

Sequence 2: optical models



Fiches de synthèse mobilisées (collection en français) :

- Fiche n°2 : modèles géométrique et ondulatoire de la lumière



Sommaire des activités ETLV :

ACTIVITY 1: persistence of vision

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DOCUMENT 1: how animation works

Animation works by using an optical illusion. By presenting a sequence of still images in quick enough succession, the viewer interprets them as a continuous moving image.

Persistence of vision is the amount of time an image remains visible by a human being even after it is no longer projected. Because the human eye and brain can only process **20 separate images per second**, the human eye can retain an image for about **50ms**. If a projector displays more than 20 images per second, the movement will seem fluid, if it displays less than 20 images per second, the images will be visible.

DOCUMENT 2: a zoetrope

The use of animation techniques to create moving images predates conventional cinema. Devices like the zoetrope used the basic principles of animation to provide entertainment in the 19th century.



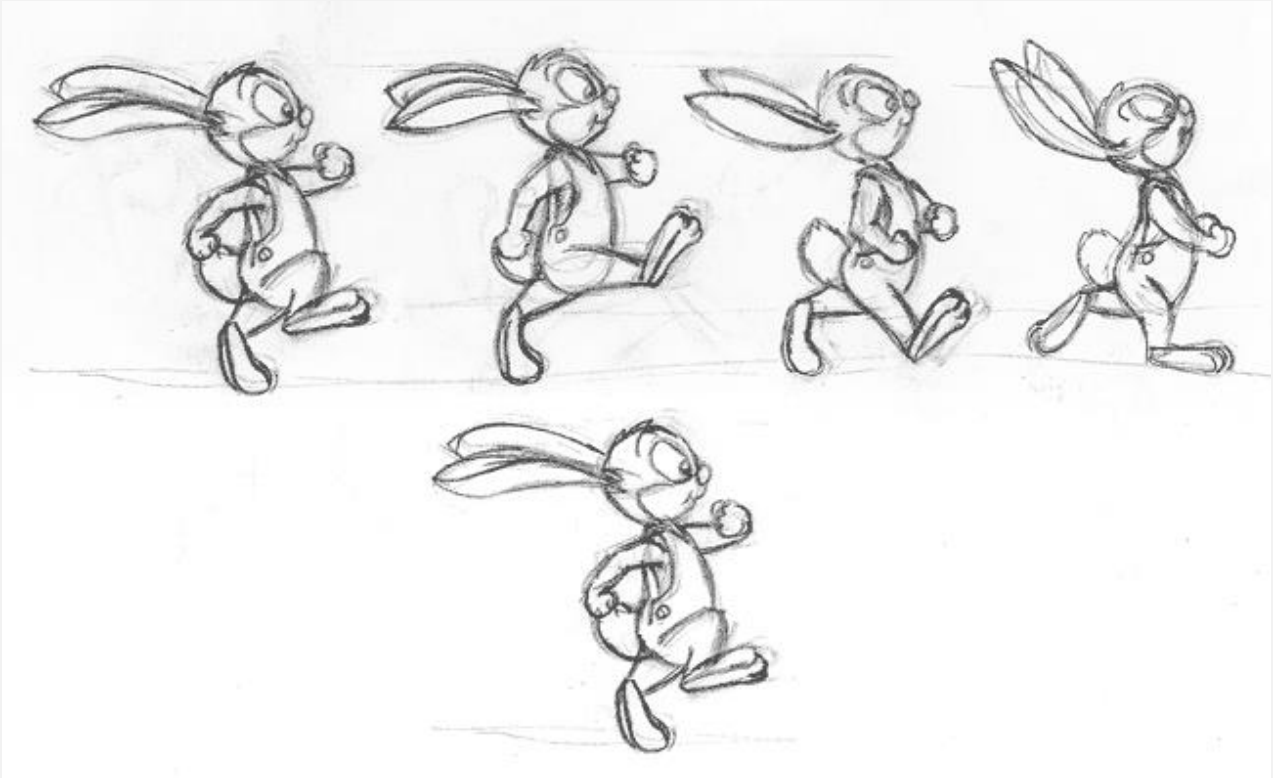
Source: [wikimedia commons](#)

A sequence of images printed on a spinning drum or disk provide the illusion of continuous motion when viewed through a slot in the drum or on a secondary moving disk. The slot acts as a shutter momentarily freezing the image.

DOCUMENT 3: cinema animations

A traditional cinema projector works on the same illusion by actually stopping the film frames.

Understanding persistence of vision helps animators to create smooth and lifelike animations in the most efficient way by showing the viewer just enough frames to create the sense of motion. In animation, moving characters are often shot “on twos”, which means one image is shown for every two frames of film, a total of 12 drawings per second. Although this is just on the limit of our ‘persistence of vision’ it is usually satisfactory for creating smooth and lifelike animation.



Source: [wikimedia commons](https://fr.wikipedia.org/wiki/Persistence_rétinienne#/media/Fichier:Animhorse.gif)

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■ **Understanding:**

Explain in your own words what persistence of vision is:

How does a zoetrope work?

Watch the following animation: https://fr.wikipedia.org/wiki/Persistence_rétinienne#/media/Fichier:Animhorse.gif in which 12 images per second are projected. Explain why the images seem visible?

Connaissances et capacités à maîtriser

Ce qu'il faut savoir faire :

Compétences	Capacités à maîtriser	Où dans cette séquence ?
APP	Utiliser du vocabulaire spécifique	Activité 1
	Lire et comprendre des documents scientifiques	Activité 1
ANA	Mettre en lien des documents pour émettre des hypothèses en réponse à une question scientifique	Activité 1