



## CONSOLIDATION 1: Fish Market Survey Results

**Suggested Timing:** 40 minutes

Students will find out about the DNA sequences (barcodes) for the fish samples collected in this project and whether or not they were labelled correctly. As a class they will watch a presentation from the Centre for Biodiversity Genomics which will highlight interesting findings from the project as a whole.

### Prior Knowledge and Skills

- Familiarity with binomial nomenclature (two part species name, also known as Latin name)

### Success Criteria

- Active participation in class discussions
- Also see **Assessment Task Ideas**

### Market Survey Results Presentation

**Fish Market Survey Class Sampling Plan** (from Action)  
DNA barcoding results (from LifeScanner website)

### Part 1: Exploring the Class Results

- Once the samples have been barcoded, the information will be available through the dashboard on the LifeScanner website.
- Have each student remind the class of the market name of his/her fish sample and then tell the class the species name of the sample based on the DNA barcoding. Students could be asked to determine the common name of the species as well.
- Record the species and common name in the right-hand column of the **Class Sampling Plan**.
- As a class discuss the results. Potential questions for discussion can include:
  - *Were any results surprising?*
  - *Were more or fewer samples mislabelled than you thought?*
  - *If a fish was substituted for another type of fish, what type of fish was it substituted? Why do you think this species was used instead of the real one?*

### Part 2: Exploring Project Results

- Have the class watch the **Market Survey Results Presentation** [to come - late May 2018) by the Centre for Biodiversity Genomics. This presentation discusses the aggregated results from the entire project and highlights interesting results.
- Questions for discussion can include:
  - *Were any results surprising?*
  - *Were more or fewer samples mislabelled than you thought?*
  - *Is the data gathered accurate enough to make statements fish labelling in general?*
- Compare the class' results with the aggregated project results.
  - *How did the overall results compare to our class results?*
  - *Were our results indicative of patterns as a whole?*
  - *Is the data we gathered accurate enough to make statements about other cities or provinces?*
  - *Why does the size of a sample (number of data points) make a difference?*



### Assessment Task Ideas

- Have students create a newspaper-type article which summarizes the results of the Market Survey and explains DNA barcoding in a way that could be understood by the general public (see the Additional Information section below for more articles about the applications of DNA barcoding).
- Have students research the fish species studied in the survey and create a summary about how DNA barcoding can help scientists better understand the health of these species.
- Have students create how-to videos that could be shared with other classes (and posted on CurioCity) about collecting fish samples and using the LifeScanner app for market surveys.

### CONNECTING TO CONTENT ON CURIOCITY

- [Scientific Sampling](#) (Backgrounder 2012)

### ADDITIONAL INFORMATION

#### Processes of Science

- [Bias and Sources of Error](#) (Accessed Feb. 28, 2018)

This page, on the Tomatosphere™ by Let's Talk Science website, explains how bias and errors can result in inaccurate results from an experimental inquiry.

- [Sample Size and Reproducibility](#) (Accessed Feb. 28, 2018)

This page, on the Tomatosphere™ by Let's Talk Science website, explains how even a well-planned experimental inquiry can include variability and errors beyond the experimenter's control.

#### More Barcoding Articles

- <http://theconversation.com/pollen-genetics-can-help-with-forensic-investigations-53426> (Accessed Feb. 26, 2018)

This article, [Pollen genetics can help with forensic investigations](#) (posted Sept. 5, 2016), explains how DNA barcoding can help forensic investigators identify pollen found at crime scenes.

- <https://www.theguardian.com/science/2014/aug/16/biodiversity-determined-by-difference-in-dna-barcode> (Accessed Feb. 26, 2018)

This article from the Guardian, [How DNA barcodes can beat the wildlife traffickers](#) (posted Aug. 16, 2014), explores how researchers in Whales are using DNA barcoding to catch animal and plant smugglers worldwide.

- <https://www.newscientist.com/article/dn24529-dna-barcoding-reveals-herbal-pill-contamination/#.VGL0gvnF-T8> (Accessed Feb. 26, 2018)

This article on the New Scientist website, [DNA barcoding reveals herbal pill contamination](#) (posted Nov. 5, 2013), discusses results from the DNA barcoding of plants used in herbal supplements.

- <https://www.wired.com/2011/11/dna-barcoding-applications/> (Accessed Feb. 26, 2018)

This Wired Science article, [DNA Barcoding Goes Mainstream](#) (posted Nov. 28, 2011), describes DNA barcoding and how this new industry has rapidly grown to prominence in less than a decade.

- <https://www.sciencedaily.com/releases/2011/05/110517111236.htm> (Accessed Feb. 26, 2018)

This article on ScienceDaily, ['Barcoding blitz' on Australia's butterflies](#) (posted May 2011) reported that about 65 per cent of Australia's 10,000 known species of moths and butterflies have been barcoded with the assistance of Canadian researchers.