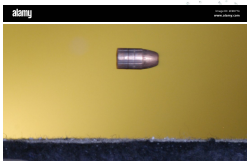
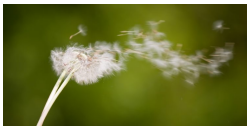




Physics of waves

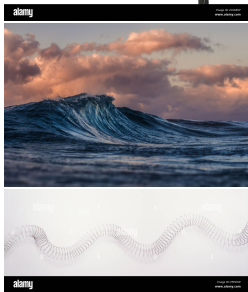
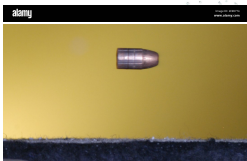
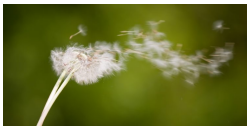
Wave or not?

All these pictures show **air**, **water** or **metal** transporting energy...
...but which of them are **waves**?



Wave or not?

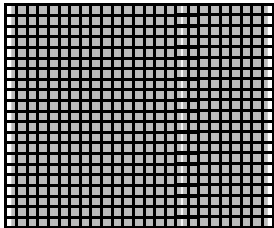
All these pictures show **air**, **water** or **metal** transporting energy...
...but which of them are **waves**?



A **wave** is a disturbance in a **medium** which transports energy, but does **not** transport the **medium** itself.

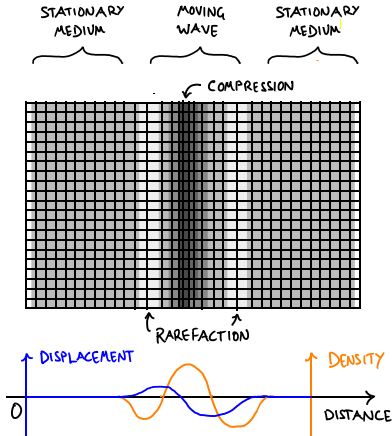
Wave medium

STATIONARY
MEDIUM



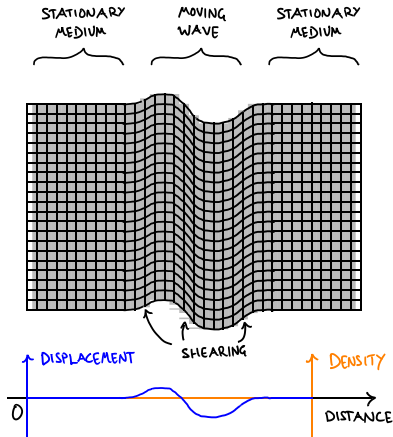
- ▶ **Waves** are typically **disturbances** in a **medium**
- ▶ Mostly you'll learn about **media** made of **liquid**, **gas** or **solid** material
- ▶ In these cases the **disturbance** means that the material is deformed away from its uniform 'resting' position
- ▶ (Other kinds of disturbance, e.g. **electromagnetic** waves, **gravitational** waves, **quantum** waves...)

Longitudinal waves



- ▶ Medium motion **parallel** to wave motion
- ▶ Density changes result in **compression** and **rarefaction**
- ▶ Examples: sound waves, earthquakes (P-waves)

Transverse waves



- ▶ Medium motion **perpendicular** to wave motion
- ▶ Medium has **constant density**
- ▶ Sideways deformation of medium is known as **shearing**
- ▶ Examples: string waves (e.g. guitar, piano), earthquakes (S-waves), small ripples on still water (capillary waves)