Using Public Genomic Databases

## Overview

This activity guides students through using publicly-available genomics databases. Students start with four *Drosophila* genes and learn how to find information about these genes, as well as information about homologous genes in mice, zebrafish, and humans. Finally, they use human disease databases to identify the human health consequences of mutations to the *Drosophila* homologs.

This activity is loosely based on the game Clue. Students need to match four *Drosophila* genes to the correct experimental data and background research.

**Duration:**

## Learning Objectives

1. Explore commonly-used public genomic databases to become familiar with the biological information on them.
2. Identify genomic information for four different *Drosophila* genes.
3. Compare how gene location and expression differs between species for homologous genes.
4. Determine the associations between *Drosophila* gene homologs and human diseases.

## Materials

* Students will need:
  + An internet connection for this activity. Students will use these websites: [*FlyBase*](https://flybase.org/), [*Mouse Genome Informatics*](https://informatics.jax.org/), [*ZFIN (Zebrafish Information Network*](https://zfin.org/) , [*NCBI*](https://www.ncbi.nlm.nih.gov/datasets/gene/), [*OMIM*](https://omim.org/), and [*MalaCards*](https://www.malacards.org/)
* Download the student activity as:
  + [Web page](https://genomicseducation.org/module/public_databases_student_guide.html)
  + [Word (docx)](https://github.com/fhdsl/GEMs/raw/main/docs/docx/module/public_databases_student_guide.docx)
  + [Google Doc](https://docs.google.com/document/d/1OO3H8LAG3_fk9MNHnTkinn6TeJzTNcSC/edit?usp=sharing&ouid=101727846555185296348&rtpof=true&sd=true)
* Google Slides presentation available for borrowing images [here](https://docs.google.com/presentation/d/1fy3FwkSLETnRUdf8huddq2n4qcb6eOyzwVg05dbudII/edit?slide=id.g2c8182c8825_0_50#slide=id.g2c8182c8825_0_50).
* Answer key available here.

## Scientific Topics

In addition to working with public genomic databases, students are exposed to the following concepts:

* curated databases
* homologs and orthologs
* model organisms
* gene ontology and GO terms
* genome assembly

## Outline

* Part 1: Using FlyBase
* Part 2: Identifying Homologs; Using Mouse Genome Informations, ZFIN, and GeneCards
* Part 3: Using OMIM and MalaCards
* Part 4: Solving the Data Mystery