

# Context for Quiz A Module 3

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All quiz questions will refer to and will be based upon the image below (© C. Sealfon).



## Image description:

Prof. Maple took this photo using a camera. Prof. Maple was indoors and the photo was taken through a glass window with a wire window screen (see further information below).

There is a bright yellow lamp and bright red lamp in the photo, each with cross-shape "+" patterns visible in the photo. The red lamp includes two separate bulbs located side by side. The red lamp is

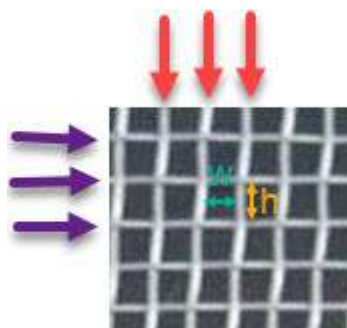
also located farther away from the window than the yellow lamp.

Note that Babinet's principle may be useful in analyzing this image.

Here is an image (not to scale) of a piece of a window screen similar to the one through which the photo was taken:



Here are some definitions to refer to aspects and dimensions of the window screen:



The window screen is made of horizontal metal wires (three of which are indicated by purple arrows) and vertical metal wires (three of which are indicated by red arrows). Let  $t$  denote the thickness or the diameter of each wire. This grid of wires forms square holes, seen as black square-like shapes in the photo of the window screen. Let  $w$  denote the width of the holes in the window screen and let  $h$  denote the height of the holes in the window screen. (If these are perfect squares, then  $w = h$ .) Parallel wires that are next to each other may be called "neighbouring wires" and holes that are next to each other may be called "neighbouring holes".

### Logistics:

The quiz will open on February 24 at 11:35am and end 25 minutes after you start, or at 12:05pm, whichever comes *first*. (All times are Toronto time.) It thus comes after Quiz B for Module 2. It will appear on Quercus as an assignment called "Quiz 3a" under "Module 3".

The quiz will consist of 6 questions: 5 conceptual questions and 1 quantitative question. You will see