Exploration 1: CDs and DVDs

In this activity you will investigate the inner structure of a CD and a DVD using a "virtual" microscope.

1) What do you see before you magnify the CD? Click the zoom in button, what do you see now?

2) How many layers do you see?

3) What do you see before you magnify it?

4) Click the zoom in button, what do you see now?

5) Why do you think the bottom and top of the CD do not look the same?

6) In which ways are the CD and DVD similar? List common characteristics.
7) In which ways are the CD and DVD different? List the features that make them different.

**Exploration 2: Small Pits**

In this activity you will compare the size of CD and DVD pits to that of other small objects.

1) Which objects are smaller than the pits? Which objects are larger?

**Exploration 3: Light Waves**

In this activity you will explore how the color and the wavelength of light are related.

1) Determine the color of light with the following wavelengths:

<table>
<thead>
<tr>
<th>Wavelength</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.45 microns</td>
<td></td>
</tr>
<tr>
<td>0.52 microns</td>
<td></td>
</tr>
<tr>
<td>0.57 microns</td>
<td></td>
</tr>
<tr>
<td>0.65 microns</td>
<td></td>
</tr>
</tbody>
</table>

**Exploration 4: Track Length**

On single-layer DVDs and all CDs, the track always circles from the inside of the disc to the outside in a spiral. In this exploration you will investigate the length of the data track on CDs and DVDs.

1) Measure the length of the data track for the CD and DVD. Write the results below.
**Exploration 5: Big Numbers**

The amount of data that can be stored in CDs and DVDs is normally measured in megabytes and gigabytes. In this exploration you will investigate how big these numbers are.

1) How many bytes are in 1 kilobyte? _______

2) How many kilobytes are in 1 megabyte? _______

3) How many megabytes are in 1 gibabyte? _______

4) How many times do you need to multiply 1 byte by 2 to generate 1 kilobyte? _______

5) How many times do you need to multiply 1 byte by 2 to generate a megabyte? _______

6) How many times do you need to multiply 1 byte by 2 to generate a gigabyte? _______

**Application**

1) Which one of these microscopic views represents the pits and lands of a DVD?

- [ ] a)
- [ ] b)
- [ ] c) Both
- [ ] d) None
2) Match the colors red and blue to their corresponding wavelength.
   a. Red is represented by the wavelength a) and blue by the wavelength b).
   b. Red is represented by the wavelength b) and blue by the wavelength a).

3) How does the track length of a DVD compare to the one of a CD?
   a. The track length of a DVD is twice the one of a CD.
   b. The track length of a DVD is half the one of a CD.
   c. The track length of a DVD is the same as the one of a CD.

4) Can you store a 4096 MB movie into a single-sided/single-layer DVD (4.38 GB)?
   a. Yes, because 4096 MB is smaller than 4.38 GB.
   b. No, because 4096 MB is smaller than 4.38 GB.