



University  
of Basel

# *Evolution*

## Guidelines Evolution Game

Dr. Marc Creus

Laboratory of Molecular Evolution (Creus Group)

Department of Chemistry

University of Basel

LAB-BOOK NR.: \_\_\_\_\_

Word(s) received \_\_\_\_\_

From Seat Nr. \_\_\_\_\_

Time: 1 minute per row.

Role the dice:

Word makes sense

↳ Yes	↳ No
Role Dice	
Nr. Received _____	<input type="checkbox"/> Extinction due to nonsense word
<input type="checkbox"/> Mutation	
<input type="checkbox"/> No mutation	
Word(s) for next generation _____	
<input type="checkbox"/> Passed on	
<input type="checkbox"/> Not passed on	
↳ <input type="checkbox"/> Not in time	↳ <input type="checkbox"/> Extinction due to timing
↳ <input type="checkbox"/> No receiver	↳ <input type="checkbox"/> Extinction due to no receptor

Put the appropriate hat on

**if 1-3**, then no mutation.

Simply pass on word to two people behind you.

**If 4-6**, then you need to mutate the word, by replacing only one letter for another letter of your choice, whilst trying to make a word that makes sense in English, e.g. from "here to hire". Pass on the new word to two people behind you.

Word(s) received \_\_\_\_\_

From Seat Nr. \_\_\_\_\_

Time: 1 minute per row.

Role the dice:

Word makes sense

↳ Yes	↳ No
<p>Role Dice</p> <p>Nr. Received _____</p> <p><input type="checkbox"/> Mutation</p> <p><input type="checkbox"/> No mutation</p> <p>Word(s) for next generation _____</p> <p><input type="checkbox"/> Passed on</p> <p><input type="checkbox"/> Not passed on</p> <p>↳ <input type="checkbox"/> Not in time</p> <p>↳ <input type="checkbox"/> No receiver</p>	<p><input type="checkbox"/> Extinction due to nonsense word</p> <p><input type="checkbox"/> Extinction due to timing</p> <p><input type="checkbox"/> Extinction due to no receptor</p>

Put the appropriate hat on

**if 1-3**, then no mutation.  
Simply pass on word to one person behind you.

**If 4-6**, then you need to mutate the word, by replacing only one letter for another letter of your choice, whilst trying to make a word that makes sense in English, e.g. from "here to hire". Pass on the new word to two people behind you.

Word(s) received \_\_\_\_\_

From Seat Nr. \_\_\_\_\_

Time: 1 minute per row.

Role the dice:

Word makes sense

↳ Yes	↳ No
<p>Role Dice</p> <p>Nr. Received _____</p> <p><input type="checkbox"/> Mutation</p> <p><input type="checkbox"/> No mutation</p> <p>Word(s) for next generation _____</p> <p><input type="checkbox"/> Passed on</p> <p><input type="checkbox"/> Not passed on</p> <p>↳ <input type="checkbox"/> Not in time</p> <p>↳ <input type="checkbox"/> No receiver</p>	<p><input type="checkbox"/> Extinction due to nonsense word</p> <p><input type="checkbox"/> Extinction due to timing</p> <p><input type="checkbox"/> Extinction due to no receptor</p>

Put the appropriate hat on

**if 1-3**, then no mutation.  
Simply pass on word to two people behind you.

**If 4-6**, then you need to mutate the word, by replacing only one letter for another letter of your choice, whilst trying to make a word that makes sense in English, e.g. from "here to hire". Pass on the new word to one person behind you.

Word(s) received \_\_\_\_\_

From Seat Nr. \_\_\_\_\_

Time: 1 minute per row.

Role the dice:

Word makes sense

↳ Yes	↳ No
Role Dice	
Nr. Received _____	<input type="checkbox"/> Extinction due to nonsense word
<input type="checkbox"/> Mutation	
<input type="checkbox"/> No mutation	
Word(s) for next generation _____	
<input type="checkbox"/> Passed on	
<input type="checkbox"/> Not passed on	
↳ <input type="checkbox"/> Not in time	↳ <input type="checkbox"/> Extinction due to timing
↳ <input type="checkbox"/> No receiver	↳ <input type="checkbox"/> Extinction due to no receptor

Put the appropriate hat on

**if 6**, then no mutation.  
Simply pass on word to two people behind you.

**If 1-5**, then you need to mutate the word, by replacing only one letter for another letter of your choice, whilst trying to make a word that makes sense in English, e.g. from "here to hire". Pass on the new word to two people behind you.

Word(s) received \_\_\_\_\_

From Seat Nr. \_\_\_\_\_

Time: 30 seconds per row.

Role the dice:

Word makes sense

↳ Yes	↳ No
<p>Role Dice</p> <p>Nr. Received _____</p> <p><input type="checkbox"/> Mutation</p> <p><input type="checkbox"/> No mutation</p> <p>Word(s) for next generation _____</p> <p><input type="checkbox"/> Passed on</p> <p><input type="checkbox"/> Not passed on</p> <p>↳ <input type="checkbox"/> Not in time</p> <p>↳ <input type="checkbox"/> No receiver</p>	<p><input type="checkbox"/> Extinction due to nonsense word</p> <p><input type="checkbox"/> Extinction due to timing</p> <p><input type="checkbox"/> Extinction due to no receptor</p>

Put the appropriate hat on

**if 6**, then no mutation.

Simply pass on word to two people behind you.

**If 1-5**, then you need to mutate the word, by replacing only one letter for another letter of your choice, whilst trying to make a word that makes sense in English, e.g. from "here to hire". Pass on the new word to two people behind you.

Word(s) received \_\_\_\_\_

From Seat Nr. \_\_\_\_\_

Time: 1 minute per row.

Role the dice:

Word makes sense

↳ Yes	↳ No
Role Dice	
Nr. Received _____	<input type="checkbox"/> Extinction due to nonsense word
<input type="checkbox"/> Mutation	
<input type="checkbox"/> No mutation	
Word(s) for next generation _____	
<input type="checkbox"/> Passed on	
<input type="checkbox"/> Not passed on	
↳ <input type="checkbox"/> Not in time	↳ <input type="checkbox"/> Extinction due to timing
↳ <input type="checkbox"/> No receiver	↳ <input type="checkbox"/> Extinction due to no receptor

Put the appropriate hat on

**if 4-6**, then no mutation.

Simply pass on word to two people behind you.

**if 3**, then add or take away one letter, such as “dove” to “doves” or to “doe” (i.e. a female of some animals, such as deer). Pass on word to two people behind you.

**if 2**, then rearrange letters within the same word, such as “love” to “vole”. Pass on word to two people behind you.

**if 1**, then replace only one letter for another letter of your choice, e.g. from “here to hire”. Pass on word to two people behind you.

Word(s) received \_\_\_\_\_

From Seat Nr. \_\_\_\_\_

Word makes sense

↳ Yes	↳ No
Role Dice	
Nr. Received _____	<input type="checkbox"/> Extinction due to nonsense word
<input type="checkbox"/> Mutation	
<input type="checkbox"/> No mutation	
Word(s) for next generation _____	
<input type="checkbox"/> Passed on	
<input type="checkbox"/> Not passed on	
↳ <input type="checkbox"/> Not in time	↳ <input type="checkbox"/> Extinction due to timing
↳ <input type="checkbox"/> No receiver	↳ <input type="checkbox"/> Extinction due to no receptor

Put the appropriate hat on

Time: 30 seconds per row (plus a pause on the 4th row).

Role the dice:

**if 6**, then no mutation. Simply pass on word to two people behind you.

**If 1-5**, then you need to mutate the word, by replacing only one letter for another letter of your choice, whilst trying to make a word that makes sense in English, e.g. from "here to hire". Pass on the new word to two people behind you.

Extinction due to catastrophic event:

**Participants seated in the 4th row will be subject to a catastrophic event:**  
those in the fourth row please wait for further instructions upon receiving your word.



Word(s) received \_\_\_\_\_

From Seat Nr. \_\_\_\_\_

Word makes sense and at least one immediate neighbour on the same row has at least one letter "e"

Yes	No
<p>Role Dice</p> <p>Nr. Received _____</p> <p><input type="checkbox"/> Mutation</p> <p><input type="checkbox"/> No mutation</p> <p>Word(s) for next generation _____</p> <p><input type="checkbox"/> Passed on</p> <p><input type="checkbox"/> Not passed on</p> <p><input type="checkbox"/> Not in time</p> <p><input type="checkbox"/> No receiver</p>	<p><input type="checkbox"/> Extinction due to nonsense word</p> <p><input type="checkbox"/> Extinction due to lack of "e"</p> <p><input type="checkbox"/> Extinction due to timing</p> <p><input type="checkbox"/> Extinction due to no receptor</p>

Put the appropriate hat on

Time: 1 minute per row.

Before rolling the dice:

check whether your own word or word from at least one immediate neighbor from the same row has at least one letter "e". If this requirement is not satisfied, then report "extinct due to lack of "e".

If you or at least one immediate neighbor in same row has an "e", then role the dice:

**if 1-3**, then no mutation. Simply pass on word to two people behind you.

**if 4-6**, then you need to mutate the word, by replacing only one letter for another letter of your choice, whilst trying to make a word that makes sense in English, e.g. from "here to hire". Pass on the new word to two people behind you.

Word(s) received \_\_\_\_\_

From Seat Nr. \_\_\_\_\_

Word makes sense and at least one immediate neighbour on the same row has at least one letter "e" and one letter "s"

Yes	No
<p>Role Dice</p> <p>Nr. Received _____</p> <p><input type="checkbox"/> Mutation</p> <p><input type="checkbox"/> No mutation</p> <p>Word(s) for next generation _____</p> <p><input type="checkbox"/> Passed on</p> <p><input type="checkbox"/> Not passed on</p> <p><input type="checkbox"/> Not in time</p> <p><input type="checkbox"/> No receiver</p>	<p><input type="checkbox"/> Extinction due to nonsense word</p> <p><input type="checkbox"/> Extinction due to lack of "e" or "s"</p> <p><input type="checkbox"/> Extinction due to timing</p> <p><input type="checkbox"/> Extinction due to no receptor</p>

Put the appropriate hat on

Time: 1 minute per row.

Before rolling the dice:

check whether your own word or word from at least one immediate neighbor from the same row has at least one letter "e" and one letter "s". If this requirement is not satisfied, then report "extinct due to lack of "e" or "s".

If you or at least one immediate neighbor in same row has an "e" or "s", then role the dice:

**if 4-6**, then no mutation. Simply pass on word to two people behind you.

**if 3**, then add or take away one letter, such as "dove" to "doves" or to "doe" (i.e. a female of some animals, such as deer). Pass on word to two people behind you.

**if 2**, then rearrange letters within the same word, such as "love" to "vole". Pass on word to two people behind you.

**if 1**, then replace only one letter for another letter of your choice, e.g. from "here to hire". Pass on word to two people behind you.

Word(s) received \_\_\_\_\_

From Seat Nr. \_\_\_\_\_

Word makes sense and at least one immediate neighbour on the same row has at least one letter "u" and one letter "v"

Yes	No
<p>Role Dice</p> <p>Nr. Received _____</p> <p><input type="checkbox"/> Mutation</p> <p><input type="checkbox"/> No mutation</p> <p>Word(s) for next generation _____</p> <p><input type="checkbox"/> Passed on</p> <p><input type="checkbox"/> Not passed on</p> <p><input type="checkbox"/> Not in time</p> <p><input type="checkbox"/> No receiver</p>	<p><input type="checkbox"/> Extinction due to nonsense word</p> <p><input type="checkbox"/> Extinction due to lack of "u" or "v"</p> <p><input type="checkbox"/> Extinction due to timing</p> <p><input type="checkbox"/> Extinction due to no receptor</p>

Put the appropriate hat on

Time: 1 minute per row.

Before rolling the dice:

check whether your own sentence or from at least one immediate neighbor from the same row has at least one letter "u" and one letter "v". If this requirement is not satisfied, then report "extinct due to lack of "u" or "v".

If you or at least one immediate neighbor in same row has an "u" or "v", then role the dice:

**If 6**, then no mutation. Simply pass on sentence to two people behind you.

**If 5**, then add or take away one word from the sentence and pass on sentence to two people behind you.

**If 4**, then rearrange words within the same sentence. Pass on sentence to two people behind you.

**If 3**, then add or take away one letter from any word of your choice and pass on sentence to two people behind you.

**If 2**, then replace only one letter for another letter of your choice in any one word, e.g. from "here to hire". Pass on sentence to two people behind you.

**If 1**, then rearrange letters within any one word. Pass on sentence to two people behind you.

## General Rules

In this experiment, you are a link in the chain of evolution: your species survives when you pass the material successfully to the next generation.

- Take all the appropriate actions and decisions within the period indicated between the signal of the first timer and the second timer.
- Please fill out the appropriate form accurately every time you receive a word.
- Each person may only receive one word per experiment and may hand it over – mutated or not mutated – to the indicated number of persons in the next row, behind.
- Put on the blue hat if you realize that you are in a situation of extinction. Put on the orange hat when your species survives – after you were able to hand out your word to the next generation.