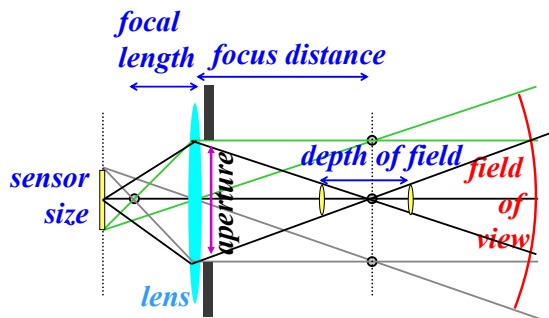


Photography Survival Kit

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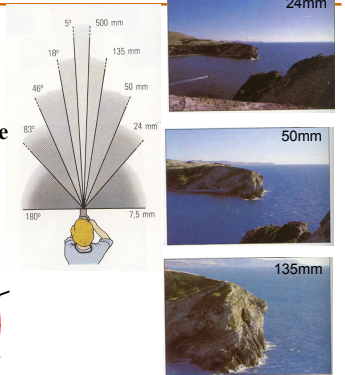
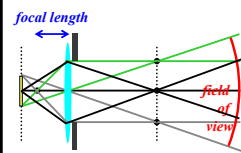
- **Focal length (in mm)**
 - Determines the field of view.
 - wide angle (<30mm) to telephoto (>100mm)
- **Focusing distance**
 - Which distance in the scene is sharp
- **Depth of field**
 - Given tolerance, zone around the focus distance that is sharp
- **Aperture (in f number)**
 - Ratio of used diameter and focal lens.
 - Number under the divider → small number = large aperture (e.g. f/2.8 is a large aperture, f/16 is a small aperture)
- **Shutter speed (in fraction of a second)**
 - Reciprocity relates shutter speed and aperture
- **Sensitivity (in ISO)**
 - Linear effect on exposure
 - 100 ISO is for bright scenes, ISO 1600 is for dark scenes

Quantities



Focal length

- <30mm: wide angle
 - 50mm: standard
 - >100mm telephoto
- Affected by sensor size (crop factor)



Exposure

- **Aperture (f number)**
 - Expressed as ratio between focal length and aperture diameter: $\text{diameter} = f / \langle f \text{ number} \rangle$
 - f/2.0, f/2.8, f/4.0, f/5.6, f/8.0, f/11, f/16 (factor of sqrt (2))
 - Small f number means large aperture
 - Main effect: depth of field
 - A good standard lens has max aperture f/1.8.
 - A cheap zoom has max aperture f/3.5
- **Shutter speed**
 - In fraction of a second
 - 1/30, 1/60, 1/125, 1/250, 1/500 (factor of 2)
 - Main effect: motion blur
 - A human can usually hand-hold up to 1/f seconds, where f is focal length
- **Sensitivity**
 - Gain applied to sensor
 - In ISO, bigger number, more sensitive (100, 200, 400, 800, 1600)
 - Main effect: sensor noise

Reciprocity between these three numbers:
for a given exposure, one has two degrees of freedom.

Depth of field

- **The bigger the aperture (small f number), the shallower the DoF**
 - Just think Gaussian blur: bigger kernel → more blurry
 - This is the advantage of lenses with large maximal aperture: they can blur the background more
- **The closer the focus, the smaller the DoF**
- **Focal length has a more complex effect on DoF**
 - Distant background more blurry with telephoto
 - Near the focus plane, depth of field only depends on image size
- **Hyperfocal distance:**
 - Closest focusing distance for which the depth of field includes infinity
 - The largest depth of field one can achieve.
 - Depends on aperture.

Equipment

- Do get an SLR, compacts are way too limited
- Don't worry about brand
- Don't worry about the body, get the cheapest one
- Worry about lenses
 - Zooms are convenient but quality can be a problem
 - avoid the basic zoom, but the one above is usually great
 - Maximum aperture matters (the smaller the number, the better)
 - Get a prime in the 35-85mm range (cheap, high quality, wide aperture)
50mm f/1.8 (both Canon & Nikon)
- Get a tripod
- Get an external flash if you want to take “event” pictures
 - And orient towards ceiling
 - Good flash photography is very difficult
- Count ~1k for camera+standard zoom+50mm

Nikon

Tends to be a tad cheaper

- D50 is a great body. D70 is a little better.
- 18-70
- 55-200 is surprisingly not so bad and super cheap
- Get the 50mm f/1.8



Canon

- Rebel XT or 20D
- 17-85
- 70-200 f/4.0 (amazing lens)
- 50mm f/1.8
- 100mm f/2.8 macro (great also for portraits)



Other brands

Not as big a range, future not always clear (see Minolta), have been slower to get to digital SLR

- Olympus
 - Good system, but smaller sensor
- Konica-Minolta
 - Just announced they stop photography!
- Pentax
 - Good entry camera
- Sigma
 - Intriguing sensor (Foveon)
- Fuji
 - One-trick pony (the sensor)
 - Nikon body
- Sony
 - Interesting hybrid, the R1
 - Very silent, good images, crappy viewfinder, no interchangeable lenses

Shooting

- Use aperture priority, work on depth of field
- Change your viewpoint
- Don't center things
- Learn to adjust ISO
- Shoot raw
- Check your histogram

Editing (Photoshop)

- Crop to improve composition
- Manage contrast using curve and adjustment layers
- Sharpen a bit
- Convert to black and white with gradient map