

4 Genetics

In this module, the students develop the basics of genetics and epigenetics. As participants in a scientific conference, they prepare an opening, an introduction and a PowerPoint slide.

The three tasks are performed in three groups from the beginning.

Introduction

“The idea that genes turn us into puppets and predetermine everything is nothing but superstition.”

Craig Venter, biochemist, born 1946

Split the *Chair*, *Introduction* and *PowerPoint Slide* tasks between three small groups. All groups begin to prepare simultaneously.

⌚ 90 minutes

✍ **Tasks:**
Chair, *introduction*,
PowerPoint-slide

📄 **Material:**
Chair
Introduction A
Introduction B
PowerPoint slide A
PowerPoint slide B

Chair

Two students deal with the conference day opening – similar to the conference chair. They briefly introduce the concept of epigenetics. For this they will receive an article and key questions on the topic.

⌚ 35 minutes preparation
10 minutes presentation

Small group of two students
Chair exercise sheet
Chair material sheets

Introduction

Two students perform the task of introducing one researcher. They each receive material (Introduction A and B) and research notes.

⌚ 35 minutes preparation
2 x 5 minutes presentation

2 small groups of 2 students
Introduction exercise sheet
Introduction A material sheets
Introduction B material sheets



**PowerPoint Slide**

Two groups each work on an informative PowerPoint slide. The slide should briefly summarize both topics. The basic rules of good presentations apply:

- 3–6 points on the slide or in a diagram
- clear heading (44 pt.)
- font size at least 28 pt.

Students may use PowerPoint or sketch their slide on paper.

- ⌚ 35 minutes preparation
- 2 x 10 minutes presentation
- 2 x 5 minutes questions

2 small groups

PowerPoint-slide exercise sheet
PowerPoint-slide material sheet A
PowerPoint-slide material sheet B

If needed:
computer with PowerPoint

Following their joint preparation time, the groups present their results one after the other and thus reenact the conference day:

- 1) Opening by the Chair
- 2) Introduction of a female and a male scientist
- 3) Two short presentations with PowerPoint slide

Outlook

At the end of the lesson series you can take over the farewell to the conference participants: "Many thanks for the numerous interesting contributions to our conference!"

Afterwards, you can summarize your impressions on the lesson series.





Welcome Address

At conferences, the Chair takes over the words of welcome and generally introduces the topic of the conference day. The Chair is basically the chairperson of the conference.

TASK

As Chair, prepare a short introduction to epigenetics:

- Delineate the term genetics.
- Describe how epigenetic changes in the genome are manifested.
- Use one of the following examples to illustrate how epigenetic differences can make an impact:
 - o Bees: worker and queen
 - o Identical twins

BONUS

Lead a discussion on how the judge should decide on Bob's application.



Introduction

Important speakers at conferences are introduced. Their person and research are briefly discussed.

TASK

Prepare two introductions for:

- Conrad Hal Waddington
- Emmanuelle Charpentier

OBJECTIVE The best-known research results of the scientists should be summarized in your introduction.

TIP

Use the search terms on the Internet search material sheets to find out more about Waddington and Charpentier's research.





PowerPoint Slide

At conferences, scientists often present their results using PowerPoint slides. These present the most important facts and figures, for example using diagrams.

TASK Prepare an informative PowerPoint slide using bullet points. To do this, you will be given a newspaper article or a diagram.

PowerPoint topics:

PowerPoint slide A: Current status of cloning

PowerPoint slide B: The CRISPR/Cas9 method

TIP Read more on the topics:

Therapeutic cloning:

<https://www.eurostemcell.org/what-cloning-and-what-does-it-have-do-stem-cell-research>

Targeted genetic modification of iPS cells:

<https://www.eurostemcell.org/crispr-changing-gene-editing-landscape>

<https://zellux.net> (in German)

