Photography Survival Kit

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**Quantities**

- **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 $\geq$ 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

**Exposure**

- **Aperture (f number)**
  - Expressed as ratio between focal length and aperture diameter:
    - $\text{diameter} = \frac{f}{f \text{ number}}$
  - 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, larger 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 $\Rightarrow$ 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
  – 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