

Sequence n° 15: storing, reading information

ACTIVITY 1 : Data on DVD's

Document 1: DVD formats

DVDs are of the same diameter and **thickness** as CDs, and they are made using some of the same materials and manufacturing methods. Like a CD, the data on a DVD is encoded in the form of small **pits** and **bumps** in the track of the disc.

A DVD is composed of several layers of plastic, totaling about 1.2 millimeters thick. Each layer is created by injection molding polycarbonate plastic. This process forms a disc that has **microscopic bumps** arranged as a single, continuous and extremely **long spiral track** of data.

Once the clear pieces of polycarbonate are formed, a thin reflective layer is **sputtered** onto the disc, covering the bumps. Aluminum is used behind the inner layers, but a semi-reflective gold layer is used for the outer layers, allowing the laser to focus through the outer and onto the inner layers. After all of the layers are made, each one is coated with lacquer.

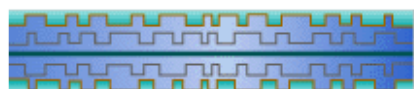
Single-sided, single layer (4.7GB)



Single-sided, double layer (8.5GB)



Double-sided, double layer (17GB)



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Source: wikimedia commons

Document 2: DVD tracks

What the image cannot impress upon you is how incredibly tiny the data track is -- just 740 nanometers separate one track from the next (a nanometer is a billionth of a meter). And the elongated bumps that make up the track are each 320 nanometers wide, a minimum of 400 nanometers long and 120 nanometers high. The figure below illustrates looking through the polycarbonate layer at the bumps.

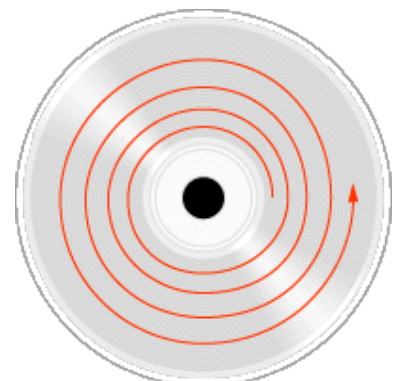
The microscopic dimensions of the bumps make the spiral track on a DVD extremely long. If you could lift the data track off a single layer of a DVD, and

stretch it out into a straight line, it would be almost **7.5 miles** long!

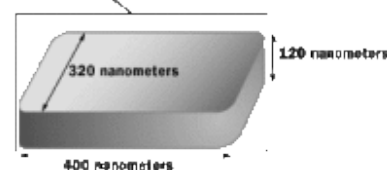
That means that a double-sided, double-layer DVD would have **30 miles** (48 km) of data!

To read bumps this small you need an incredibly precise disc-reading mechanism.

Source: wikipedia



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■ Acquiring vocabulary

English	French
thickness	
data	
encoded	
pits	
bumps	
long spiral track	
To sputter	

■ Presenting conclusions

Read documents 1 and 2 and explain how information is stored on a DVD.

Activity summary

What you must remember:

- **data**
- **spiral track**

Skills linked to the curriculum:

Compétences	Capacités à maîtriser
APP	<p>Extraire les informations jugées pertinentes concernant :</p> <ul style="list-style-type: none"> – les dimensions caractéristiques du CD (distances, capacité de stockage) – le principe de la lecture du disque optique <p>Expliquer le principe de codage des données sur un support optique numérique.</p>
COM	<p>Utiliser un vocabulaire scientifique adapté Présenter des résultats</p>