

## What do I need to know for the midterm exam #1?

The exam will be designed to assess the learning objectives up to the lecture prior to the exam. The list of learning objectives is communicated on 1) the lecture slide, 2) in the course syllabus, and 3) the learning planner (it's all the same list). Please consult them as these will set the parameters of the exam.

The following is a list of topics/concepts that you will need to know to address the learning outcomes on the exam. Please note that this does not necessarily represent an exhaustive. I have tried my best to list topics/concepts that were discussed in class. If I missed something, but it was discussed in class, then it's a safe bet that it belongs on the list. **Colin**

### 1. Scientific Investigation

- What makes a good research question? Formulate research questions

### 2. Characteristics of chromosomes, genomes and genes:

- Features of the genetic material
- Building blocks of nucleic acids
- Building blocks of DNA and RNA
- Chemical bonds that link nucleotides
- Denaturation and renaturation of DNA
- Variations and characteristics of the genetic material in viruses, bacteria, and eukaryotes
- Molecular anatomy of chromosomes (ideograms, gene maps)
- Organization of DNA sequences (repeats, VNTRs, STRs, etc..)
- Organization of genes and genomes

### 3. Gene Expression and Interactions

- Transcription
- Translation
- Genetic code
- Open reading frames
- Posttranscriptional and posttranslational modifications
- Predict the sequences of mRNA and proteins based on DNA
- Gene interaction
- Gene regulation

### 4. Mutations

- Alleles, phenotypes
- Mutations (types of mutations; classification of mutations)
- Dominant and recessive relationships
- Gain-of-function mutations; loss-of-function mutations

**Key words and terms:** Section 1 (web site) key words and terms (just those relating to the concepts and terms covered up until the exam)