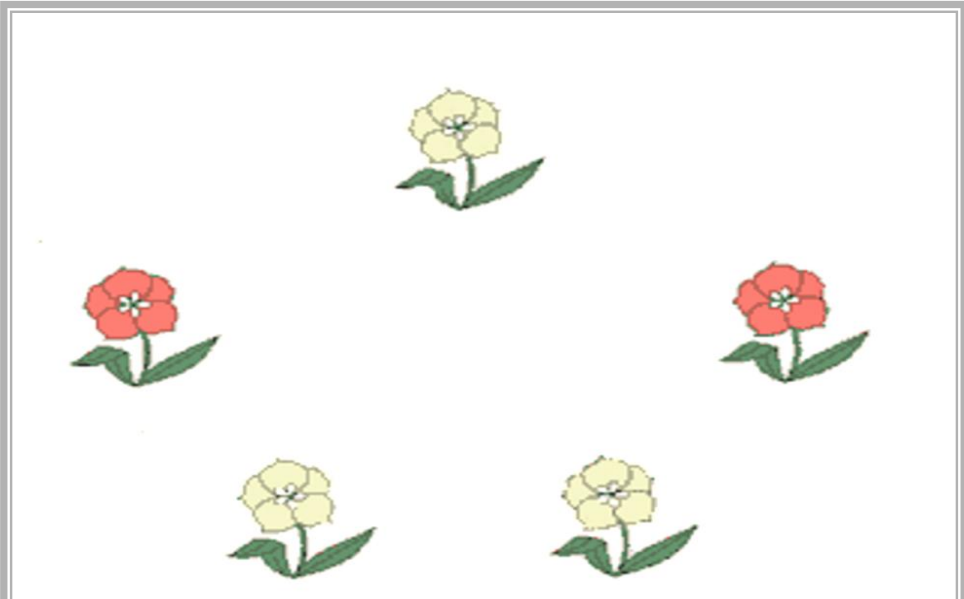
MUTATION: WHITE FLOWERED PLANTS



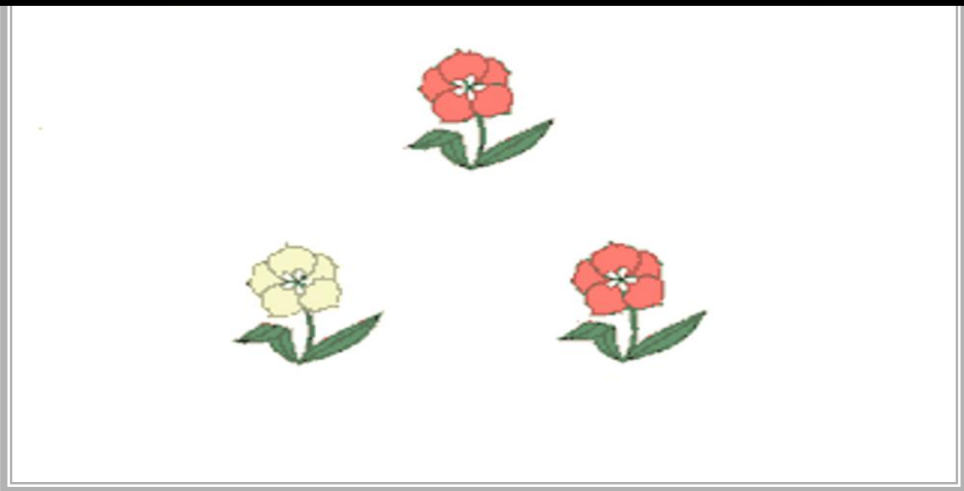
NEW SPECIES



DAUGHTER SPECIES



SPECIATION



DAUGHTER SPECIES

SPECIATION

SPECIATION



SPECIATION

**EVOLUTION
NEW SPECIES**

SPECIATION

SPECIATION TYPES

SPECIATION TYPES

ANAGENETIC SPECIATION

SPECIATION TYPES



SPECIATION TYPES

ANAGENETIC SPECIATION
CLADOGENETIC SPECIATION

SPECIATION TYPES

ANA GENETIC SPECIATION

ANA GENETIC SPECIATION

ANAGENETIC SPECIATION



1 SPECIES EVOLVES
INTO
1 NEW SPECIES

ANAGENETIC
SPECIATION

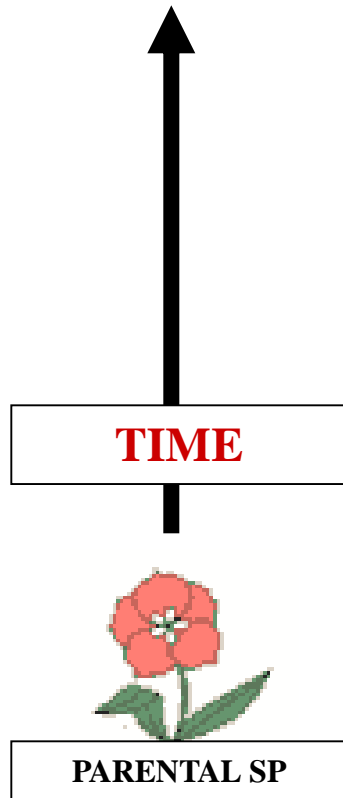
ANAGENETIC VS CLADOGENETIC SPECIATION

T



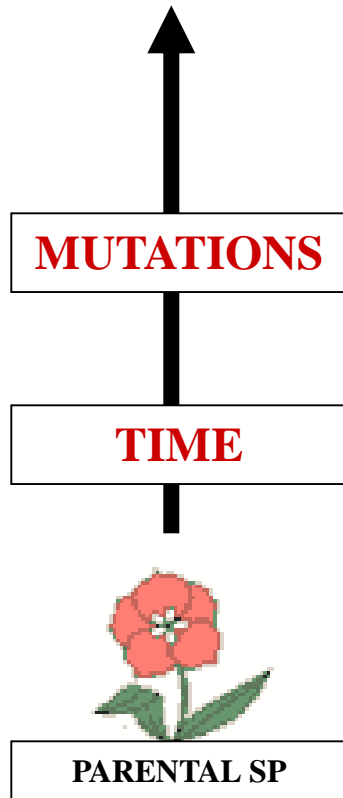
PARENTAL SP

ANAGENETIC VS CLADOGENETIC SPECIATION



ANAGENETIC VS CLADOGENETIC SPECIATION

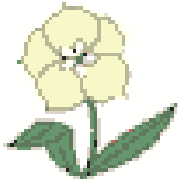
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ANAGENETIC VS CLADOGENETIC SPECIATION



DAUGHTER SP



MUTATIONS

TIME



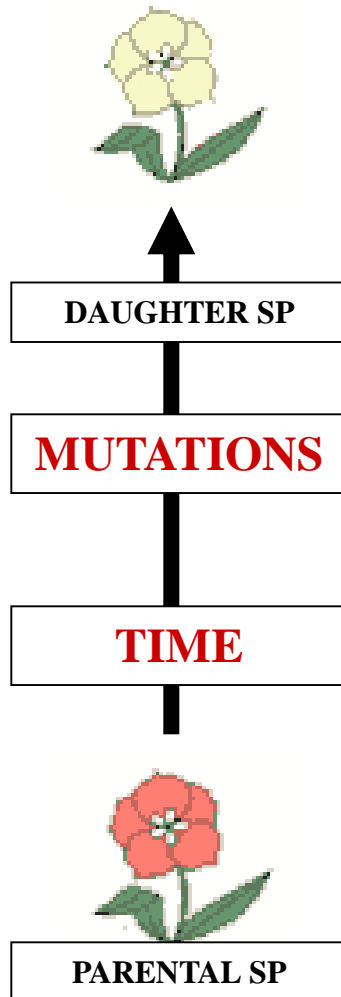
PARENTAL SP

ANAGENETIC VS CLADOGENETIC



ANAGENETIC
SPECIATION

SPECIATION



ANAGENETIC VS CLADOGENETIC

ANAGENETIC
SPECIATION

SPECIATION



DAUGHTER SP

MUTATIONS

DOES NOT DERIVE BIO-DIVERSITY



PARENTAL SP

CLADOGENETIC SPECIATION

CLADOGENETIC SPECIATION

CLADOGENETIC SPECIATION



1 SPECIES EVOLVES
2 NEW SPECIES

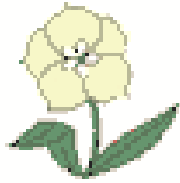
CLADOGENETIC
SPECIATION

ANAGENETIC VS CLADOGENETIC

T

ANAGENETIC
SPECIATION

SPECIATION



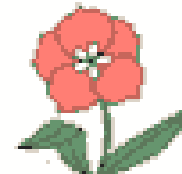
DAUGHTER SP

MUTATIONS

DOES NOT DERIVE BIO-DIVERSITY



PARENTAL SP



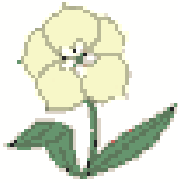
PARENTAL SP

ANAGENETIC VS CLADOGENETIC

I

ANAGENETIC
SPECIATION

SPECIATION



DAUGHTER SP

MUTATIONS

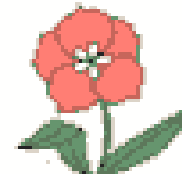
DOES NOT DERIVE BIO-DIVERSITY



PARENTAL SP



TIME



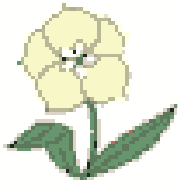
PARENTAL SP

ANAGENETIC VS CLADOGENETIC

T

ANAGENETIC
SPECIATION

SPECIATION



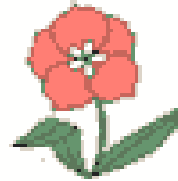
DAUGHTER SP

MUTATIONS

DOES NOT DERIVE BIO-DIVERSITY



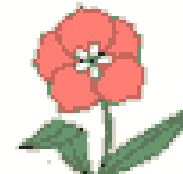
PARENTAL SP



OCCUPY DIFFERENT GEOGRAPHIC AREAS

ISOLATION

TIME



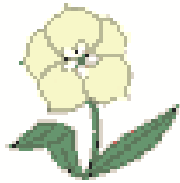
PARENTAL SP

ANAGENETIC VS CLADOGENETIC

M

ANAGENETIC
SPECIATION

SPECIATION



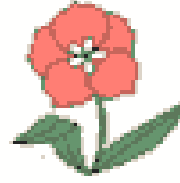
DAUGHTER SP

MUTATIONS

DOES NOT DERIVE BIO-DIVERSITY



PARENTAL SP



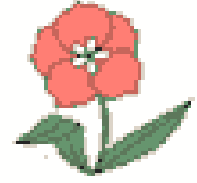
TIME

ISOLATION

TIME



PARENTAL SP



TIME

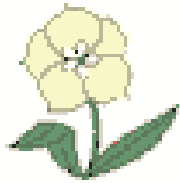
ANAGENETIC VS CLADOGENETIC

ANAGENETIC
SPECIATION

SPECIATION

DS

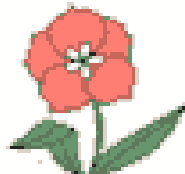
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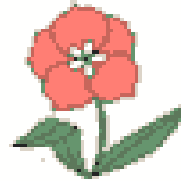
DAUGHTER SP

MUTATIONS

DOES NOT DERIVE BIO-DIVERSITY



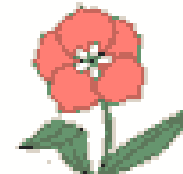
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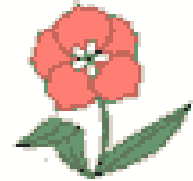
MUTATIONS

ISOLATION

TIME



PARENTAL SP



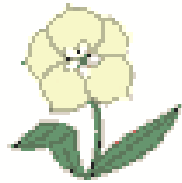
MUTATIONS

ANAGENETIC VS CLADOGENETIC

ANAGENETIC
SPECIATION

SPECIATION

C
+



DAUGHTER SP

MUTATIONS

DOES NOT DERIVE BIO-DIVERSITY



PARENTAL SP

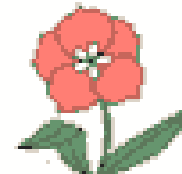
DAUGHTER SP



MUTATIONS

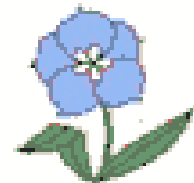
ISOLATION

TIME



PARENTAL SP

DAUGHTER SP



MUTATIONS

ANAGENETIC VS CLADOGENETIC

ANAGENETIC
SPECIATION

SPECIATION

CLADOGENETIC
SPECIATION

D



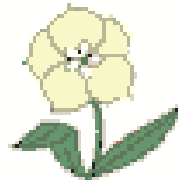
DAUGHTER SP

MUTATIONS

DOES NOT DERIVE BIO-DIVERSITY



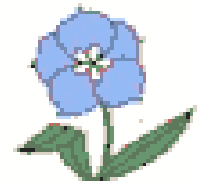
PARENTAL SP



DAUGHTER SP

ISOLATION

TIME



DAUGHTER SP



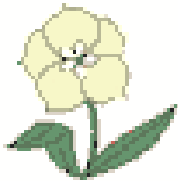
PARENTAL SP

ANAGENETIC VS CLADOGENETIC

ANAGENETIC
SPECIATION

SPECIATION

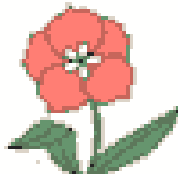
CLADOGENETIC
SPECIATION



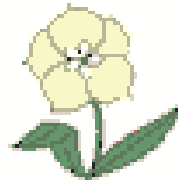
DAUGHTER SP

MUTATIONS

DOES NOT DERIVE BIO-DIVERSITY



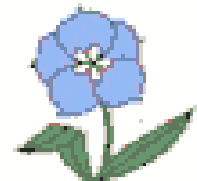
PARENTAL SP



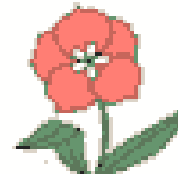
DAUGHTER SP

MUTATIONS

DOES DERIVE BIO-DIVERSITY



DAUGHTER SP



PARENTAL SP



CLADOGENETIC SPECIATION TYPES

**CLADOGENETIC
SPECIATION
TYPES**

ALLOPATRIC SPECIATION

**CLADOGENETIC
SPECIATION
TYPES**



CLADOGENETIC SPECIATION TYPES

ALLOPATRIC SPECIATION
SYMPATRIC SPECIATION

CLADOGENETIC SPECIATION TYPES

**SYMPATRIC
DISTRIBUTION
VS
ALLOPATRIC
DISTRIBUTION**

SYMPATRIC DISTRIBUTION

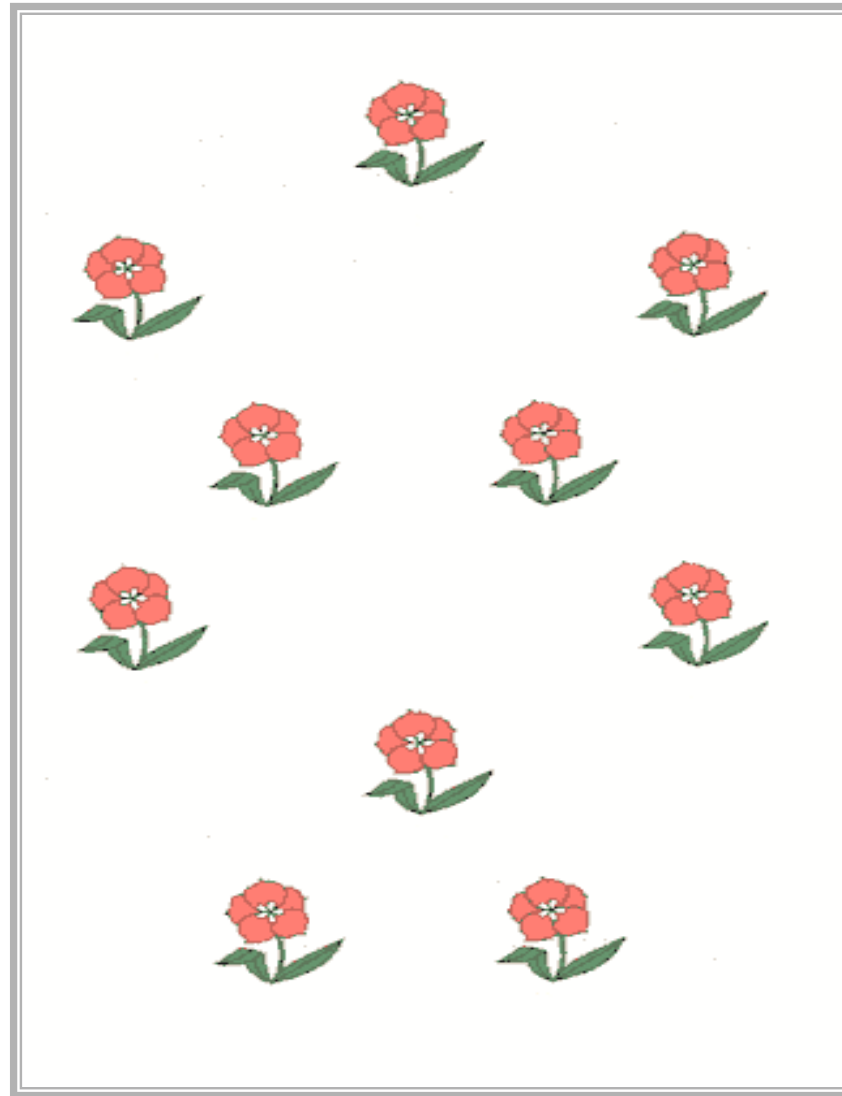
SYMPATRIC DISTRIBUTION



**POPULATION
OCCUPIES SAME
GEOGRAPHIC AREA**

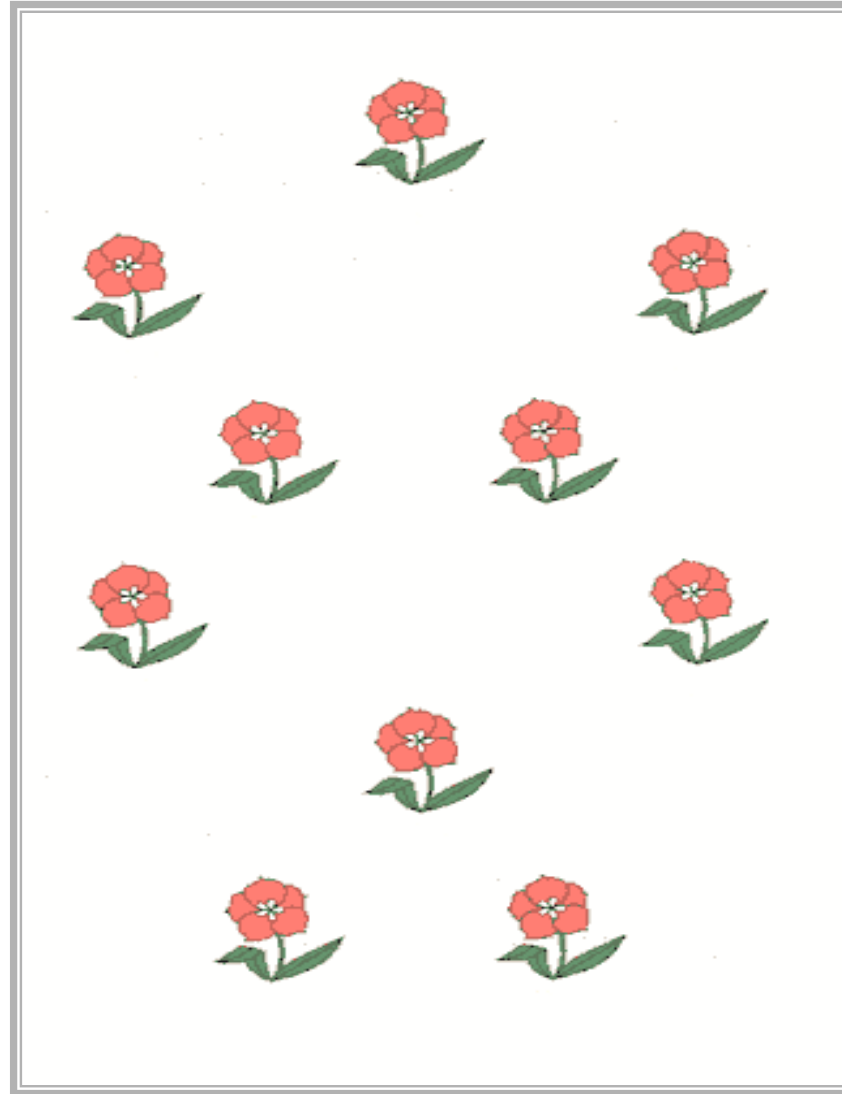
**SYMPATRIC
DISTRIBUTION**

**GEOGRAPHIC
AREA**

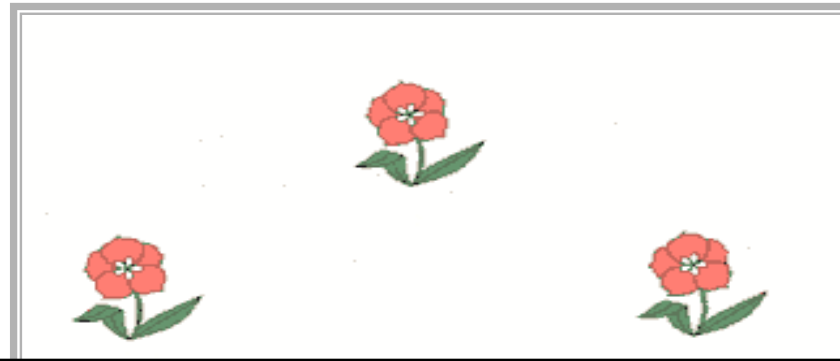


**GEOGRAPHIC
AREA**

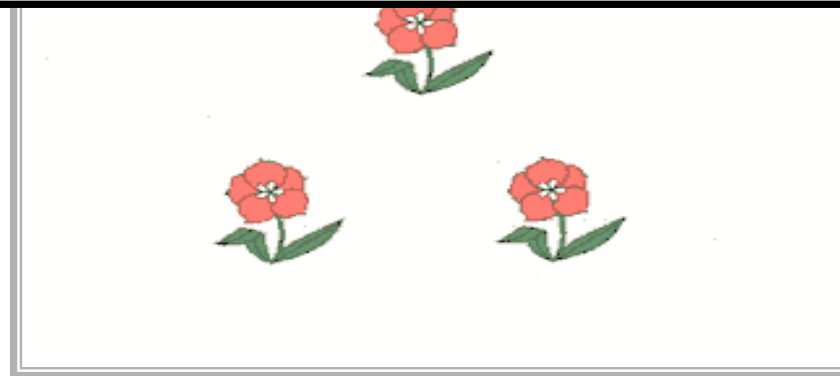
**SAME
GEOGRAPHIC
AREA**



**SAME
GEOGRAPHIC
AREA**



SYMPATRIC DISTRIBUTION



ALLOPATRIC DISTRIBUTION

**ALLOPATRIC
DISTRIBUTION**

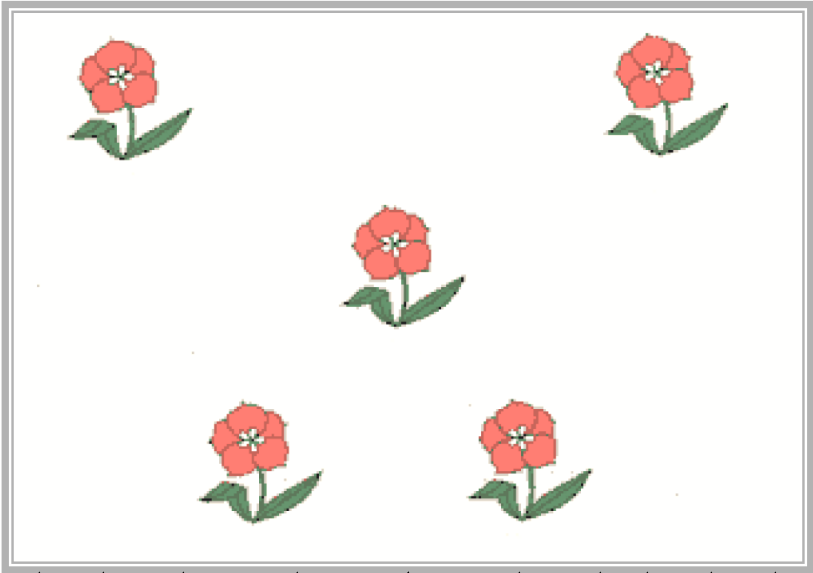


POPULATION

**OCCUPIES DIFFERENT
GEOGRAPHIC AREAS**

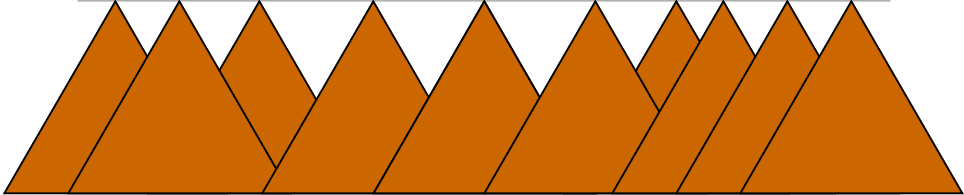
**ALLOPATRIC
DISTRIBUTION**

**NORTHERN
POPULATION**



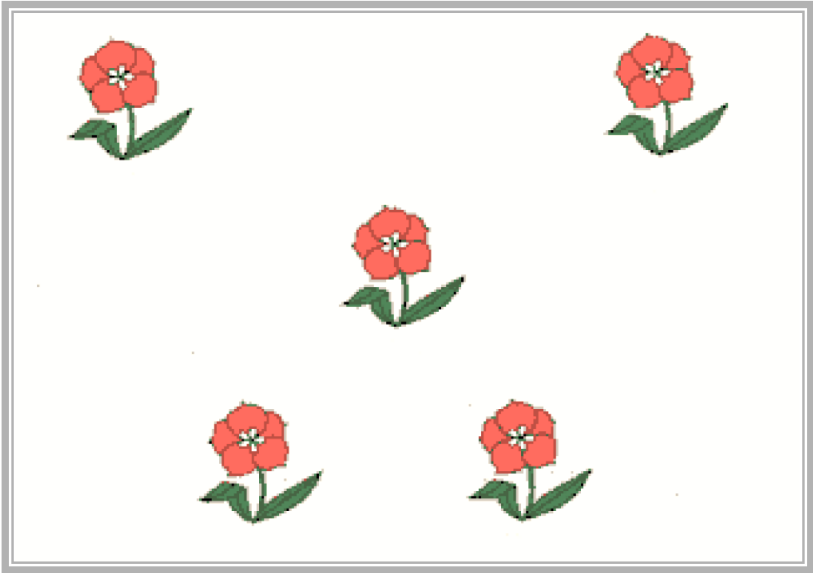
**GEOGRAPHIC
AREA**

**MOUNTAIN
RANGE**



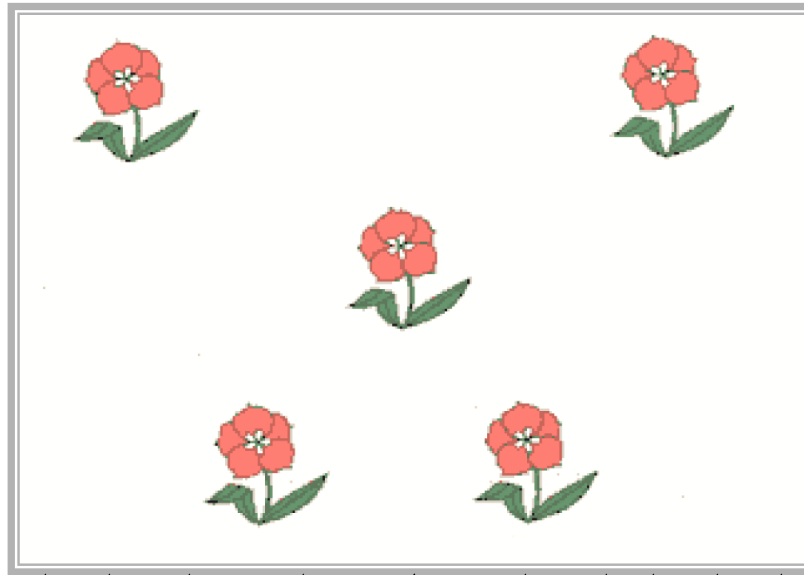
**MOUNTAIN
RANGE**

**SOUTHERN
POPULATION**



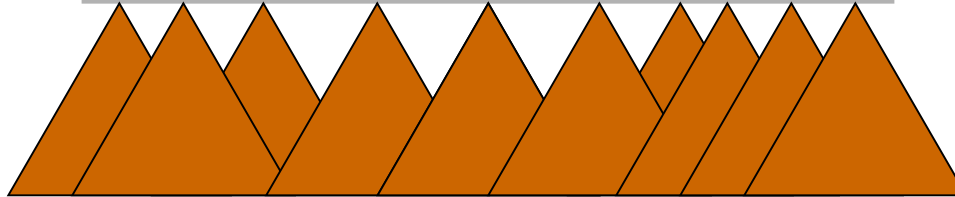
**GEOGRAPHIC
AREA**

**NORTHERN
POPULATION**



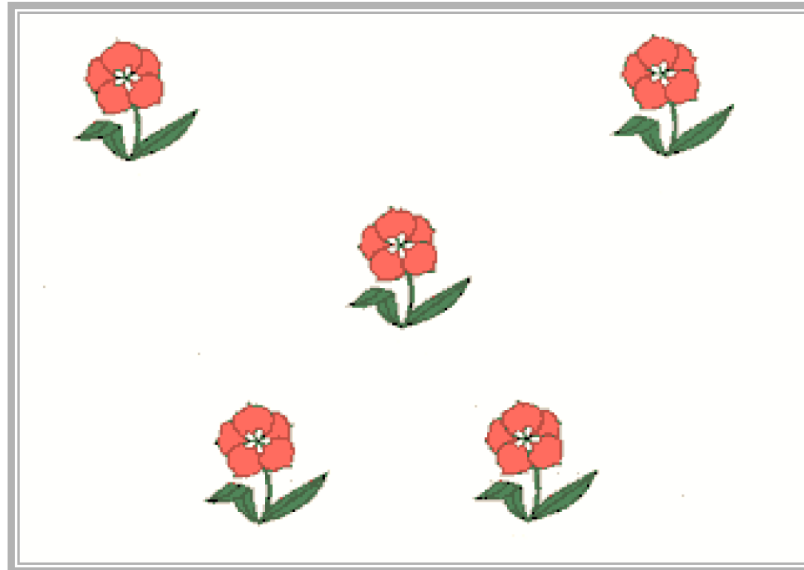
**DIFFERENT
GEOGRAPHIC
AREA**

**MOUNTAIN
RANGE**



**MOUNTAIN
RANGE**

**SOUTHERN
POPULATION**

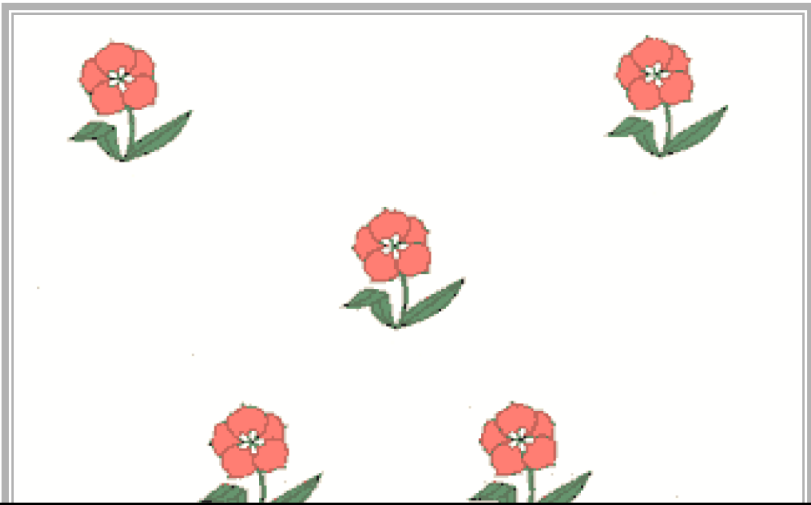


**DIFFERENT
GEOGRAPHIC
AREA**



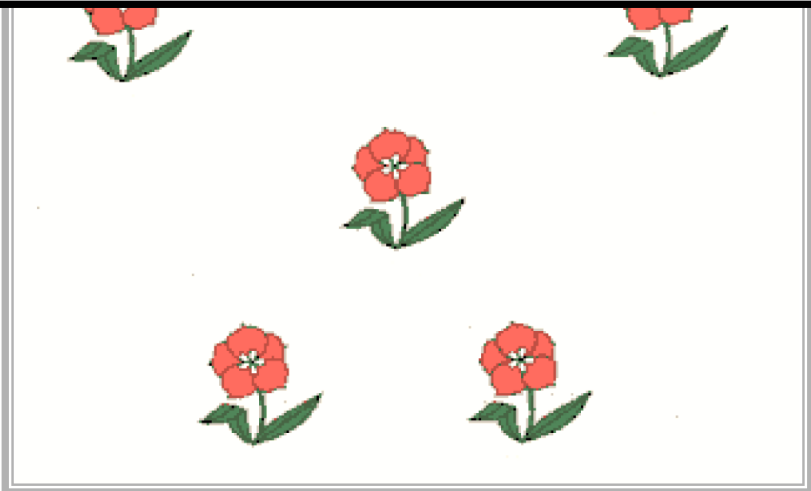


NORTHERN
POPULATION



ALLOPATRIC DISTRIBUTION

SOUTHERN
POPULATION





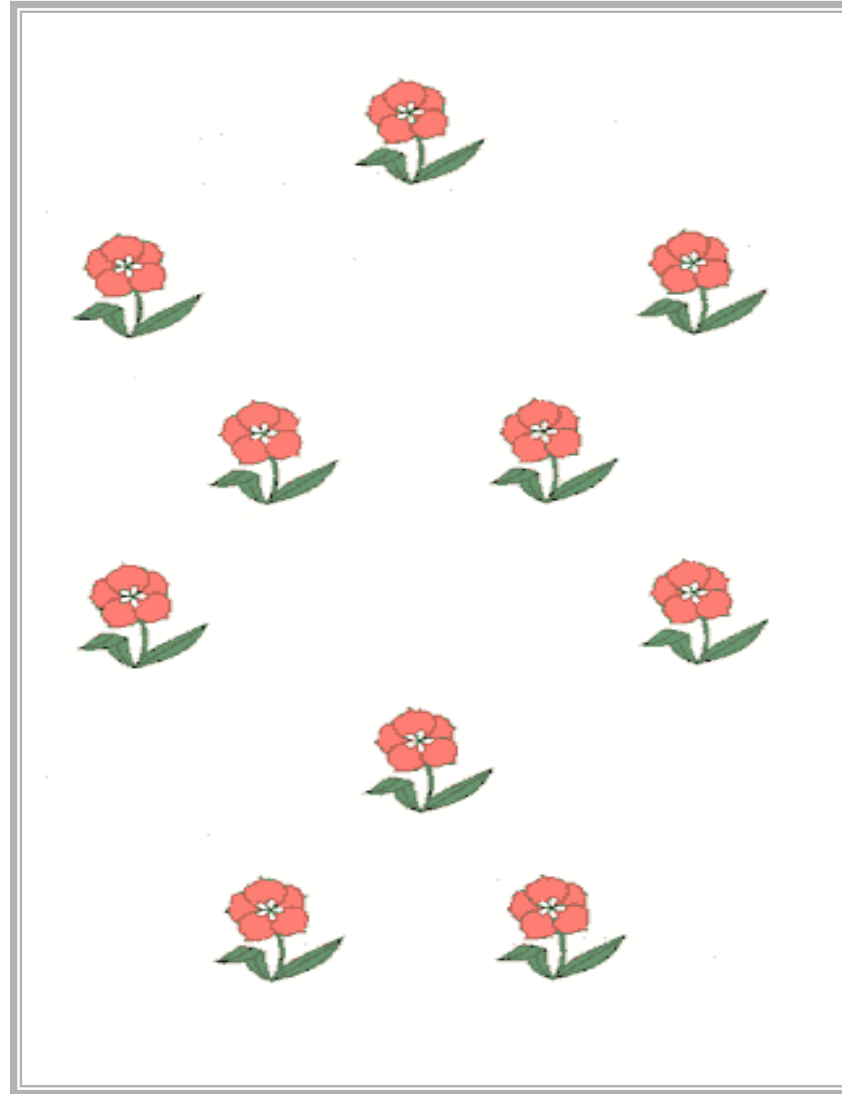
ALLOPATRIC SPECIATION



ALLOPATRIC SPECIATION SCENARIO

ALLOPATRIC SPECIATION

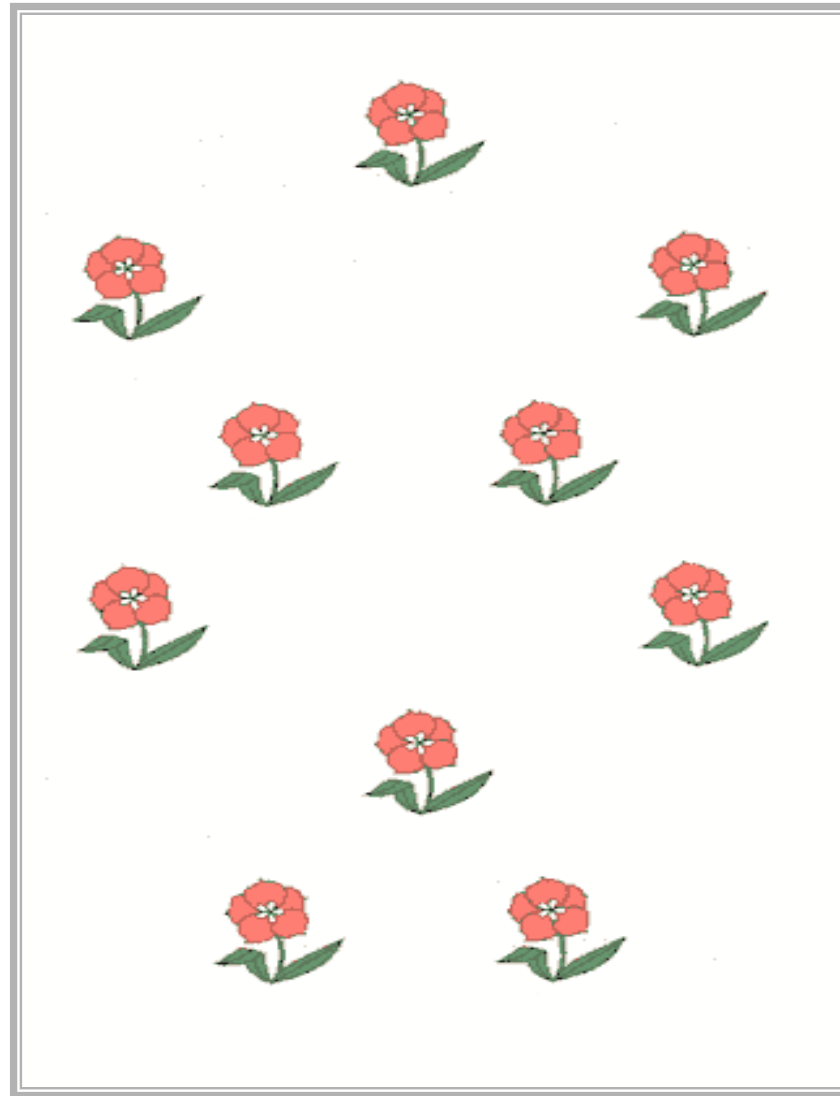
**GEOGRAPHIC
AREA**



**GEOGRAPHIC
AREA**

PARENTAL POPULATION

ALLOPATRIC SPECIATION

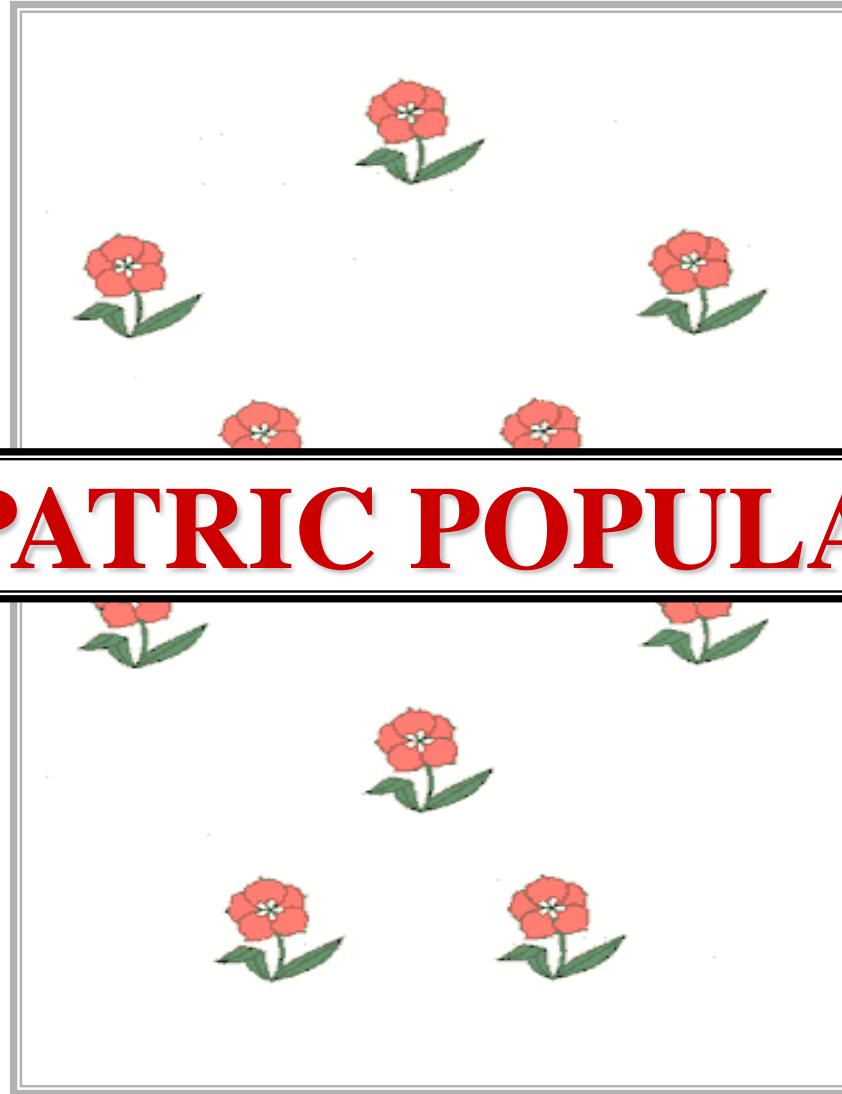


**SAME
GEOGRAPHIC
AREA**

**SAME
GEOGRAPHIC
AREA**

PARENTAL POPULATION

ALLOPATRIC SPECIATION

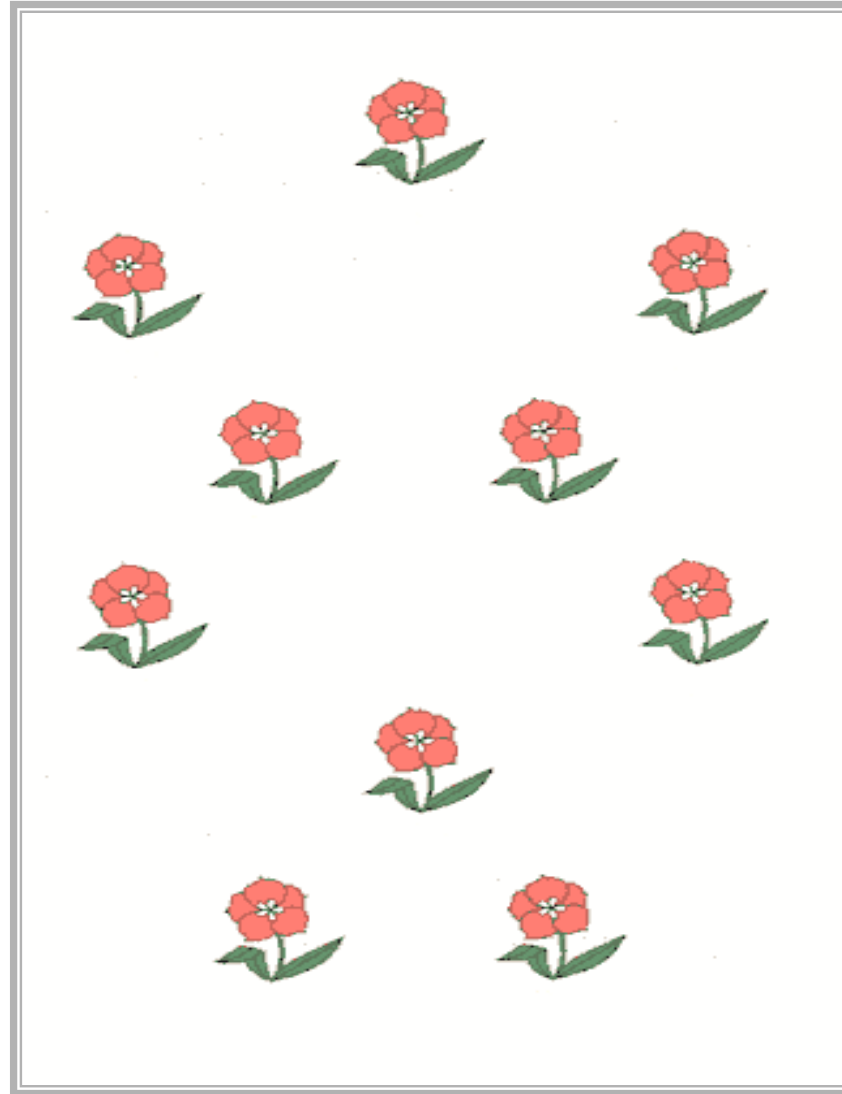


SYMPATRIC POPULATION

PARENTAL POPULATION

ALLOPATRIC SPECIATION

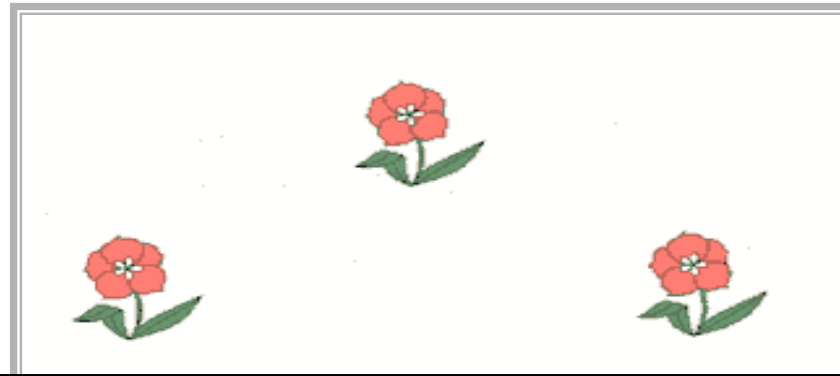
TIME



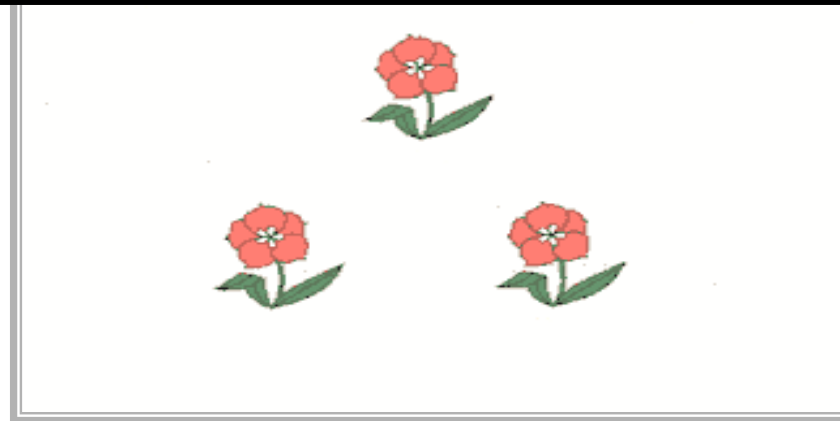
TIME

PARENTAL POPULATION

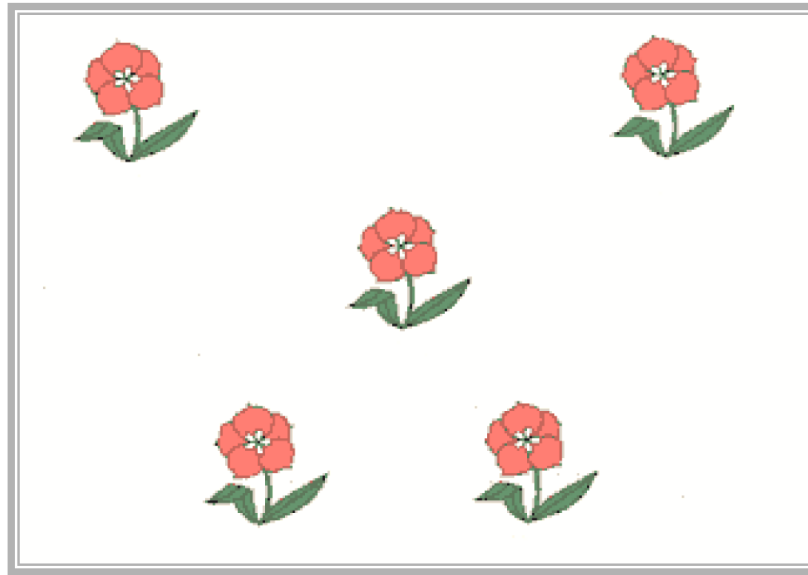
ALLOPATRIC SPECIATION



**GEOLOGIC BARRIER
ARISES**



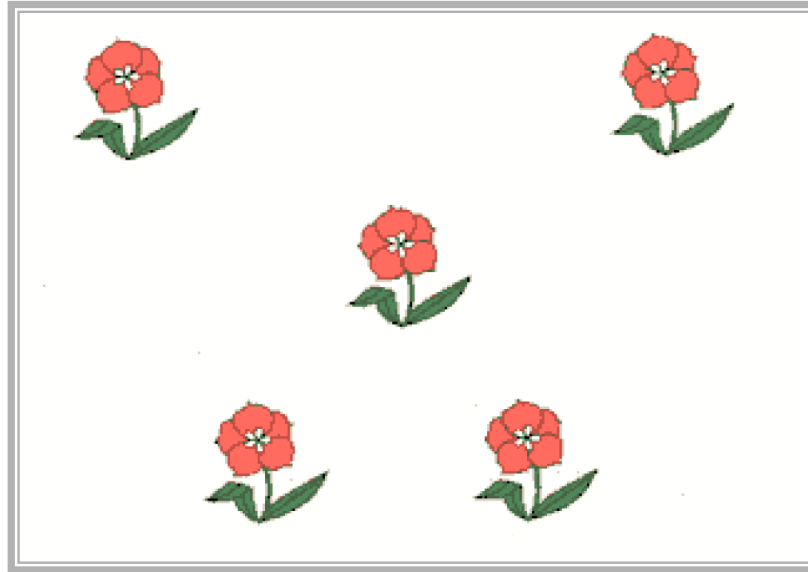
PARENTAL POPULATION



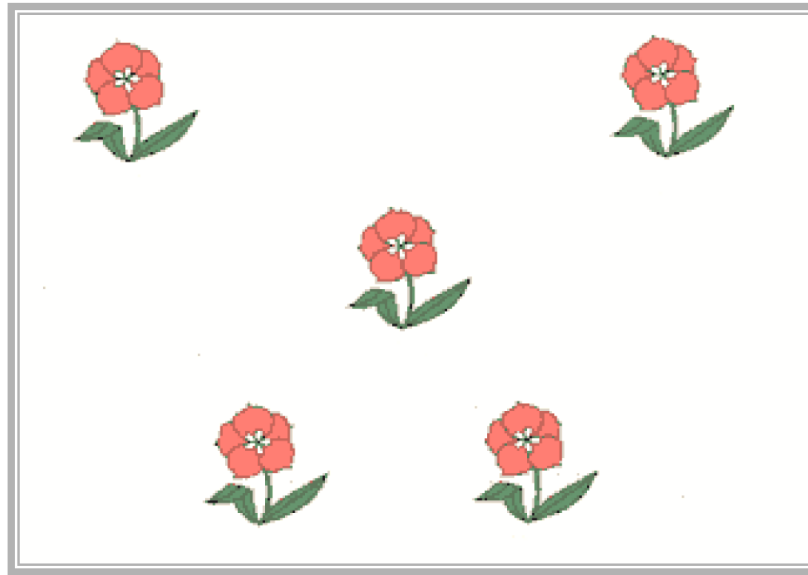
**MOUNTAIN
RANGE
ARISES**



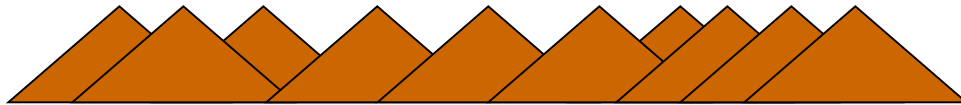
**MOUNTAIN
RANGE
ARISES**



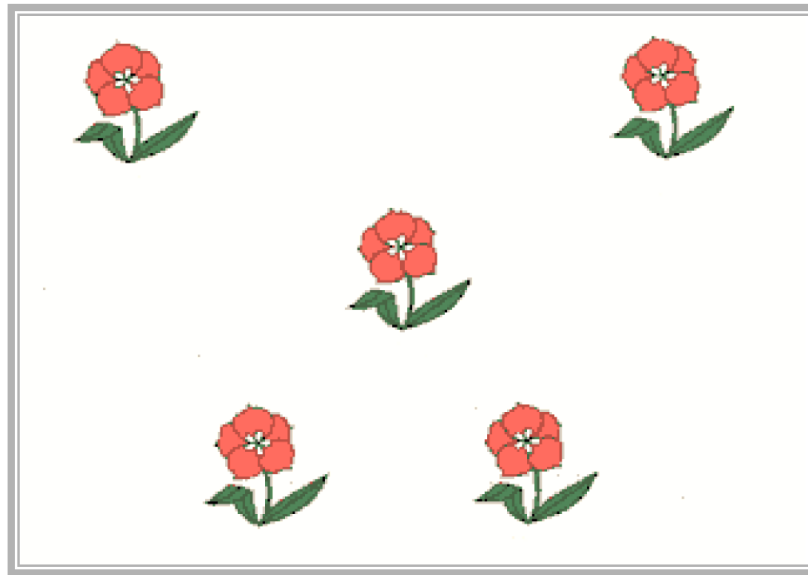
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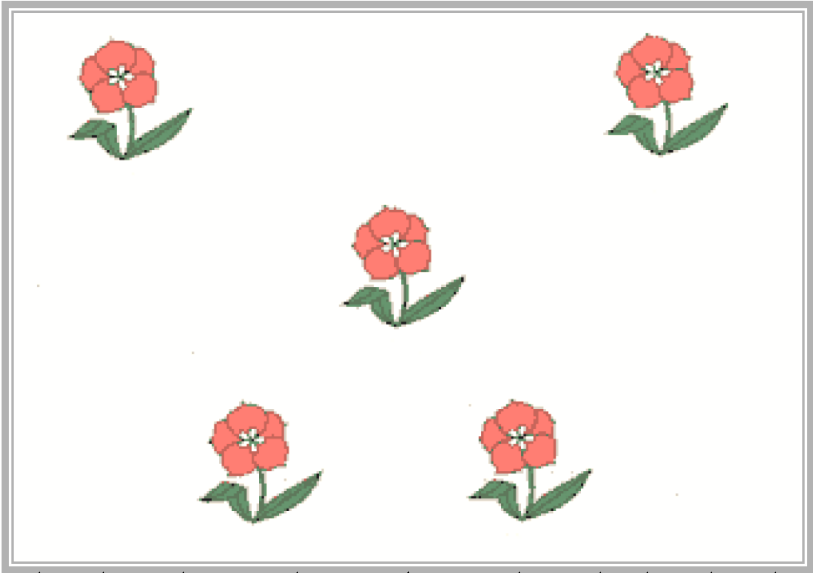


TIME

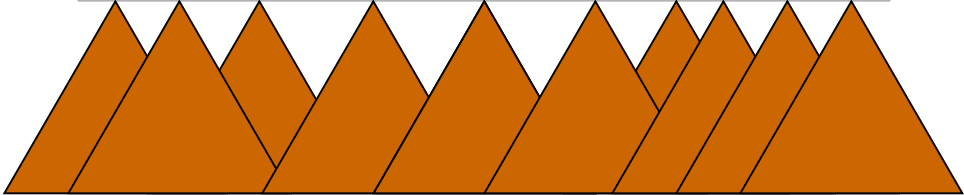


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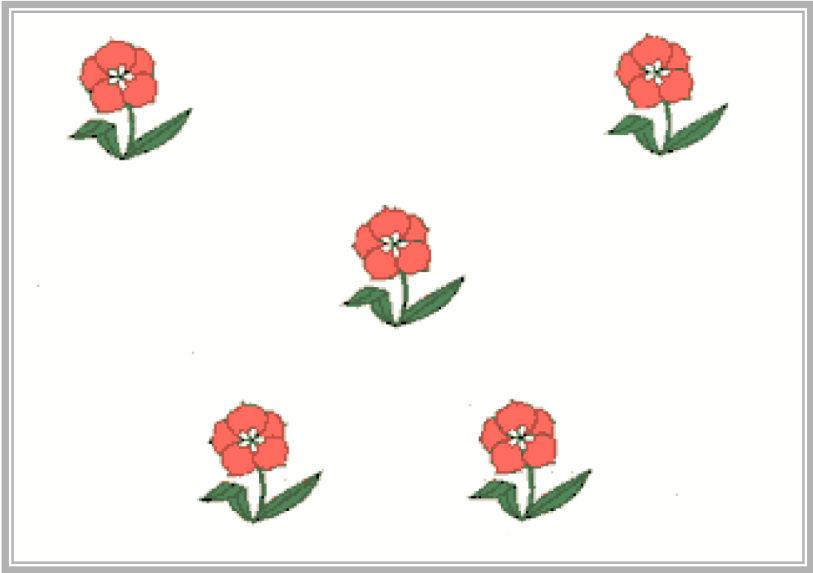




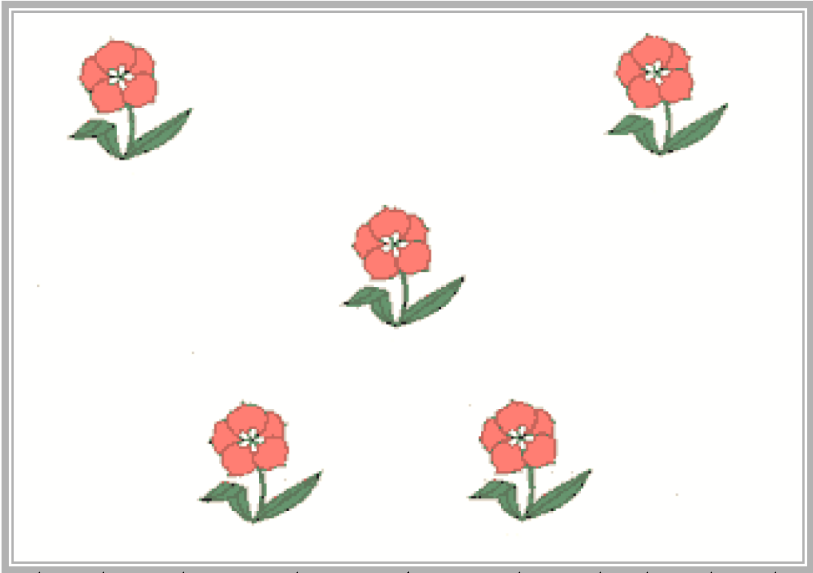
TIME



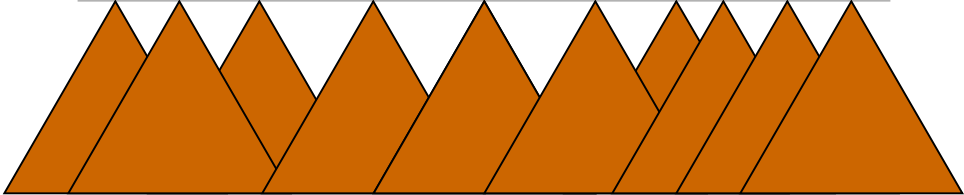
TIME



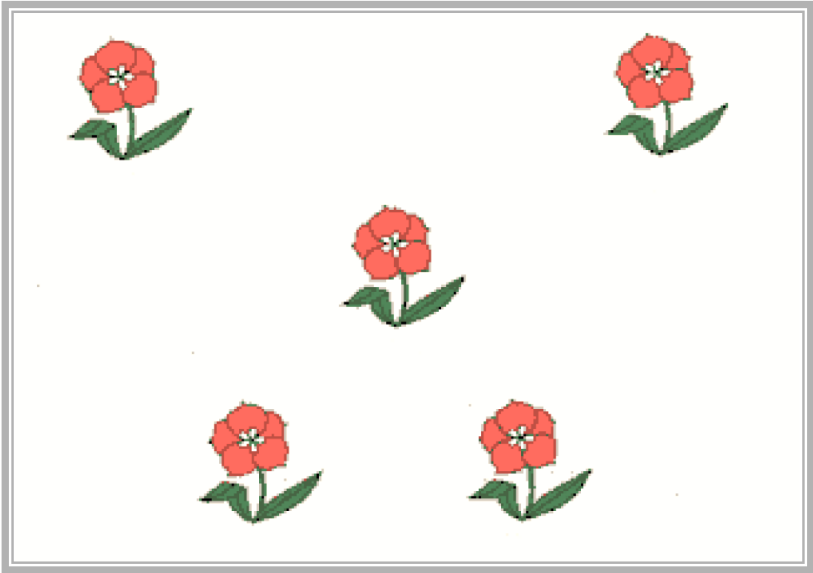
**NORTHERN
POPULATION**



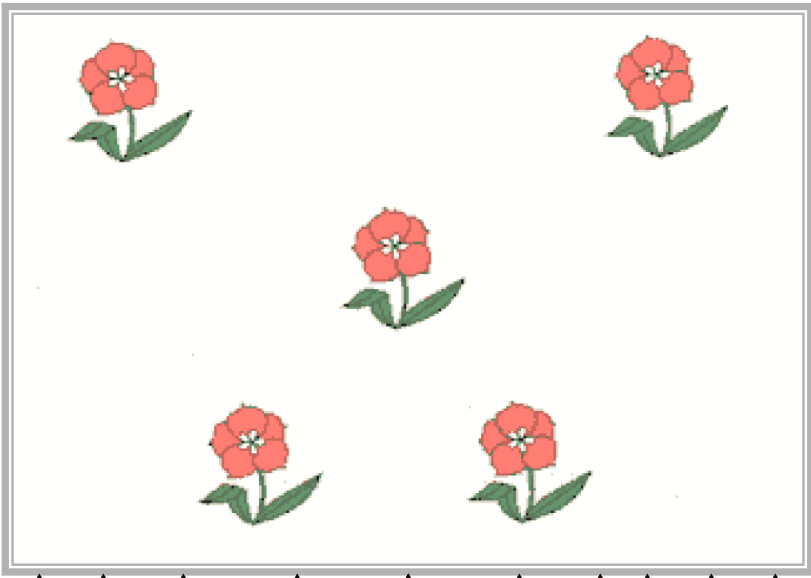
**MOUNTAIN
RANGE**



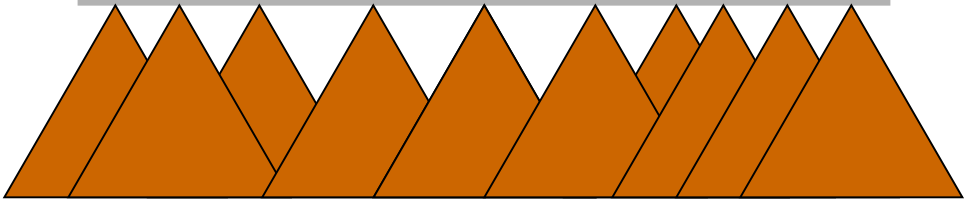
**MOUNTAIN
RANGE**



**NORTHERN
POPULATION**

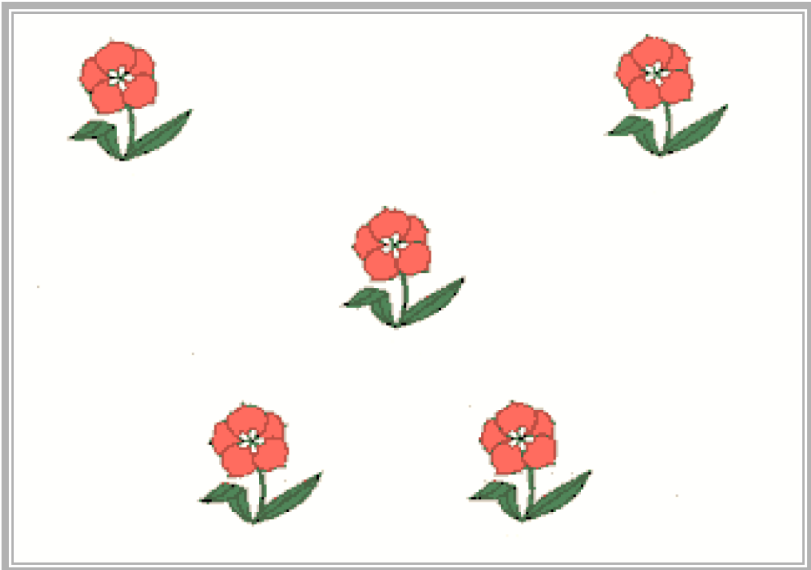


**MOUNTAIN
RANGE**

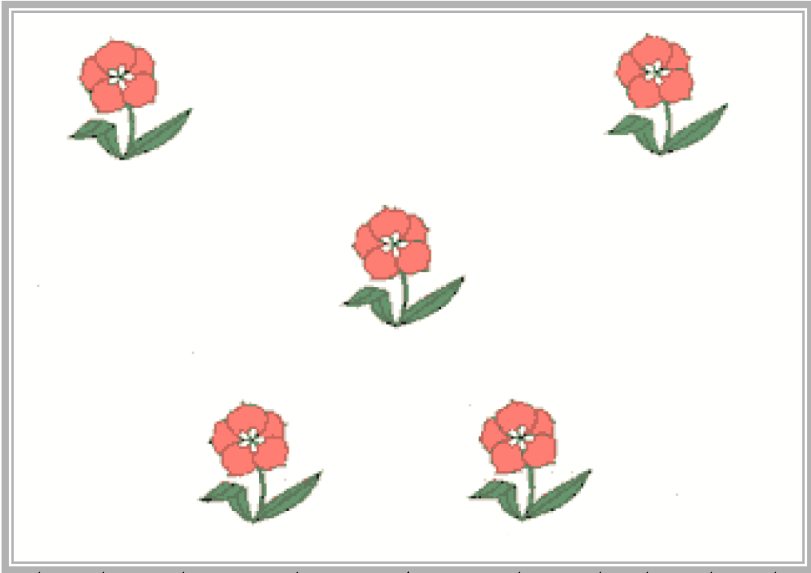


**MOUNTAIN
RANGE**

**SOUTHERN
POPULATION**

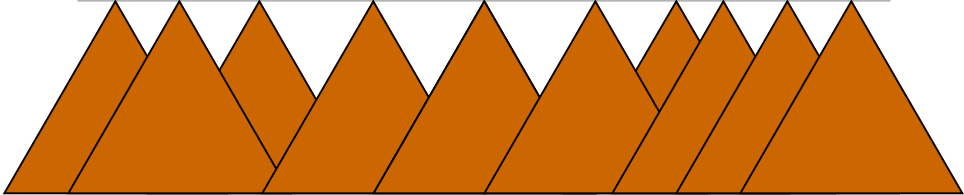


**NORTHERN
POPULATION**



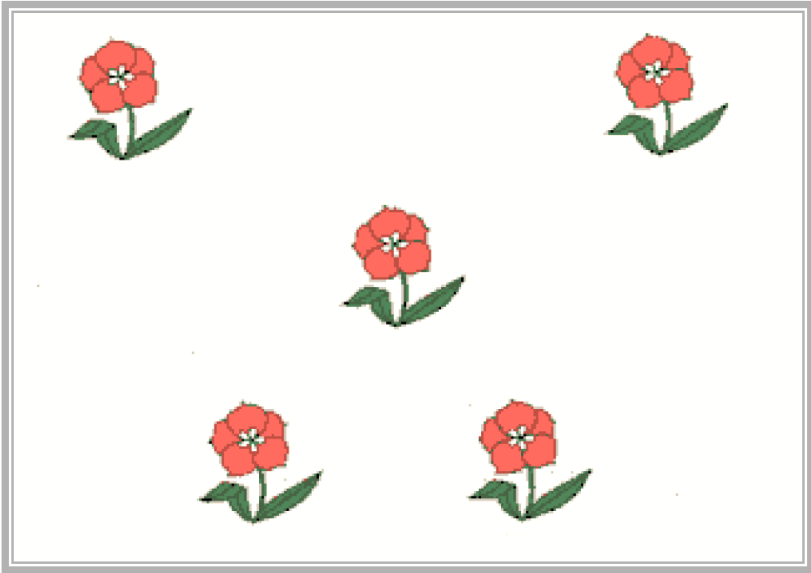
**DIFFERENT
GEOGRAPHIC
AREA**

**MOUNTAIN
RANGE**



**MOUNTAIN
RANGE**

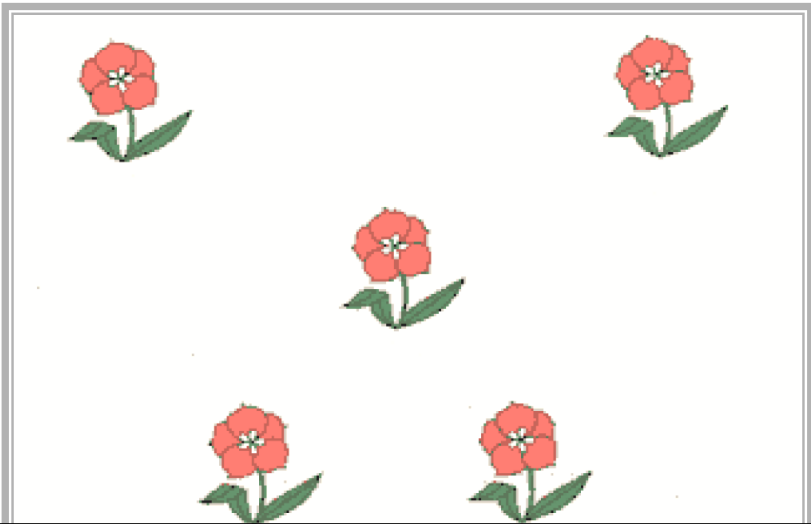
**SOUTHERN
POPULATION**



**DIFFERENT
GEOGRAPHIC
AREA**

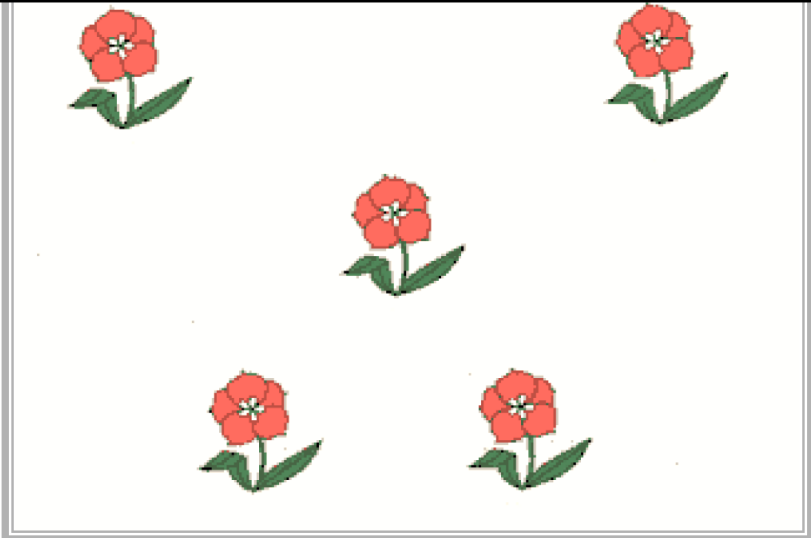


NORTHERN
POPULATION

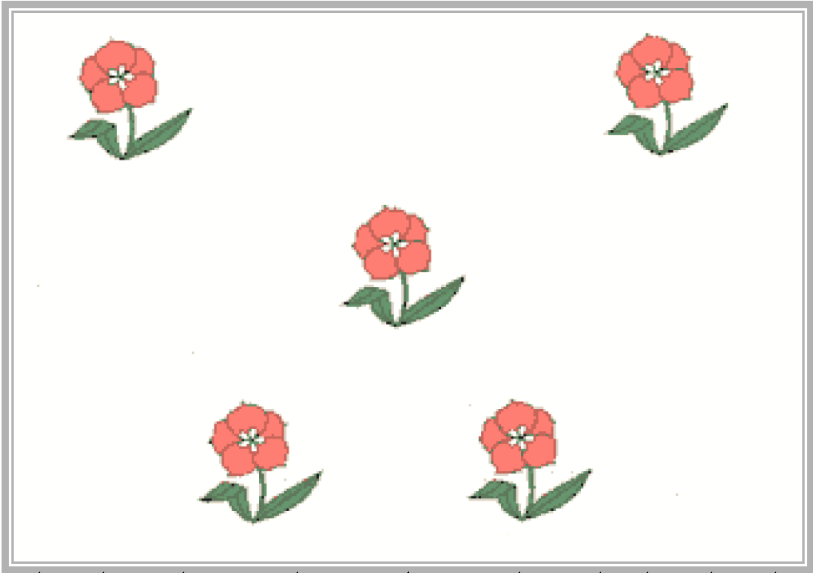


**ALLOPATRIC
POPULATIONS**

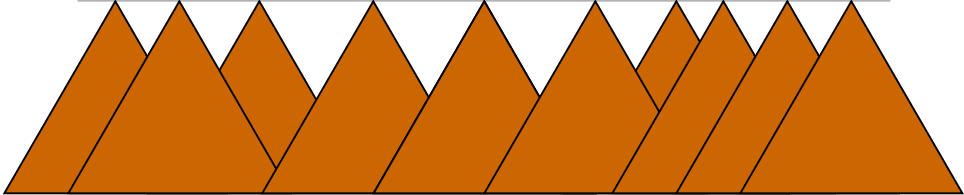
SOUTHERN
POPULATION



**NORTHERN
POPULATION**

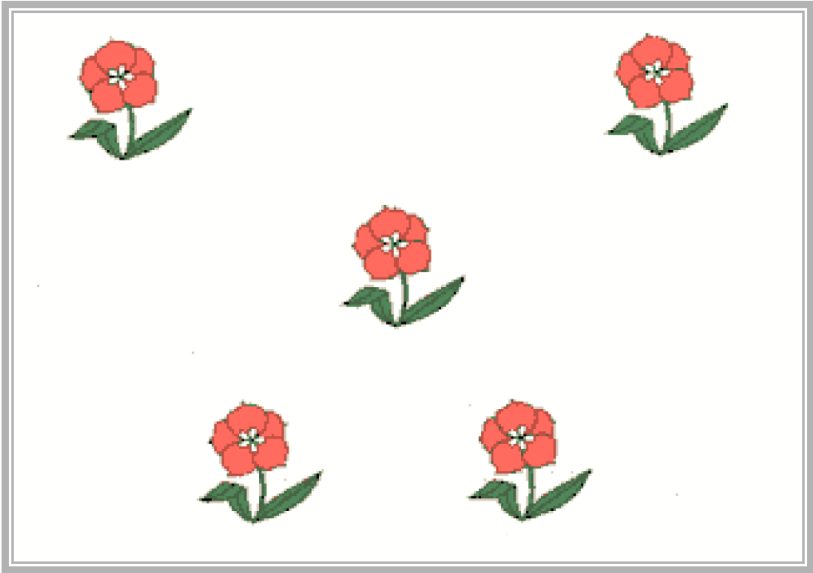


**MOUNTAIN
RANGE**

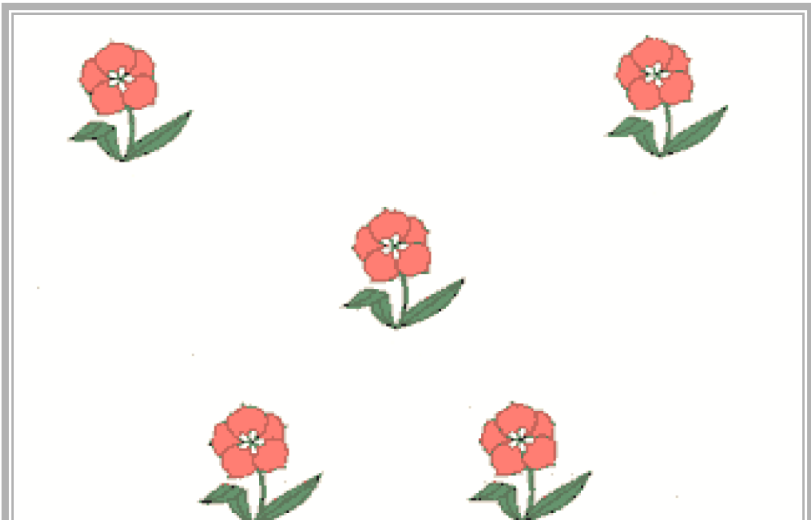


**MOUNTAIN
RANGE**

**SOUTHERN
POPULATION**

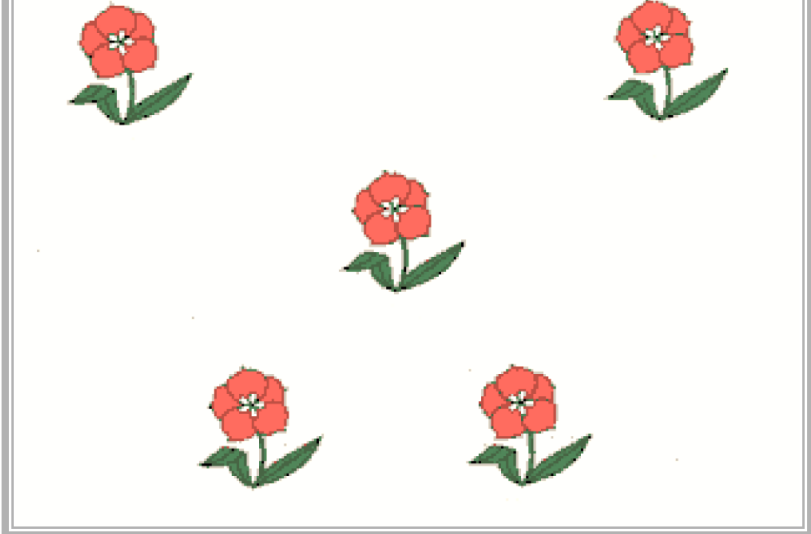


NORTHERN
POPULATION

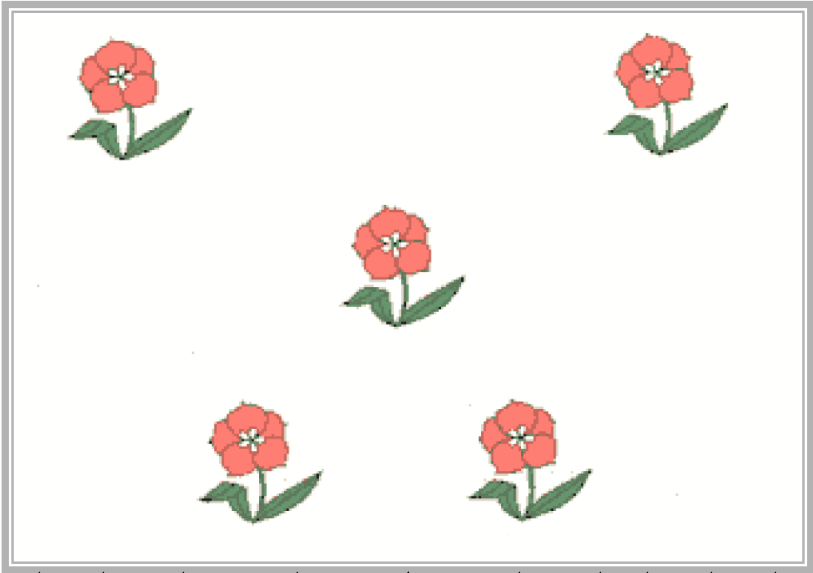


**GEOGRAPHICALLY
ISOLATED**

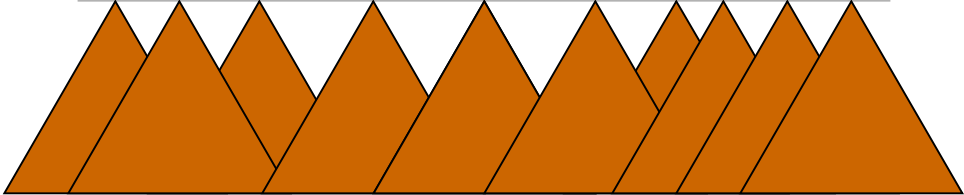
SOUTHERN
POPULATION



NORTHERN
POPULATION

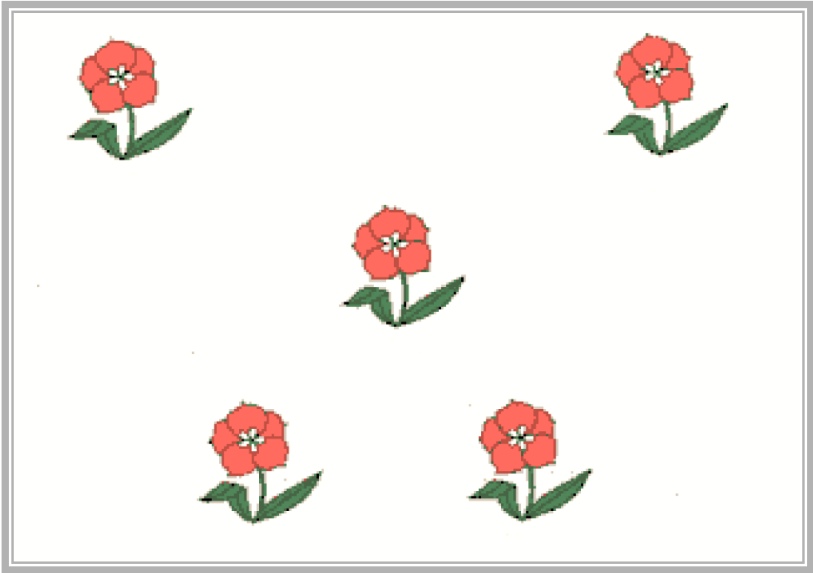


TIME

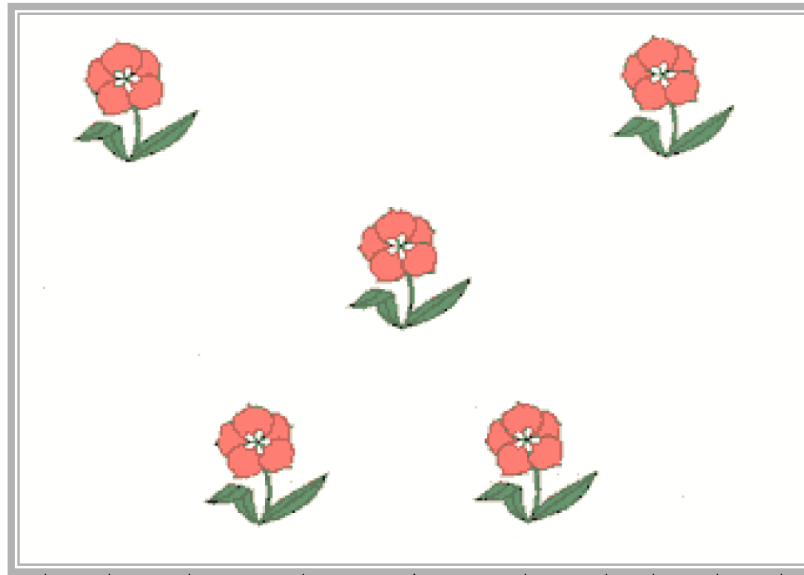


TIME

SOUTHERN
POPULATION



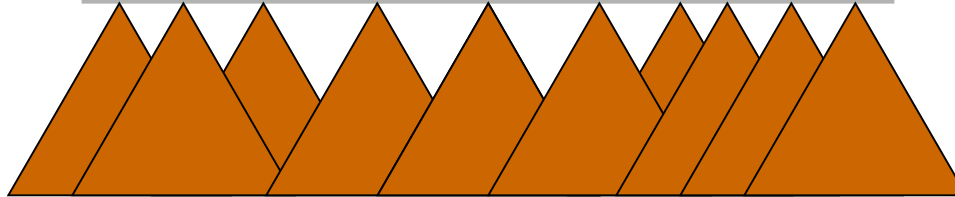
**NORTHERN
POPULATION**



**UNDERGOES
SEPARATE
MUTATIONS
&
SELECTION**

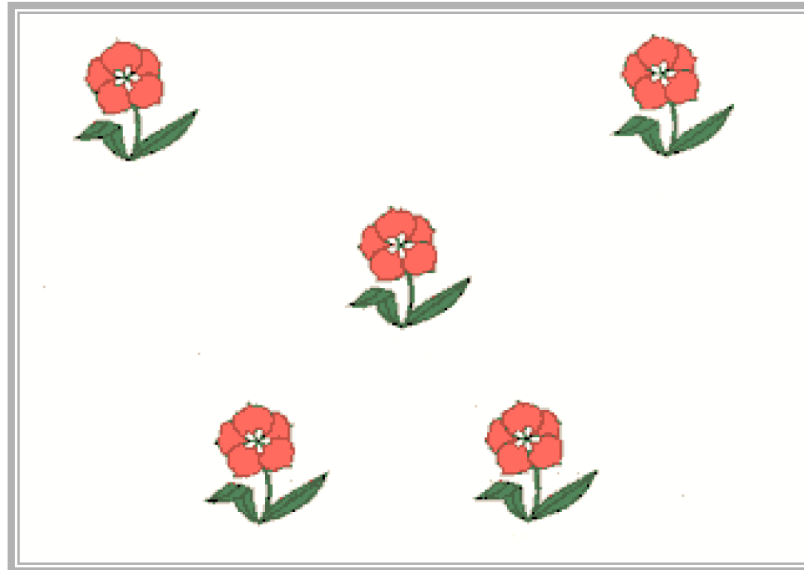
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**MOUNTAIN
RANGE**



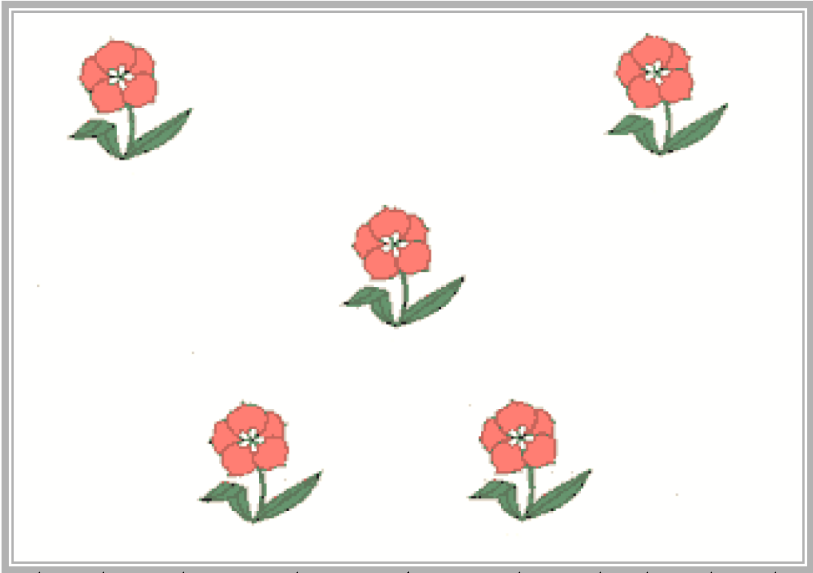
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RANGE**

**SOUTHERN
POPULATION**

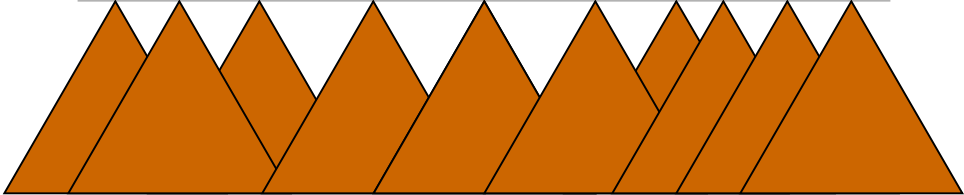


**UNDERGOES
SEPARATE
MUTATIONS
&
SELECTION**

NORTHERN
POPULATION

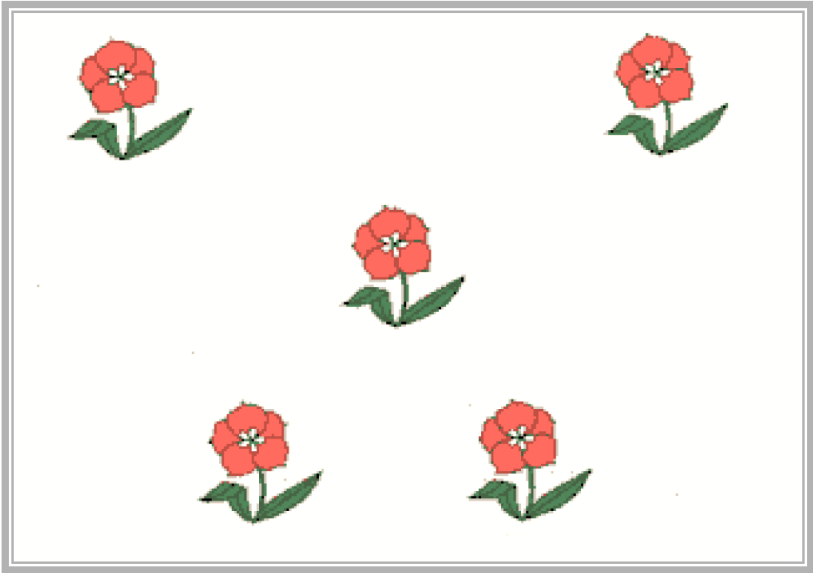


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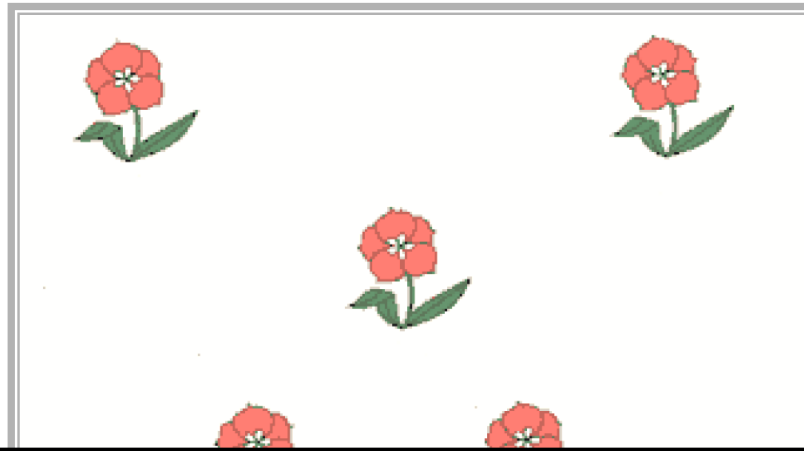


TIME

SOUTHERN
POPULATION

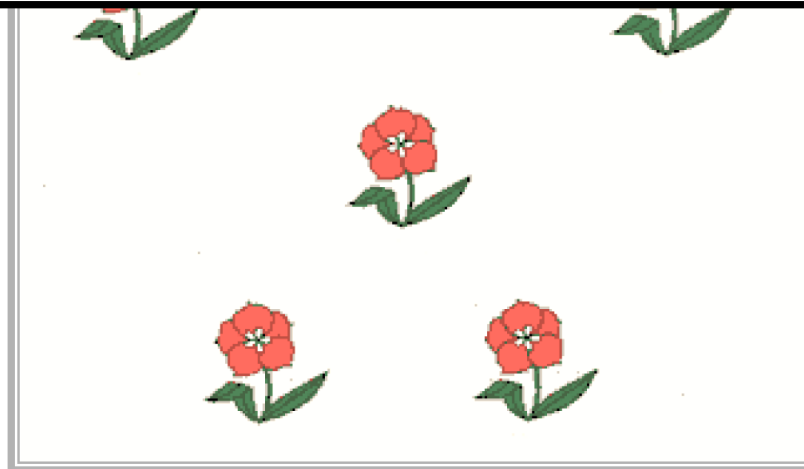


NORTHERN
POPULATION



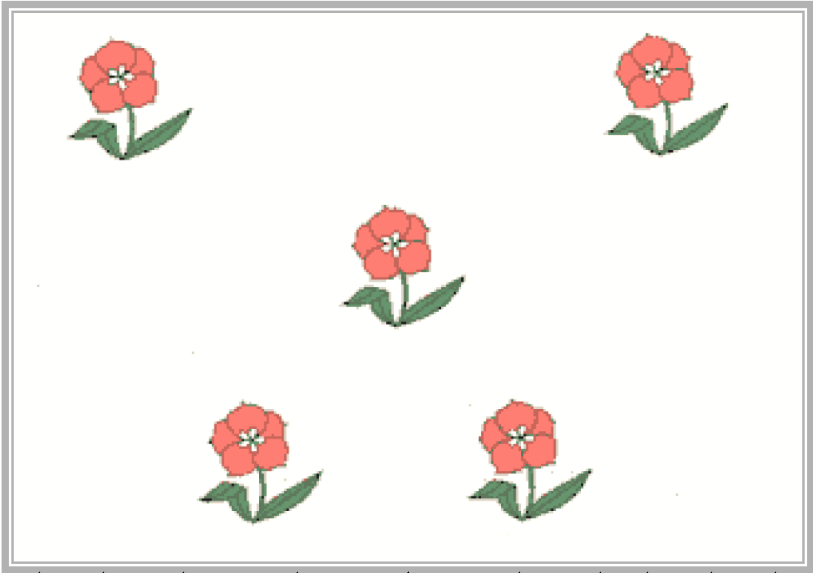
EVOLVE MORPHOLOGICAL CHANGES

SOUTHERN
POPULATION

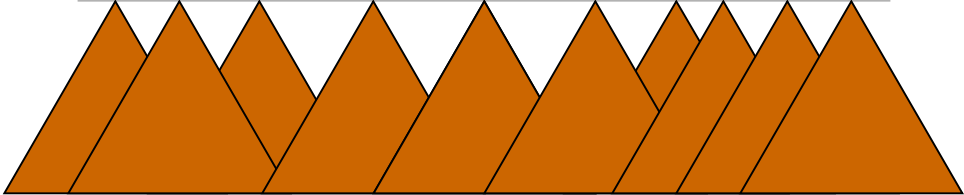




**NORTHERN
POPULATION**

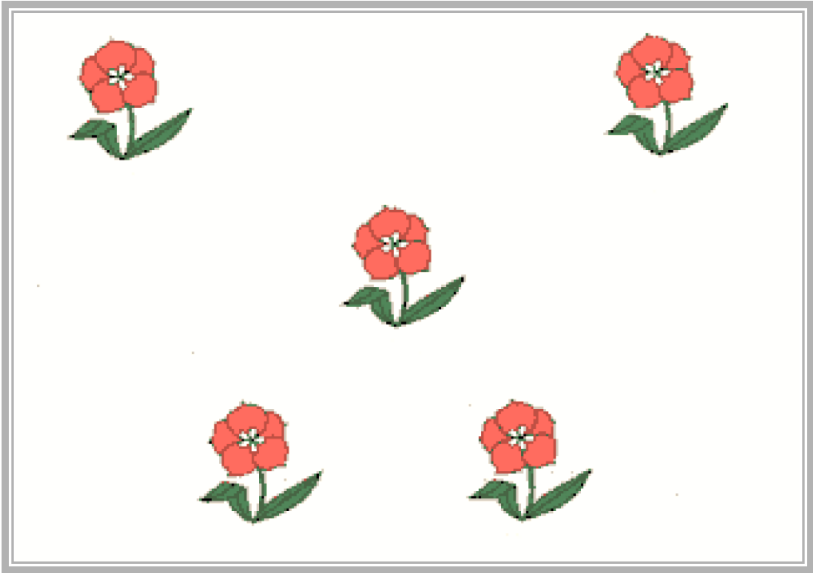


**MOUNTAIN
RANGE**

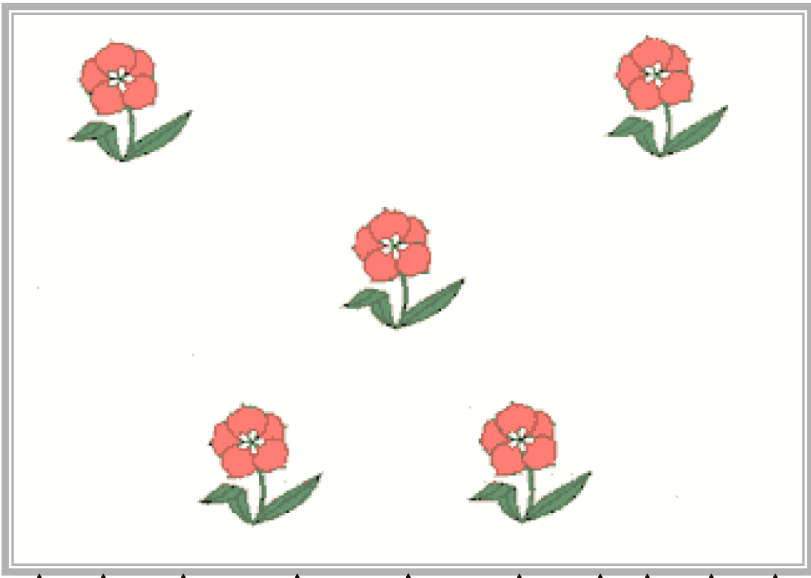


**MOUNTAIN
RANGE**

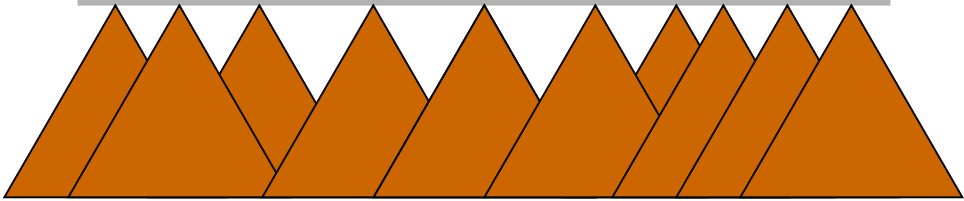
**SOUTHERN
POPULATION**



NORTHERN
POPULATION

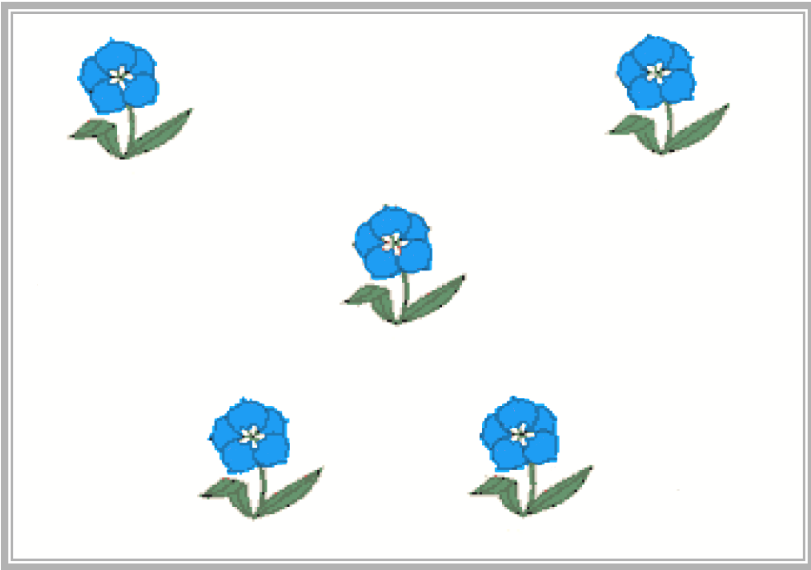


MOUNTAIN
RANGE



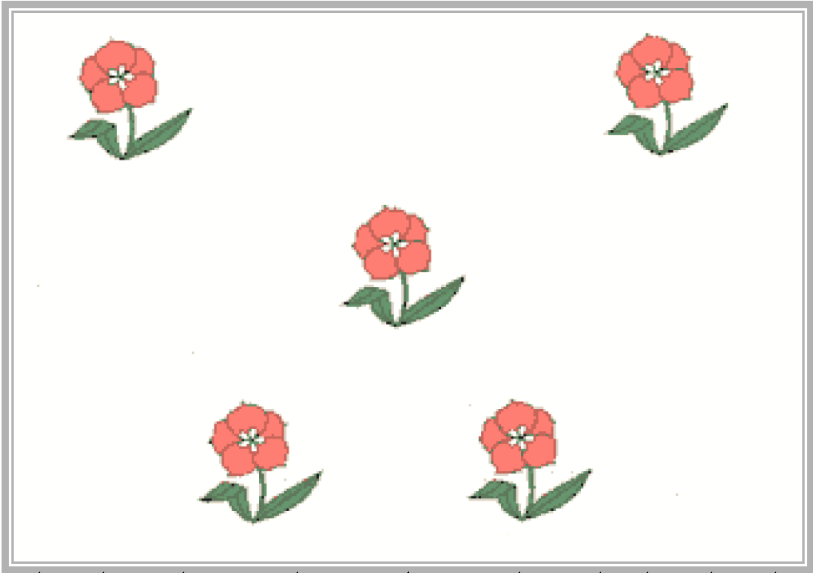
MOUNTAIN
RANGE

SOUTHERN
POPULATION

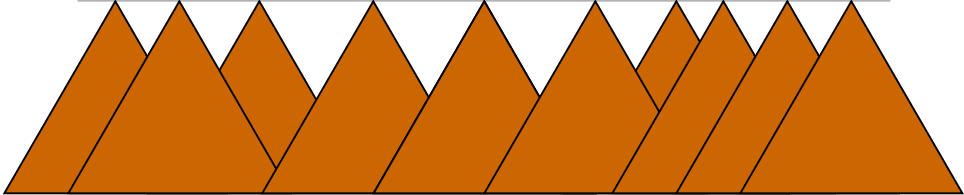


SOUTHERN
POPULATION
EVOLVES
BLUE
FLOWERS

NORTHERN
POPULATION

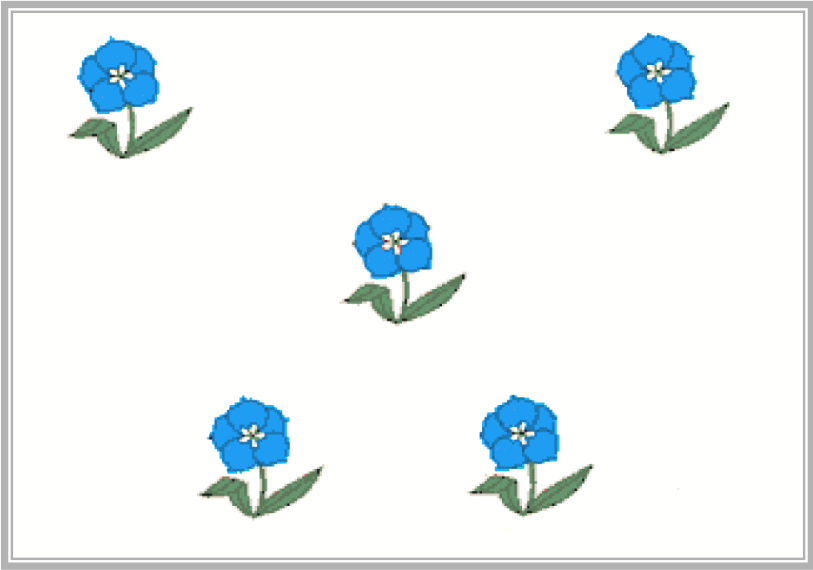


TIME

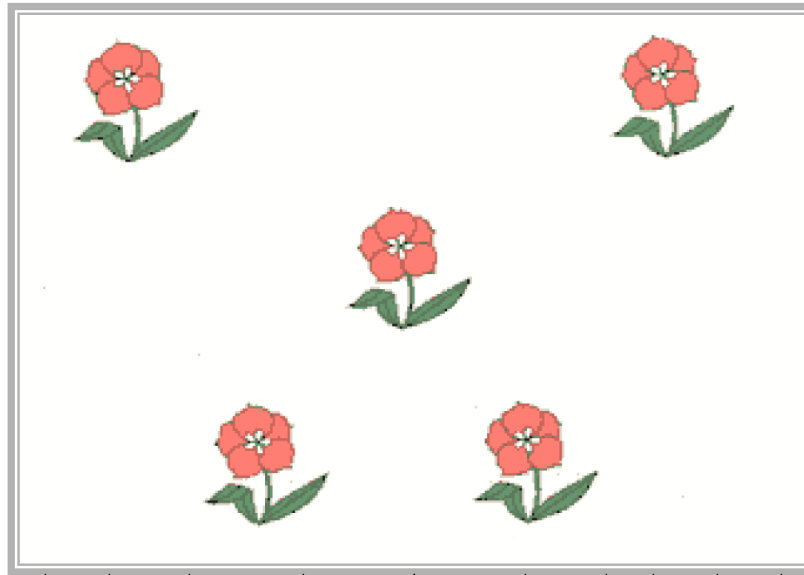


TIME

SOUTHERN
POPULATION



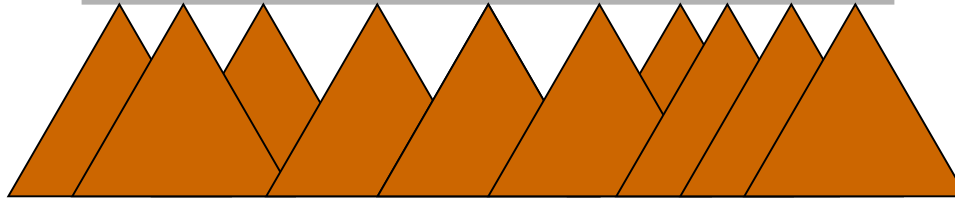
**NORTHERN
POPULATION**



**UNDERGOES
SEPARATE
MUTATIONS
&
SELECTION**

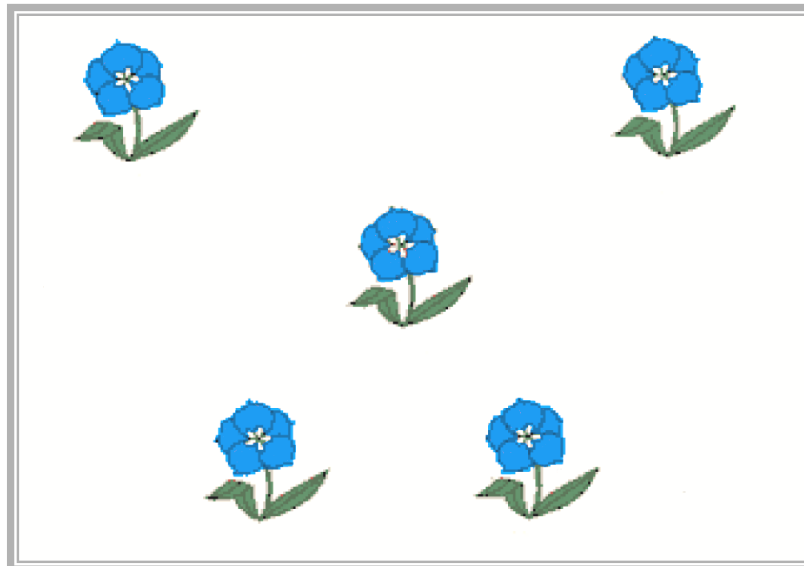
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**MOUNTAIN
RANGE**



**MOUNTAIN
RANGE**

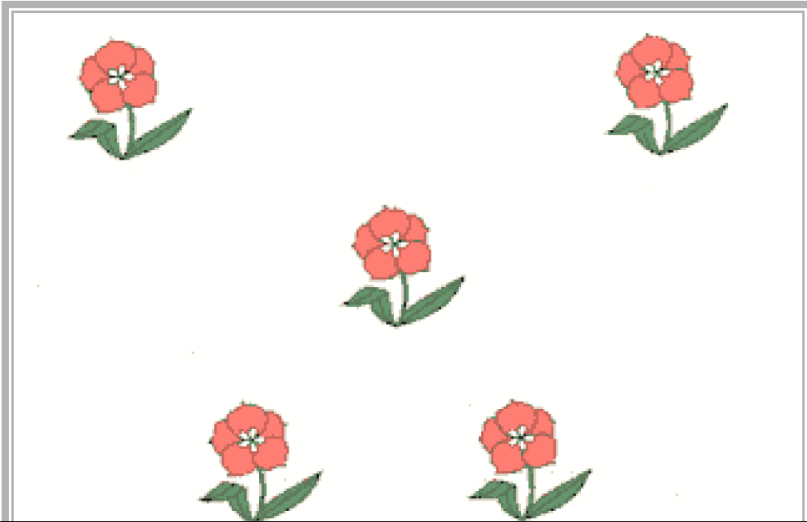
**SOUTHERN
POPULATION**



**UNDERGOES
SEPARATE
MUTATIONS
&
SELECTION**

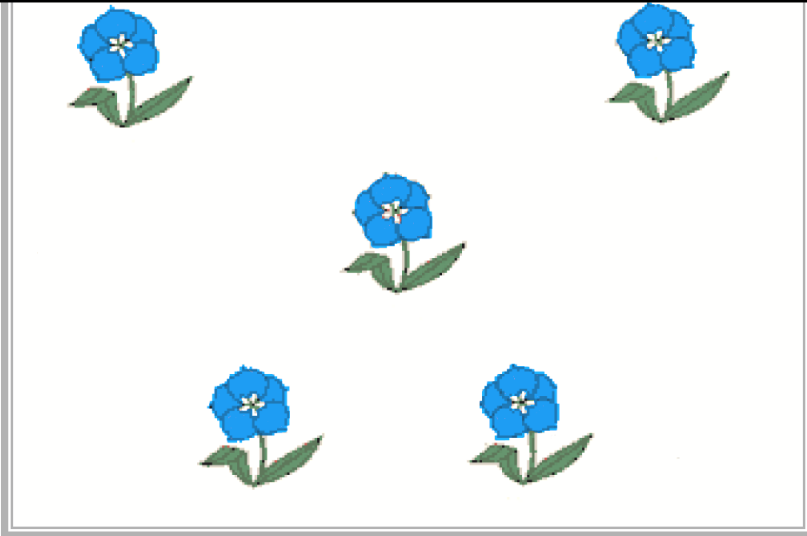


NORTHERN
POPULATION

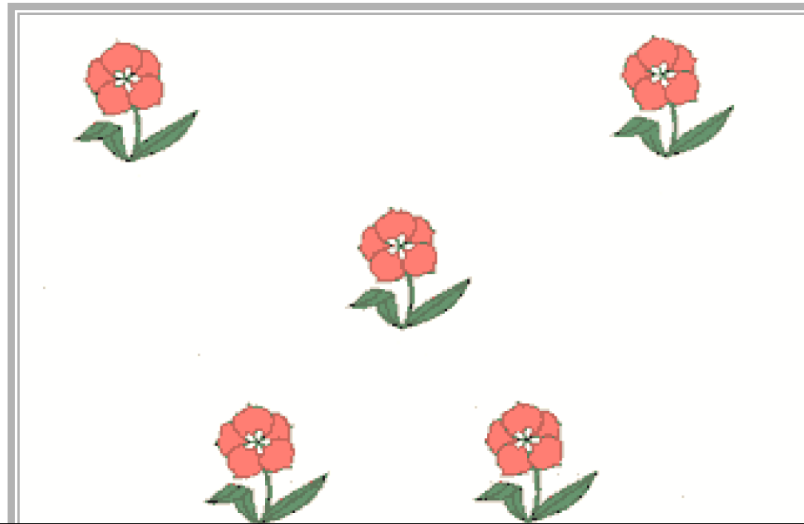


**EVOLVE
BREEDING BARRIERS**

SOUTHERN
POPULATION



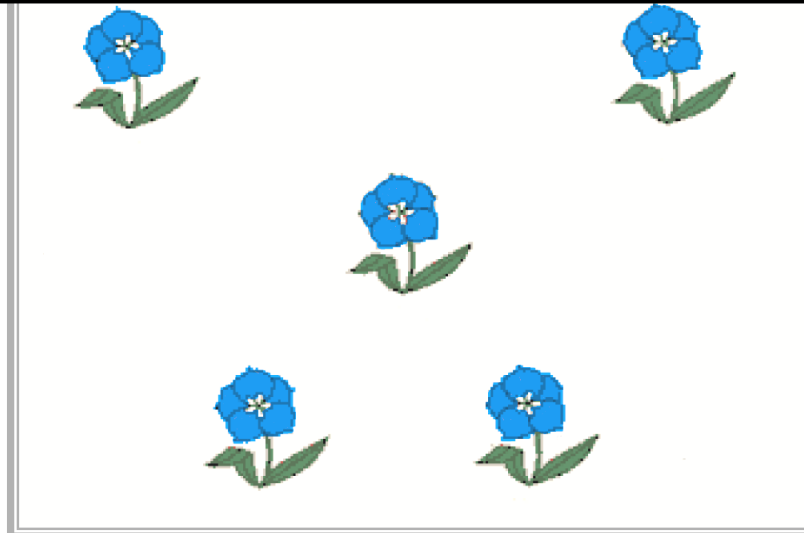
**NORTHERN
POPULATION**



**DIFFERENT
POLLINATION**

EVOLVE BREEDING BARRIERS

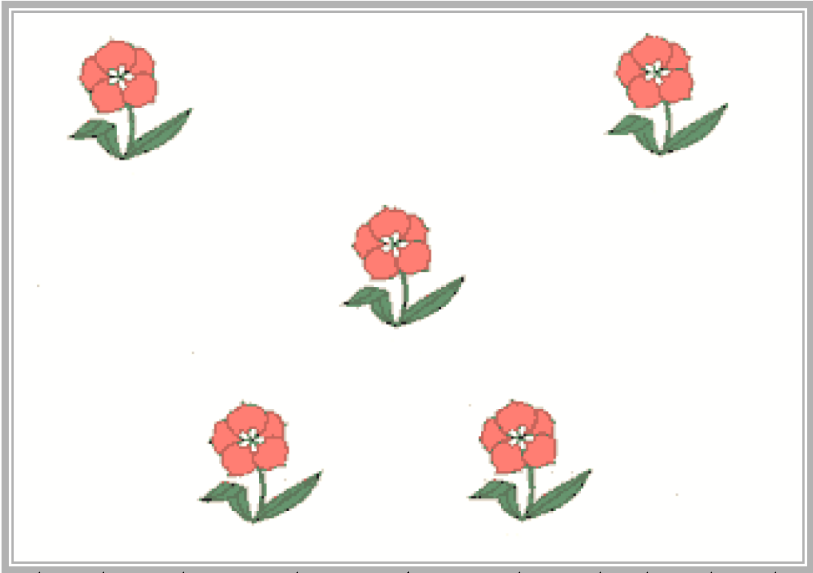
**SOUTHERN
POPULATION**



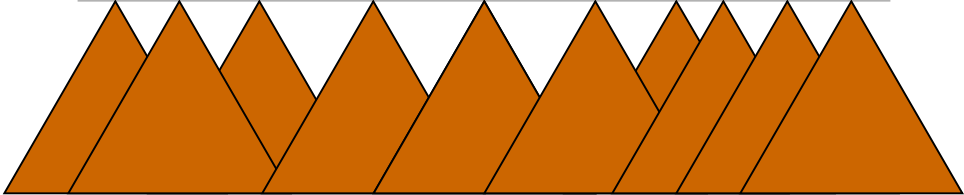
**DIFFERENT
POLLINATION**



**NORTHERN
POPULATION**

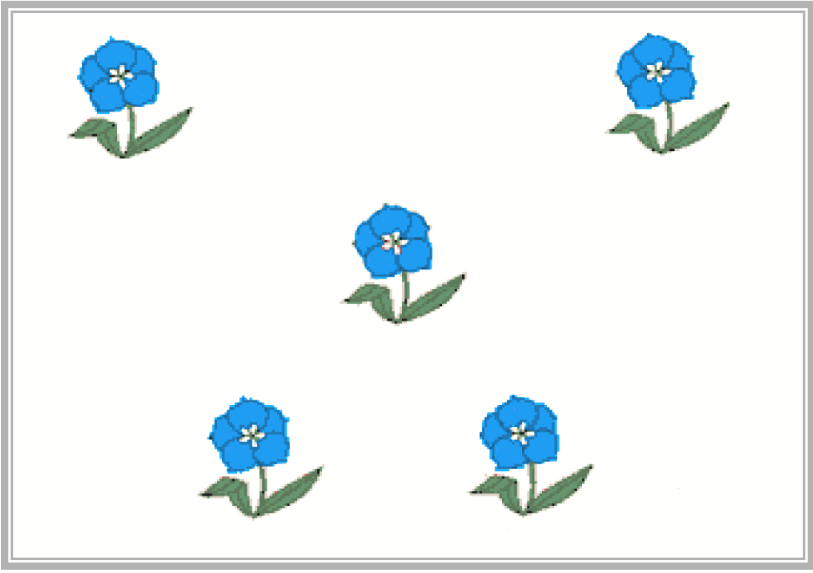


**MOUNTAIN
RANGE**

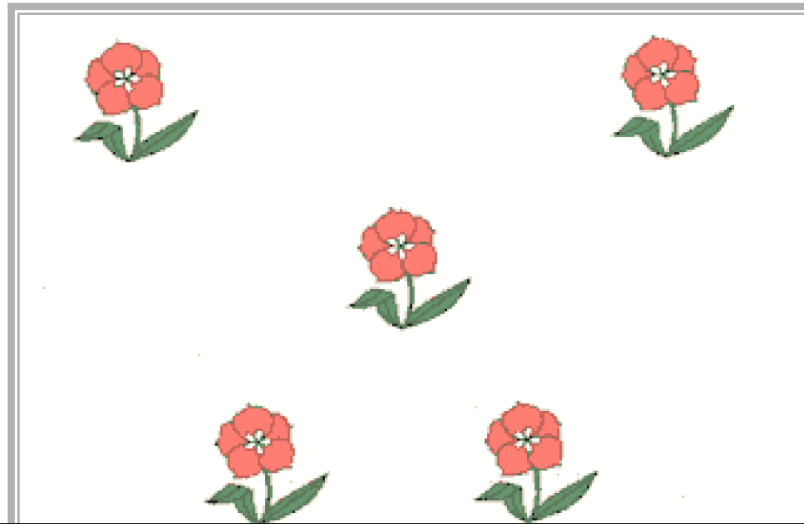


**MOUNTAIN
RANGE**

**SOUTHERN
POPULATION**

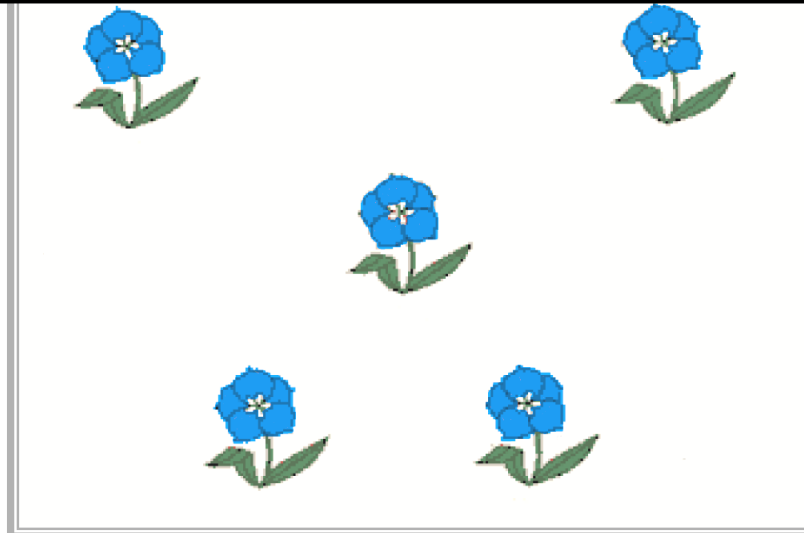


NORTHERN
POPULATION

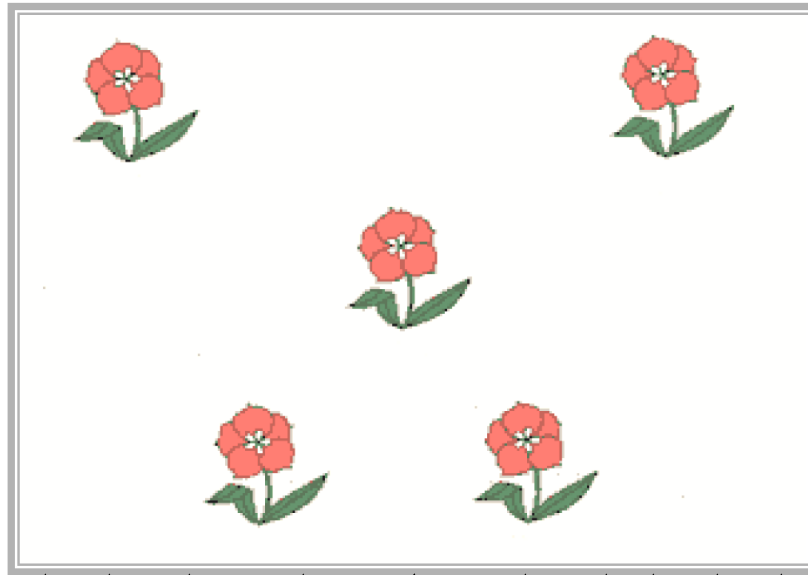


**REPRODUCTIVELY
ISOLATED**

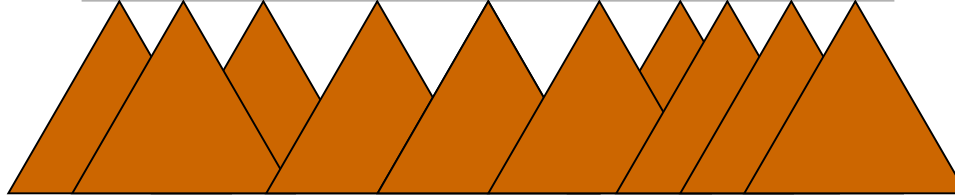
SOUTHERN
POPULATION



**NORTHERN
POPULATION**

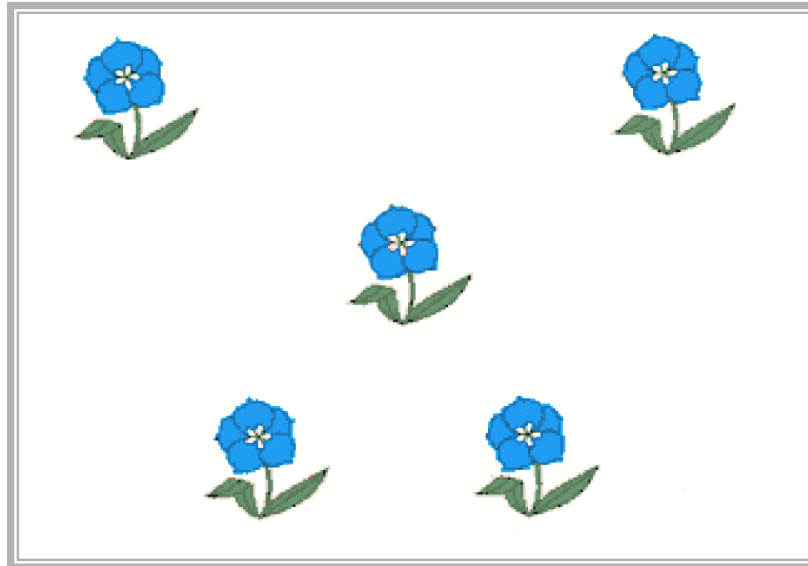


**MOUNTAIN
RANGE**



**MOUNTAIN
RANGE**

**SOUTHERN
POPULATION**



NORTHERN
POPULATION

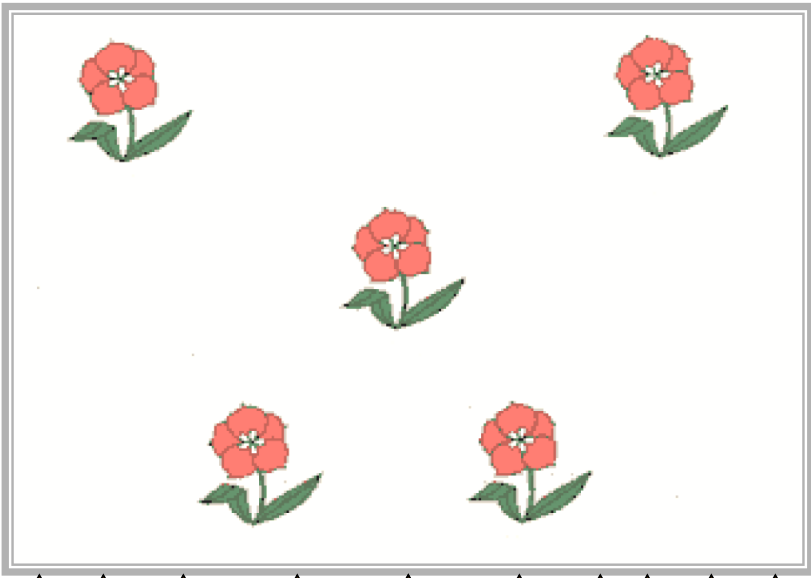


**MORPHOLOGICALLY
DISTINCT
&
REPRODUCTIVELY
ISOLATED
POPULATIONS**

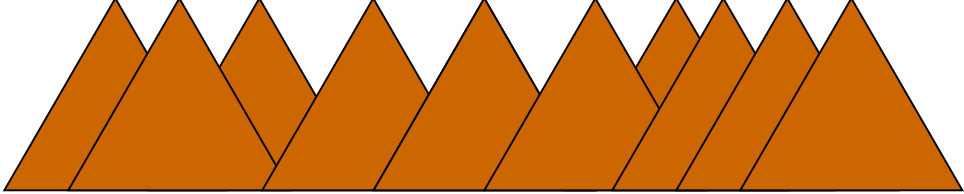
SOUTHERN
POPULATION



NORTHERN
POPULATION

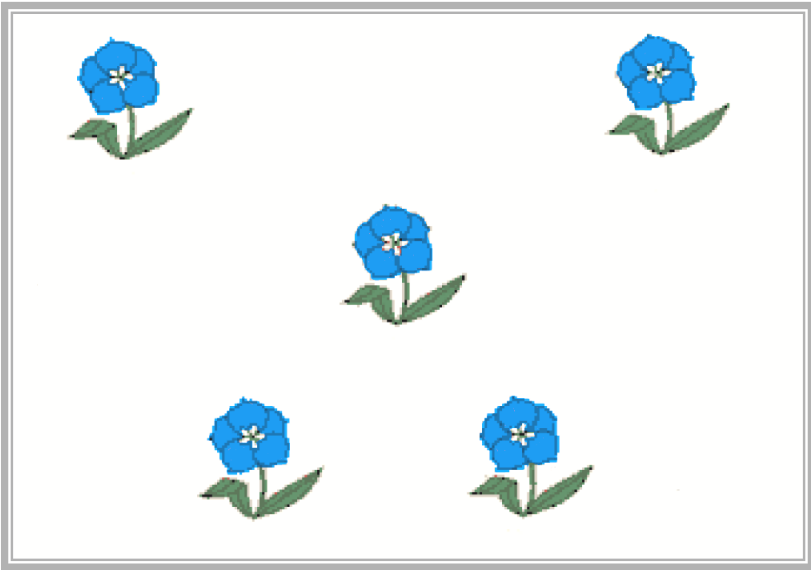


MOUNTAIN
RANGE

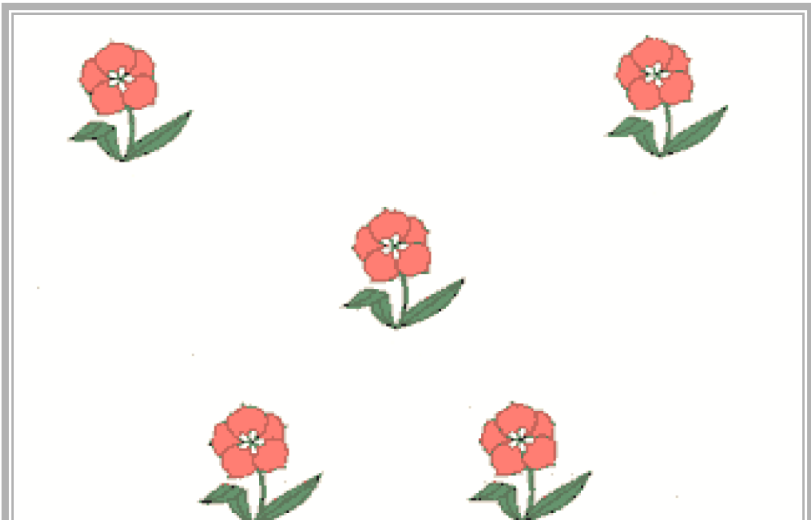


MOUNTAIN
RANGE

SOUTHERN
POPULATION

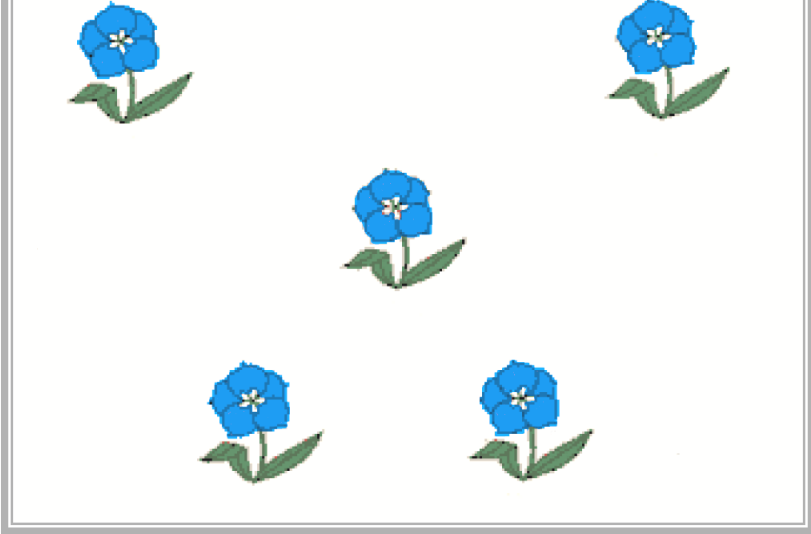


NORTHERN
POPULATION

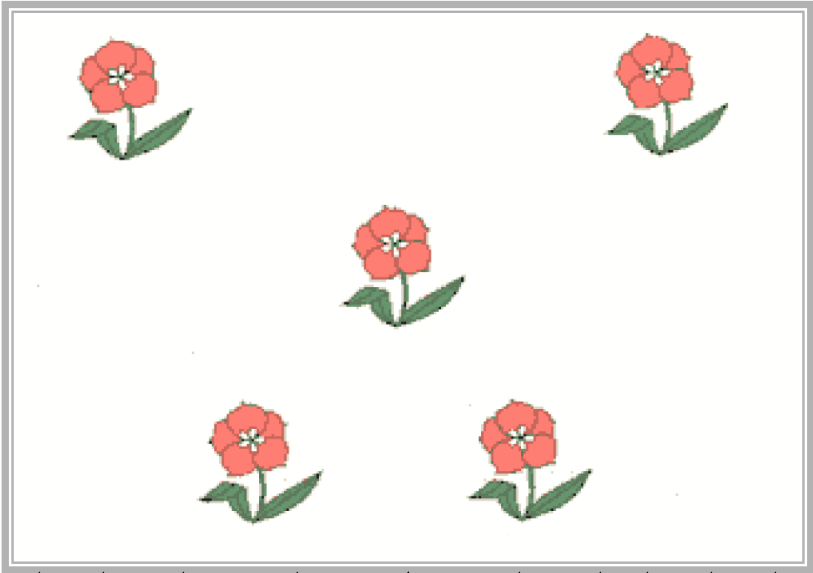


**DAUGHTER SPECIES
EVOLVES**

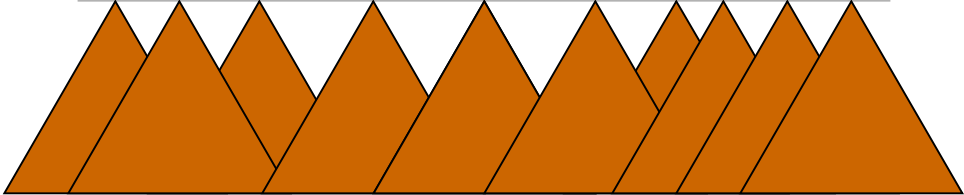
SOUTHERN
POPULATION



NORTHERN
POPULATION



TIME



TIME

SOUTHERN
POPULATION

