Digital Camera Primer

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Component: Camera
Factors:

- **Type:**
  - DSLR (Digital Single-Lens Reflex) are the big ones with changeable lenses, manual and automatic features etc. for pros & avid amateurs
  - Point-and-shoot are the smaller ones with few manual features
  - Others are in-between

Component: Image chip (CCD)
What: captures the image – acts like film in old-school cameras
Factors:

- **Resolution**: measured in Megapixels (Mp) – more gives more clarity.
- **Size**: measured in millimetres, but usually hard to find out how big a camera's CCD chip is. Bigger is better, even if the number of Mp is the same. Two main kinds in Digital SLR's are "crop" and "full frame".
- **ISO**, or sensitivity
  - For any given situation, a certain amount of light has to reach the CCD to form the image
  - The sensitivity can be set for each picture, e.g. high ISO (1600) for low-light situations; low ISO (50) for sunny days
    - Low ISO gives smoother, less "grainy" images – sometimes more grain is what you want, though

Component: Lens
What: That glass thing in front that forms the image, just like you study in science class
Factors:

- **Focal length** – measured in mm
  - a longer focal length brings objects closer (telephoto) but takes in a narrower view
  - a shorter focal length is the opposite – smaller objects but wider view
  - telephoto lenses have less *depth of field*, meaning there is more in front of and behind the subject that will be blurry. You can use this to isolate the subject e.g. portrait in focus with flowers etc soft-focus in behind.
  - A zoom lens has a range of focal lengths, usually from somewhat wide to somewhat telephoto – good all-purpose compromise
- **Quality** – almost any modern name-brand camera will have a good-quality lens, and you can upgrade over time

Component: Aperture
What: the opening in the lens that can be made more or less open to control the amount of light getting through
Factor:

- **f/ratio** – measured as a number e.g. f/2.8
    - smaller numbers (e.g. 2.8) mean a wider lens opening, so it can be used in lower-light settings e.g a rink
    - smaller numbers give less depth of field; larger numbers (e.g. 22) give more
    - using a smaller aperture means you will need a lower shutter speed and/or higher ISO
- Cameras (and lenses) report the largest aperture available, so an f/2 lens also has f/2.8, f/4, f/5.6 etc. The camera will usually tell you exactly what you're set at
- A lens with a low f/ number, e.g. f/1.8, will be better if you're going to shoot a lot in low-light settings
- Math stuff: the "ratio" is (focal length) / (aperture diameter), so an f/2 lens has an aperture diameter half the focal length

Component: Shutter
What: Governs how long the camera lets the light get at the CCD
Factors:

- High shutter speed lets you freeze motion e.g. in sports
- Slower shutter speeds let you take pictures in lower light – the shutter stays open longer to let more light in
- Slower shutter speeds are more prone to blurring caused by your motion, shaky hands, etc – you may need a tripod
- Recommendation: handheld, your lowest shutter speed should be the inverse of the focal length e.g. 1/200 for a 200mm lens.

Component: Memory chip
What: the removable chip where the pictures are stored
Factor: Amount of space – more is better, but you should download often (and organize and cull often, too)

Component: Viewscreen
What: the place on the camera where you can review, control, delete pictures on the memory chip, and often also see what you're taking the picture of.
Factors:

- Size & clarity of the screen
- Can the screen tilt out?
- Some cameras also have an eye-level viewfinder, where you put your eye up to the camera and look through the lens, or just above it. This lets you concentrate on the picture as you take it, and blocks out glare from surrounding light.

Component: Camera controls
What: dials & buttons on the camera (top & back, usually) that let you control shutter speed, ISO, aperture, focus, automatic/manual, etc.
Factors:

- All cameras have a full *automatic exposure setting* (ISO, aperture and shutter speed are chosen for you) and auto focus
- Most also let you take *manual control* of ISO, shutter speed and aperture.

- Most have semi-automatic settings: you set shutter speed and it sets the aperture, or v.versa
- Manual focus and manual zoom are rarer on inexpensive cameras, but very desirable. Manual focus and zoom that use pushbuttons to move in and out are hard to use, and take practice. Focus and zoom with twisting lens rings are quick and easy.