

# Microscopes and the Visually Impaired

Molecular biology can be one of the greatest challenges when supporting a student with a visual impairment into the science curriculum.

It's important to exhaust all options before developing alternative lessons for visually impaired students. Science teachers as a group are a quite resourceful, we sometimes get very creative with our adaptations.

Most individuals with visual impairments have some level of functional vision. With extreme magnification some students are able view microscopic world or images of the microscopic world.

Observing cells, small organisms and tissues and under microscope has always been a fundamental part of biology.

The following suggestions are provided to help assist science teachers and their visually impaired students to gain access to the amazing world of microscopy.

1. Microscopes and students with low vision.
2. Microscopes and students with significant visual impairments.

## Microscopes and Students With Low Vision

Many students with low vision are already using a CCTV for print enlargement and for viewing images. Sighted peers find viewing enlarged images on the CCTV fascinating. The CCTV can become an integral part of the science class benefitting all students.

Microscope mounted cameras are available that link to the CCTV or television. Viewing these microscopic images does not only benefit visually impaired students by also their sighted peers.

Water soluble pens can be used to draw around the microscopic images to assist with viewing and identification. These pens can also be used to tally individual cells or bacteria.

If the student requires a more permanent record of their observations a plastic overhead sheet can be placed on the CCTV screen. A permanent felt pen can be used to record information on the overhead plastic. The plastic sheet usually stays in place with the static electrical charge on the screen.

Some of the TV/computer based systems can record still images that can be viewed by the student when its convenient.

Explain to Science Department Heads and School Administrators that microscope cameras will benefit all science students. The Science Department will continue to use this technology during demonstrations long after the student with visually impaired has left the classroom.

## Microscopes and Students With Significant Visual Impairments

Students with more significant visual impairments will have to rely on other adaptations to understand the images from the microscope.

When a blind student reaches the stage of molecular biology there are a variety of commercially made tactile models available such as the cell, the D.N.A. molecule etc.

Custom made 3D models can be created to give the student an idea of what's being viewed under the microscope i.e. a comparison plant/animal cell or a specific type of bacteria.

Students can utilize sighted peers, Educational Assistants or their Science Teachers for a verbal description of what's being observed under the microscope. It usually takes a very articulate person to relay this information accurately.

Tactile diagrams can be created to resemble the image seen under the microscope. These diagrams can be created using embossing tools, attached tactile items and braille. It's important to add the braille to the diagram before applying the tactile additions as the paper will not fit into the brailier. Using BrailleLabel is one way around this problem.

Specialized Swell Paper is available to produce raised diagrams. Using Corel Draw software, Braille Transcribers can create computer generated drawings and diagrams. The images are sent directly from the PC to the memory of the photocopier (check to see if this feature is available with your photocopier). The drawings or diagrams are then

photocopied onto the special Swell Paper. The paper is then passed through a small heating device to create the raised image.

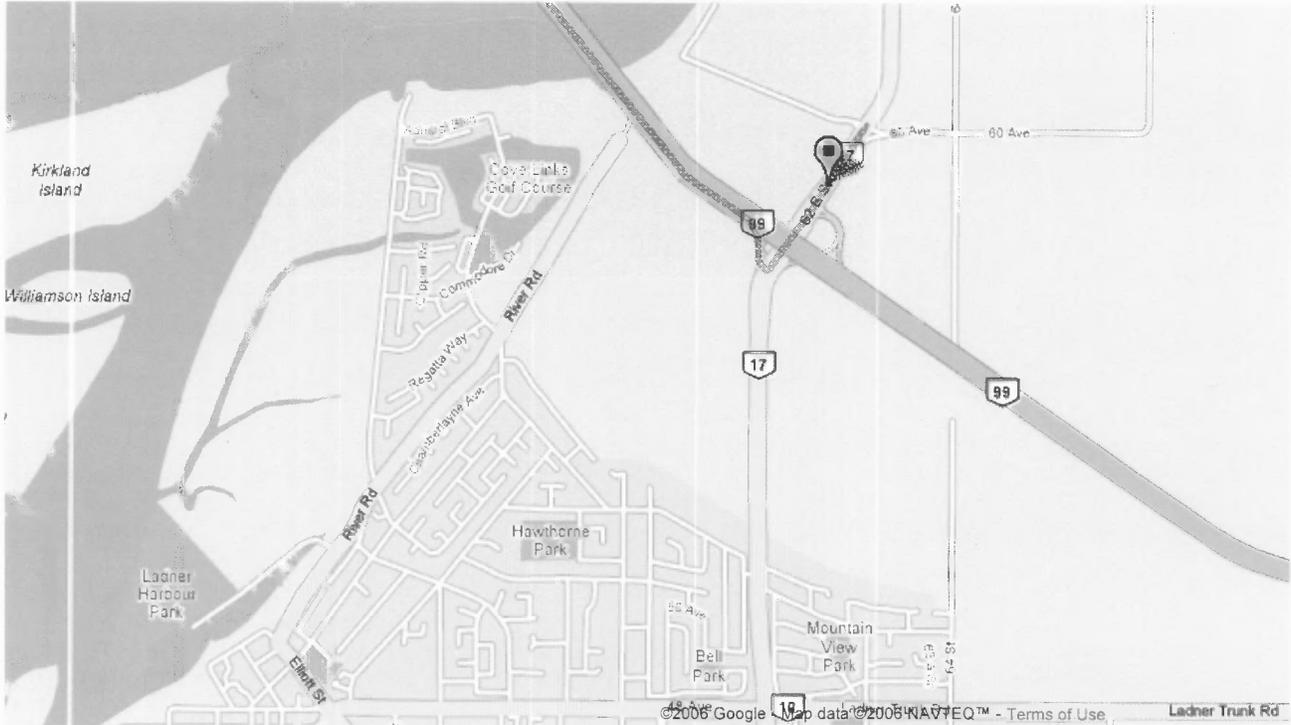
*The Swell Paper has an invisible coating containing small cells of alcohol. When the black 'ink' portions of the page are exposed to heat, the tiny cells expand and become raised. As black adsorbs more heat than white the lighter 'white' background remains smooth and unchanged.*

The Swell Paper diagrams can be labeled using a braille font in Corel Draw, if the braille font is missing it can be 'googled' and downloaded from the internet. The braille dots become readable after the swelling process.

The beauty of the Swell Paper system is that Corel Draw files can be archived and shared with colleagues. This saves reinventing the wheel each time a diagram is required. If a plant cell has already been developed it produced within minutes.



Start **1750 W 75th Ave**  
**Vancouver, BC, Canada**  
End **6005 HWY-17 (S)**  
**Delta, BC, Canada**  
Travel **15.9 km (about 18 mins)**



### Directions

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|--|-------------------------|
| 1. Head <b>northwest</b> from <b>W 75th Ave</b>                  | <b>0.1 km</b>           |
| ➔ 2. Turn <b>right</b> at <b>Angus Dr</b>                        | <b>0.2 km</b>           |
| ➔ 3. Turn <b>right</b> at <b>SW Marine Dr</b>                    | <b>0.5 km</b>           |
| 4. Continue on <b>W 70th Ave</b>                                 | <b>0.9 km</b><br>1 min  |
| ➔ 5. Turn <b>right</b> at <b>Oak St</b>                          | <b>0.2 km</b>           |
| 6. Continue on <b>HWY-99</b>                                     | <b>13 km</b><br>11 mins |
| 7. Take the <b>HWY-17</b> exit <b>28</b> to <b>BC Ferries</b>    | <b>0.3 km</b>           |
| ← 8. Turn <b>left</b> and head toward <b>62 B St</b>             | <b>0.6 km</b>           |
| 9. Make a <b>U-turn</b> at <b>62 B St</b>                        | <b>0.4 km</b>           |
| 10. Arrive at <b>6005 HWY-17 (S)</b><br><b>Delta, BC, Canada</b> |                         |

These directions are for planning purposes only. You may find that construction projects, traffic, or other events may cause road conditions to differ from the map results.

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