



# Camera Basics

# A Brief History

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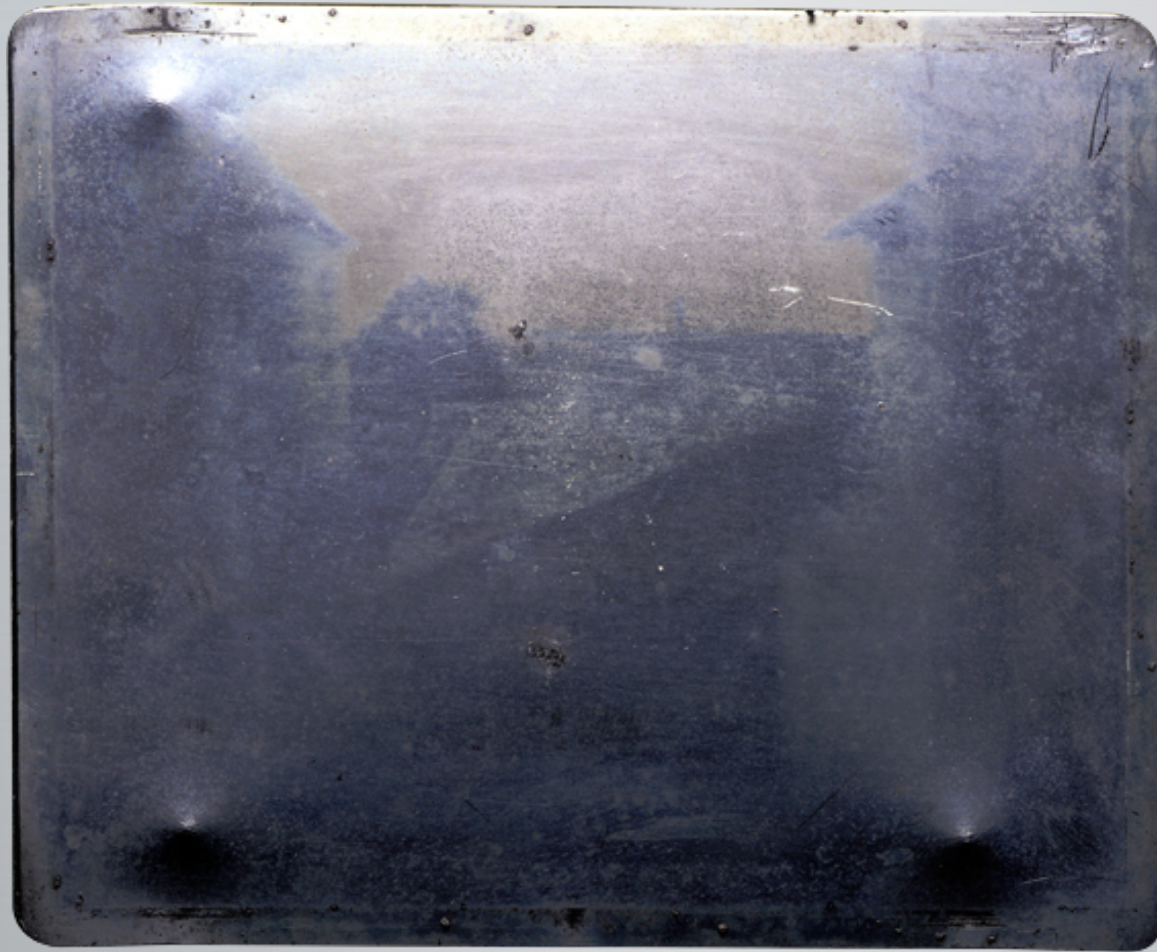
# Viewing First Photo

How it looks today

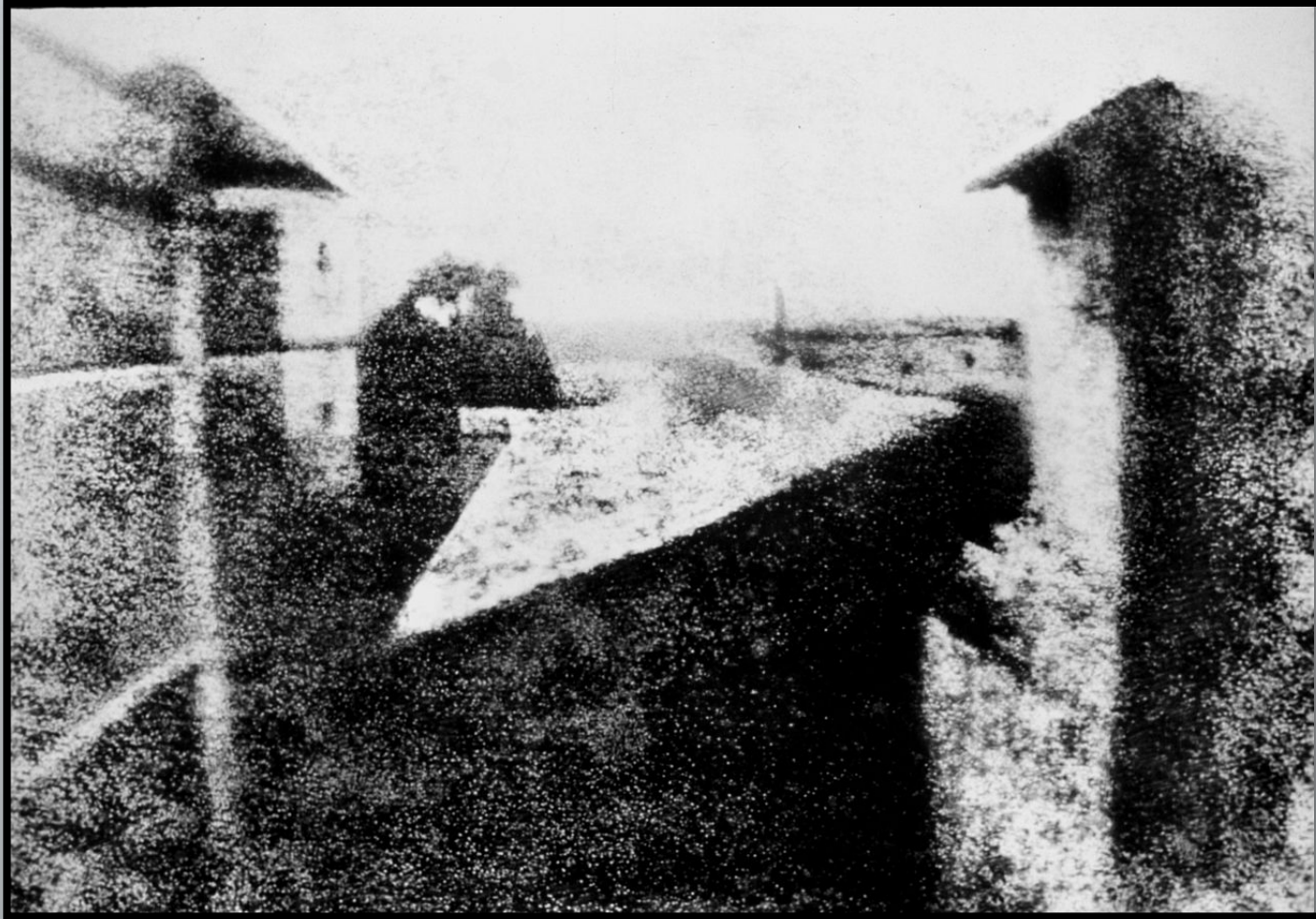


# First Photo

How it looked in 2004



# First Photograph (enhanced)



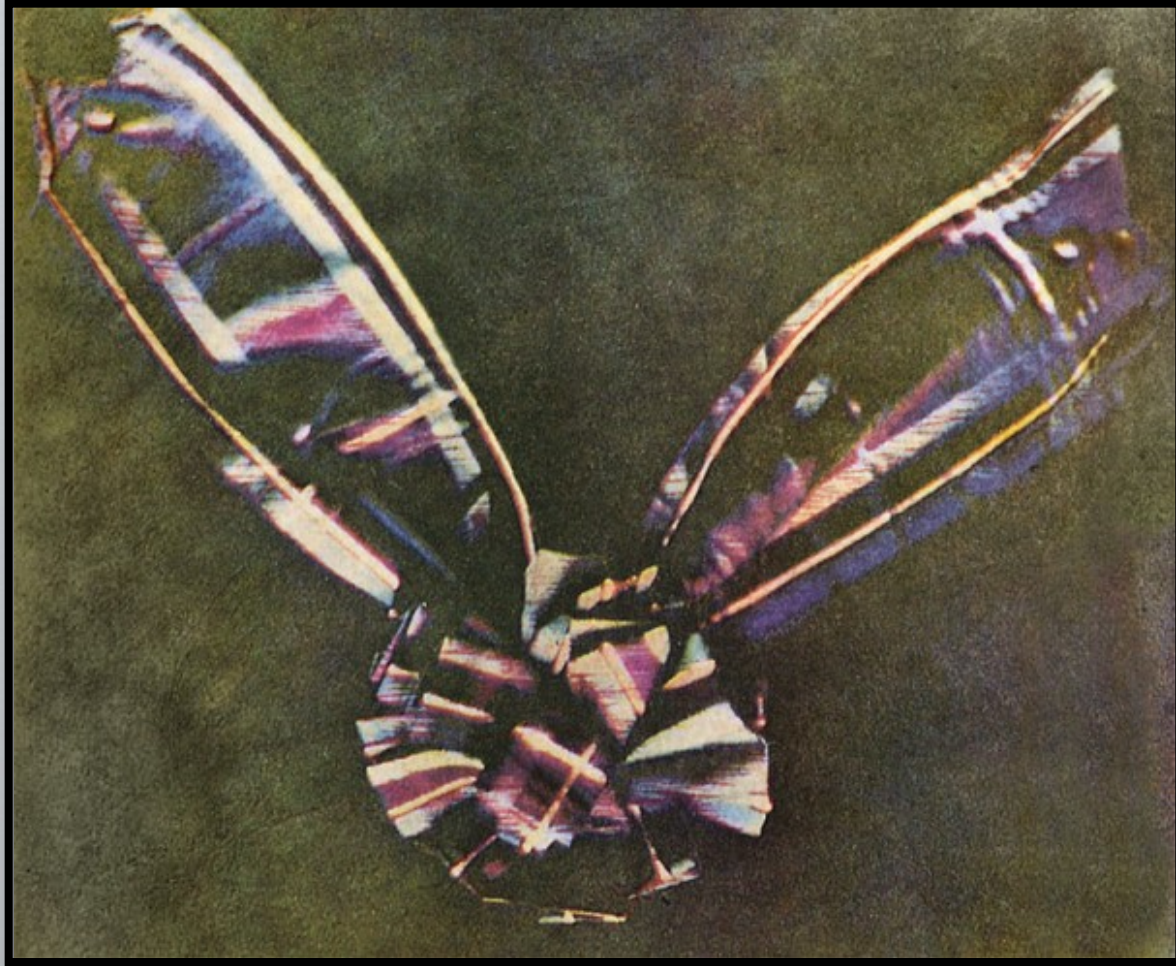
View from the Window at Le Gras, Joseph Nicéphore Niépce

# First Photo with Human, 1838



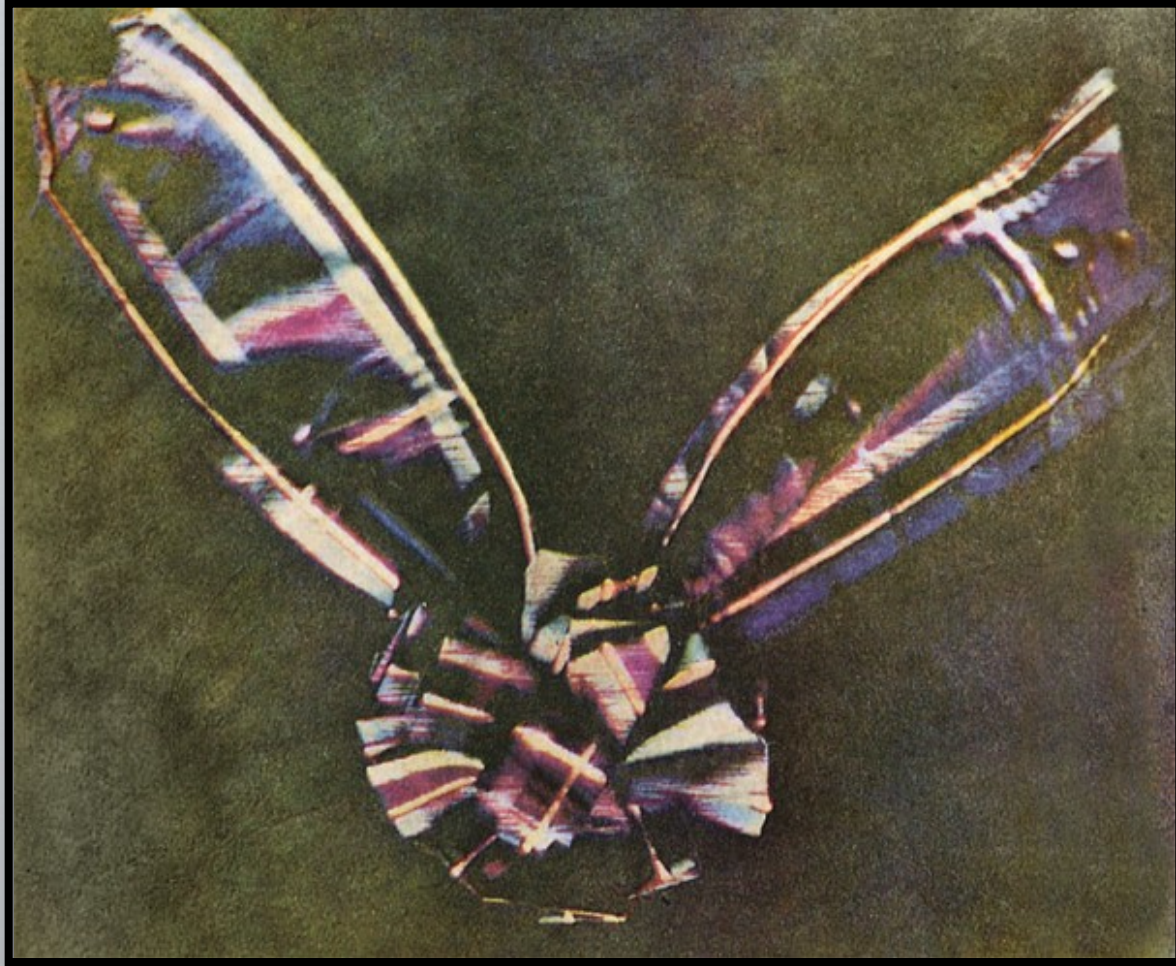
“Boulevard du Temple,” a daguerreotype made by Louis Daguerre in 1838. It is a view of a busy street, with a 10 minute exposure time the moving traffic left no trace. **Can you find the two visible people?**

# First Color Photo 1861



The first color photo, an additive projected image of a tartan ribbon, was taken in 1861 by the Scottish physicist James Clerk Maxwell.

# First Digitally Scan 1957

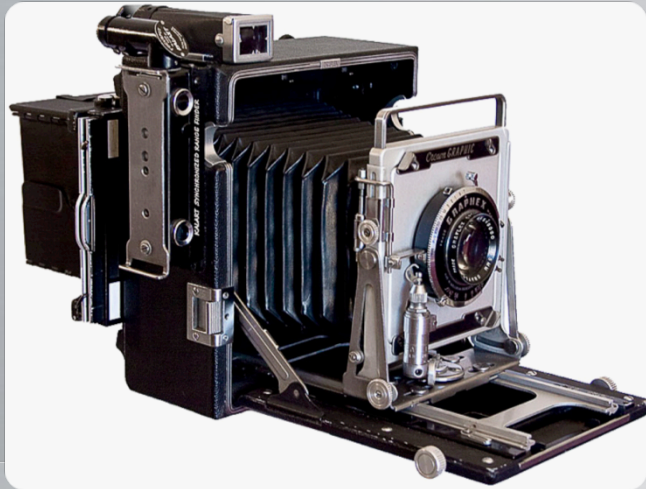


It was built in 1957 at the US National Bureau of Standards by a team led by Russell Kirsch.



# Historic Camera Types

## 1930-40's Press



## 1950-60's Rangefinder



## 1950's Twin Lens Reflex



## 1960-70's 35 mm SLR



# Digital Camera Progression

First Digital 1975



Canon RC-701 1086



Sony Mavica 1981



Kodak Hawkeye II  
on Nikon 1989



# Digital Camera Progression

Fuji DS-X 1989



First Video Phone

Casio LT-70 Phonemate 1995



Kodak CS 460  
on Nikon 1995



Nikon CP950 1999





# Modern Digital Cameras

## Point & Shoot



## Rangefinder



## Bridge

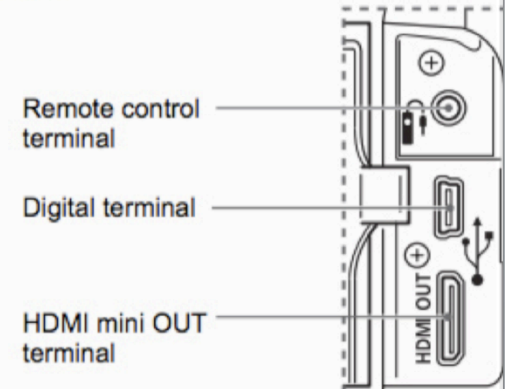
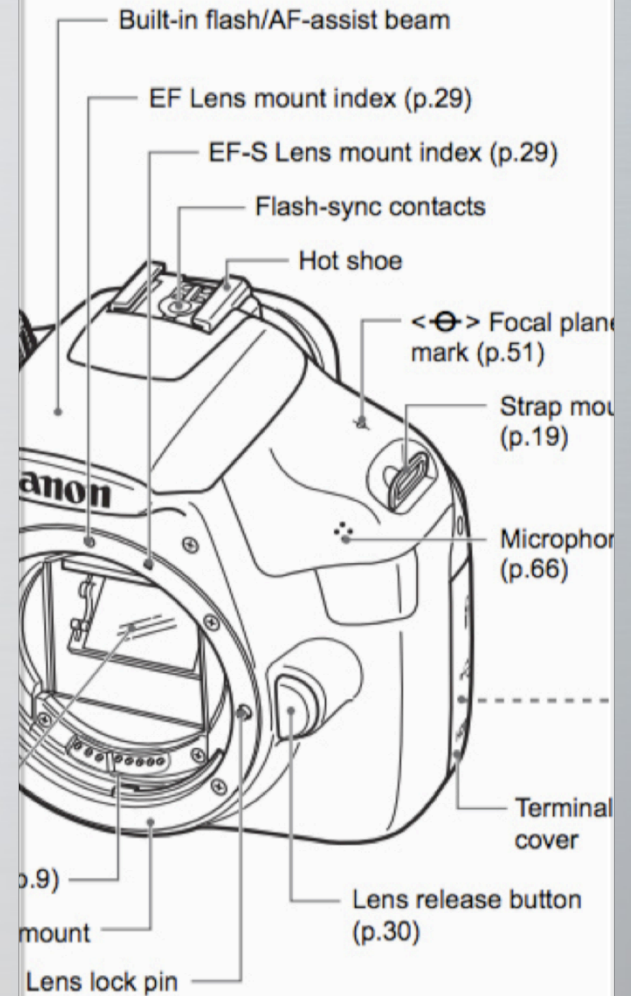


## dSLR



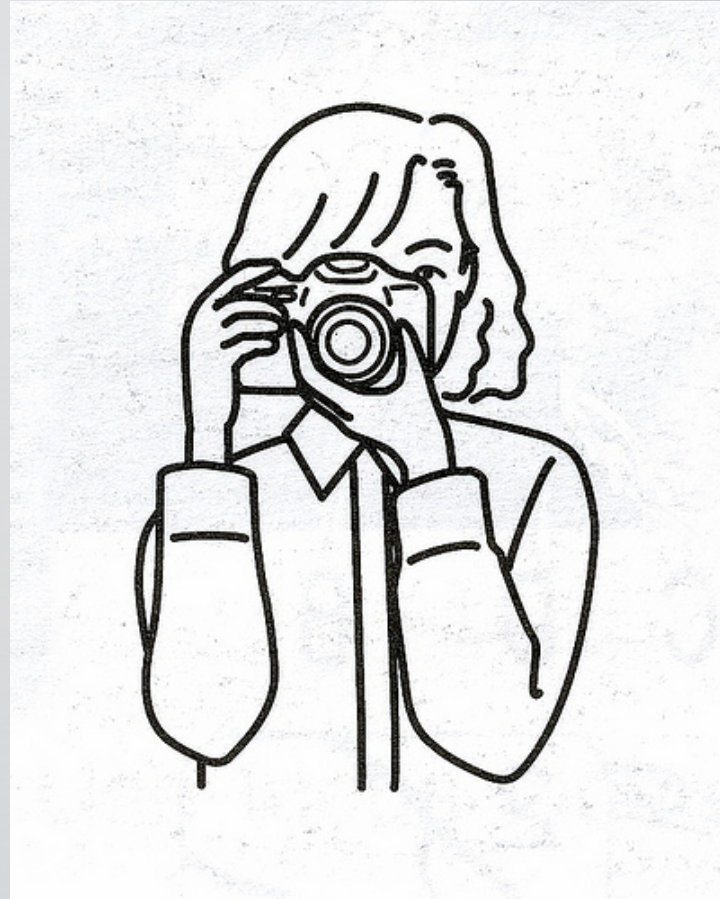
# Camera Parts

## Body



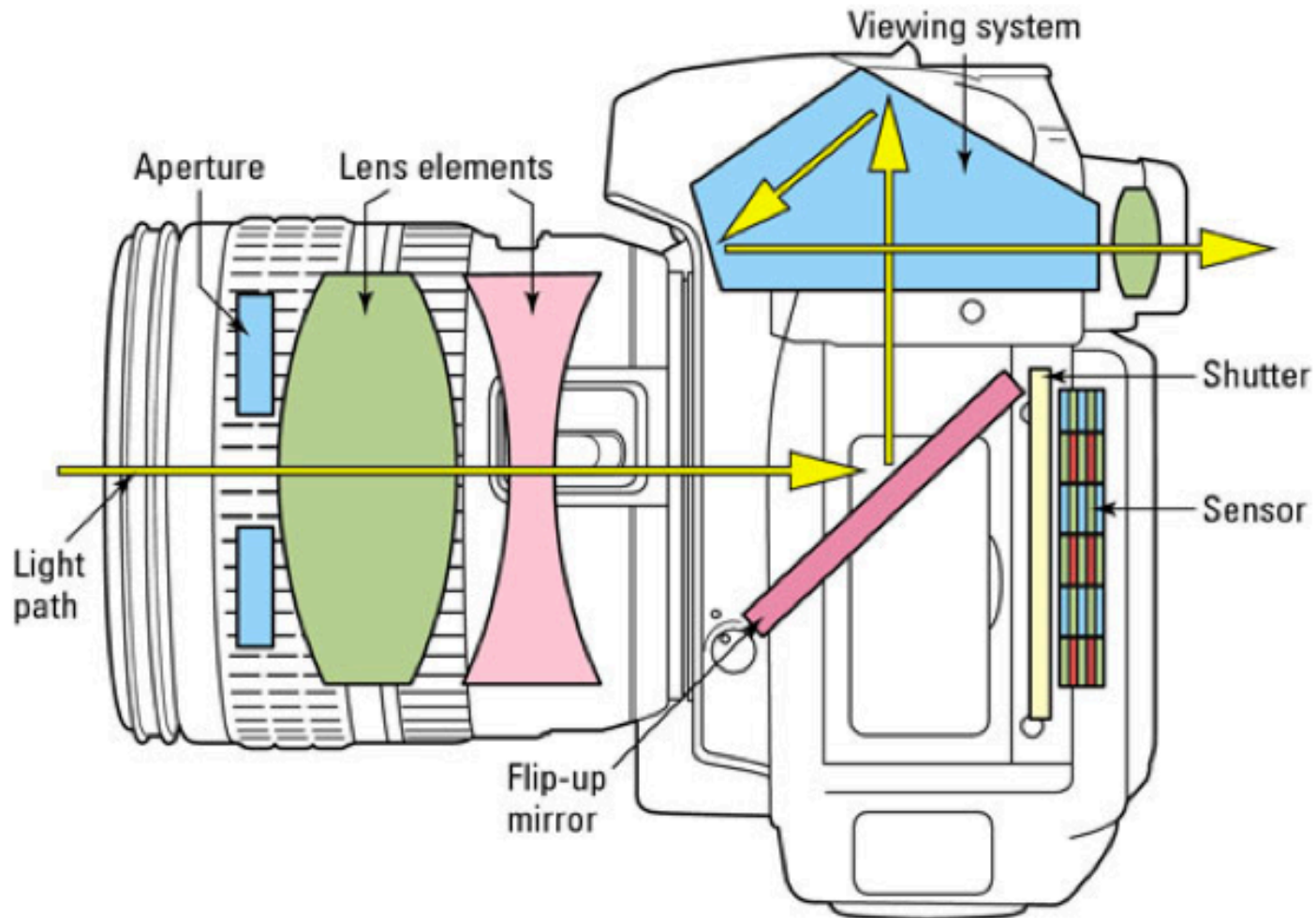
# How to hold a dSLR camera

- <http://www.youtube.com/watch?v=7I6RJthJLws>
- <http://www.youtube.com/watch?v=J9IVvUvfqzw>



**Keep elbows close to body**

# Internal Side View Drawing



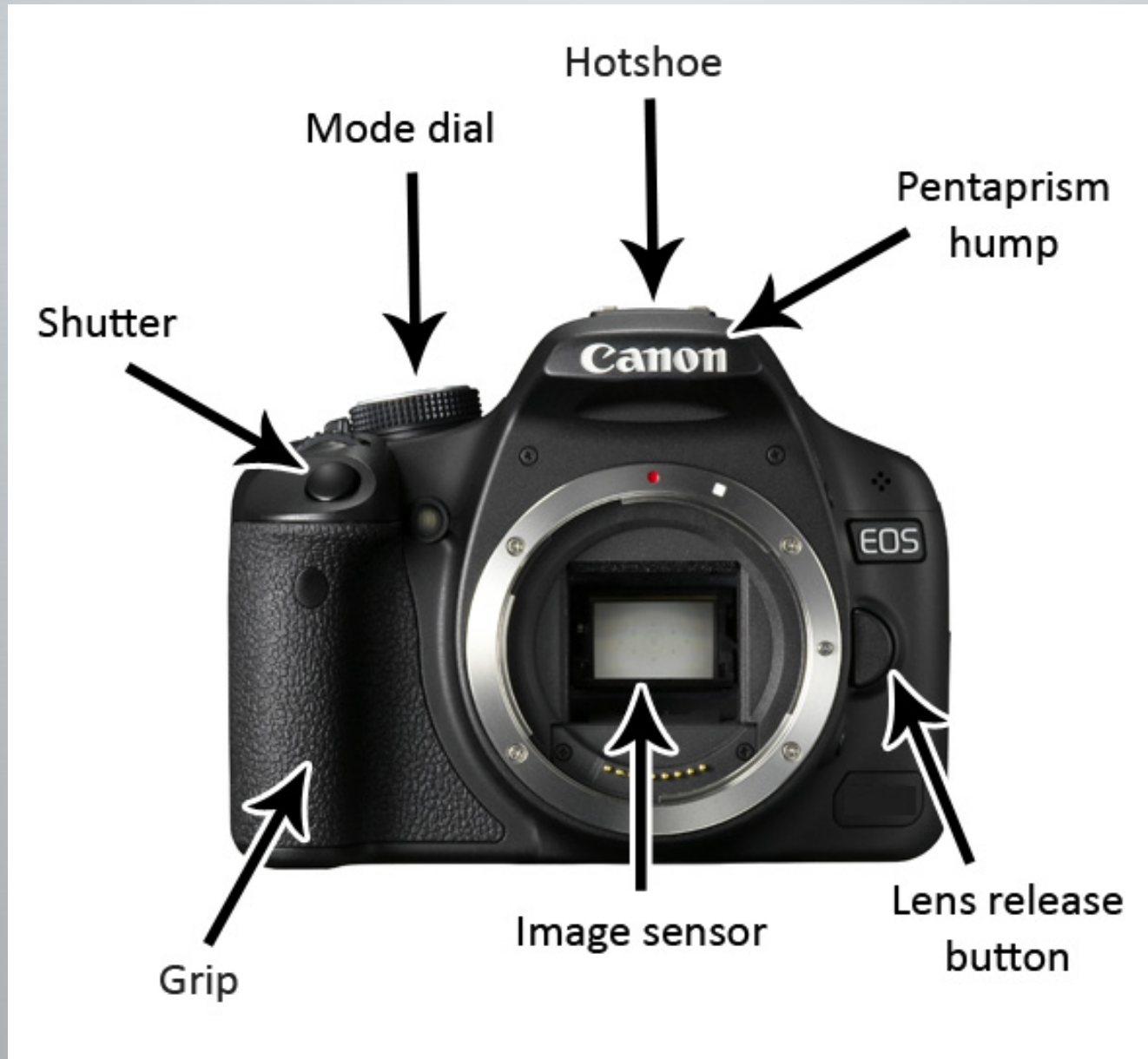


# Internal View



*KenRockwell.com*

# Parts 1



# Parts 2



# Camera Parts Basics 1

- <http://www.youtube.com/watch?v=ikppUYDQAZU>

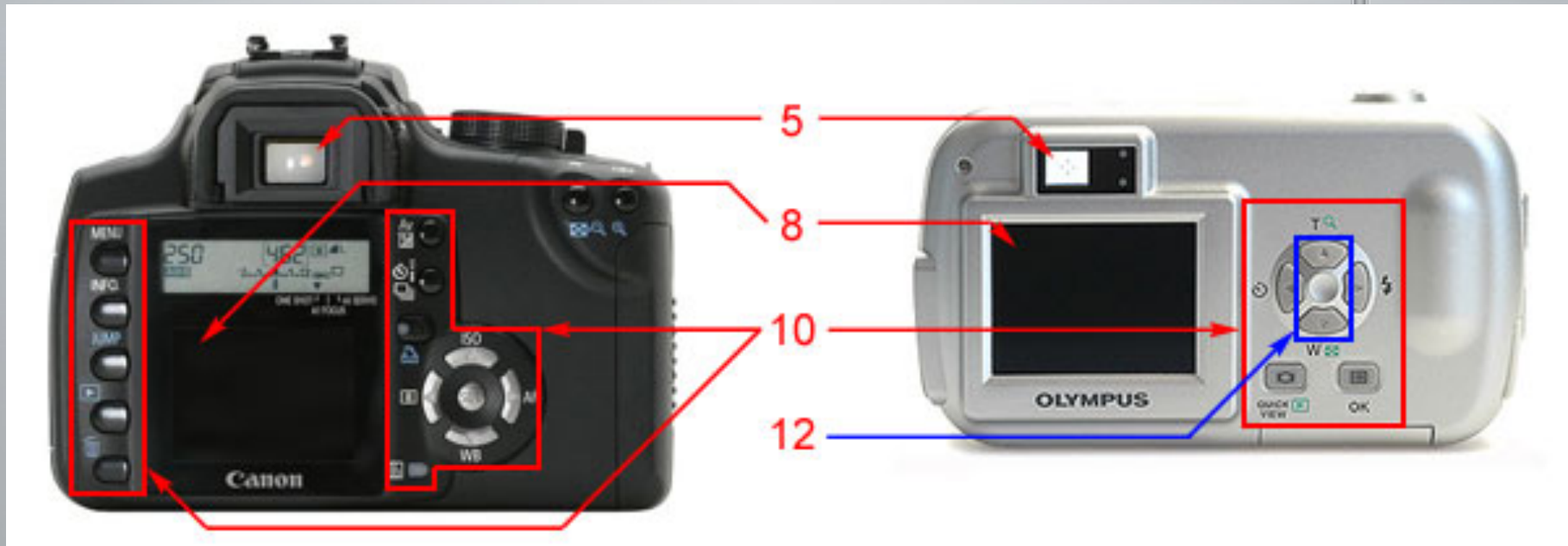
# Parts 3



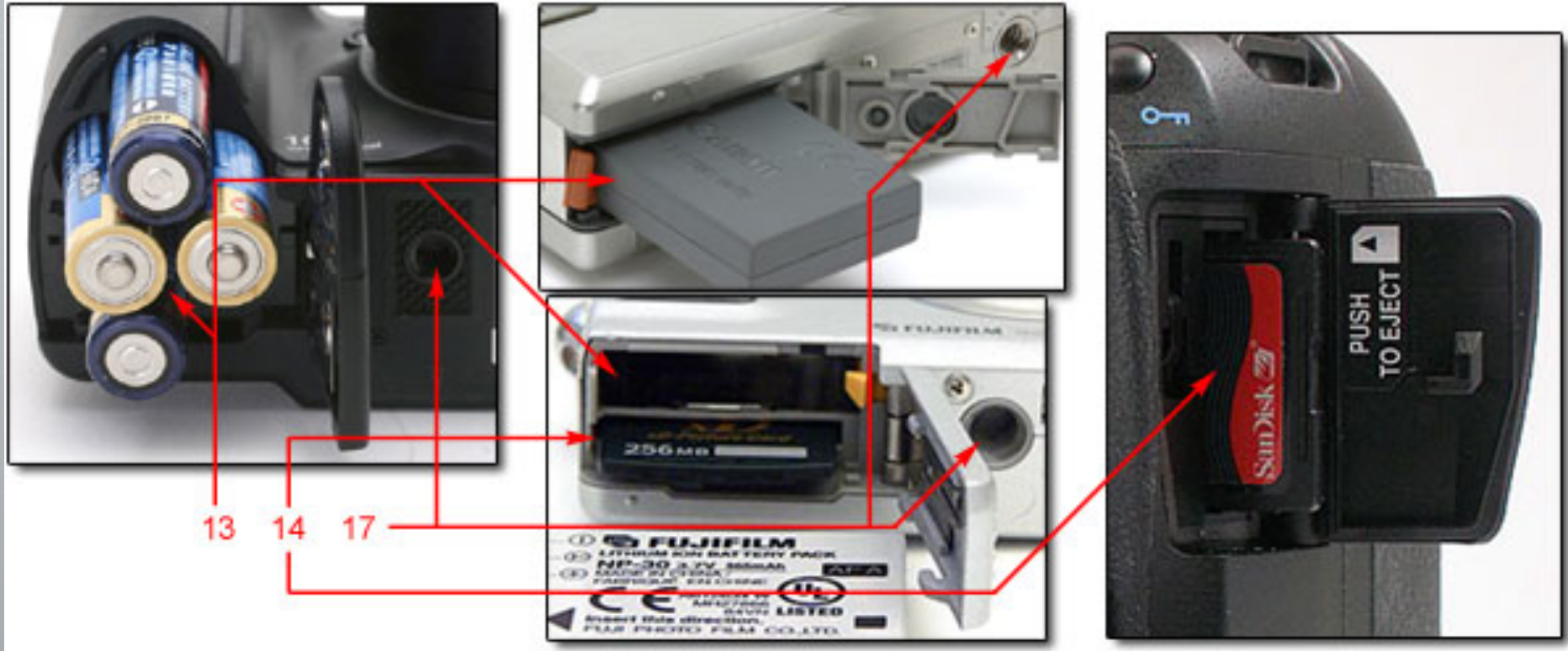
# Parts 4



# Parts 5

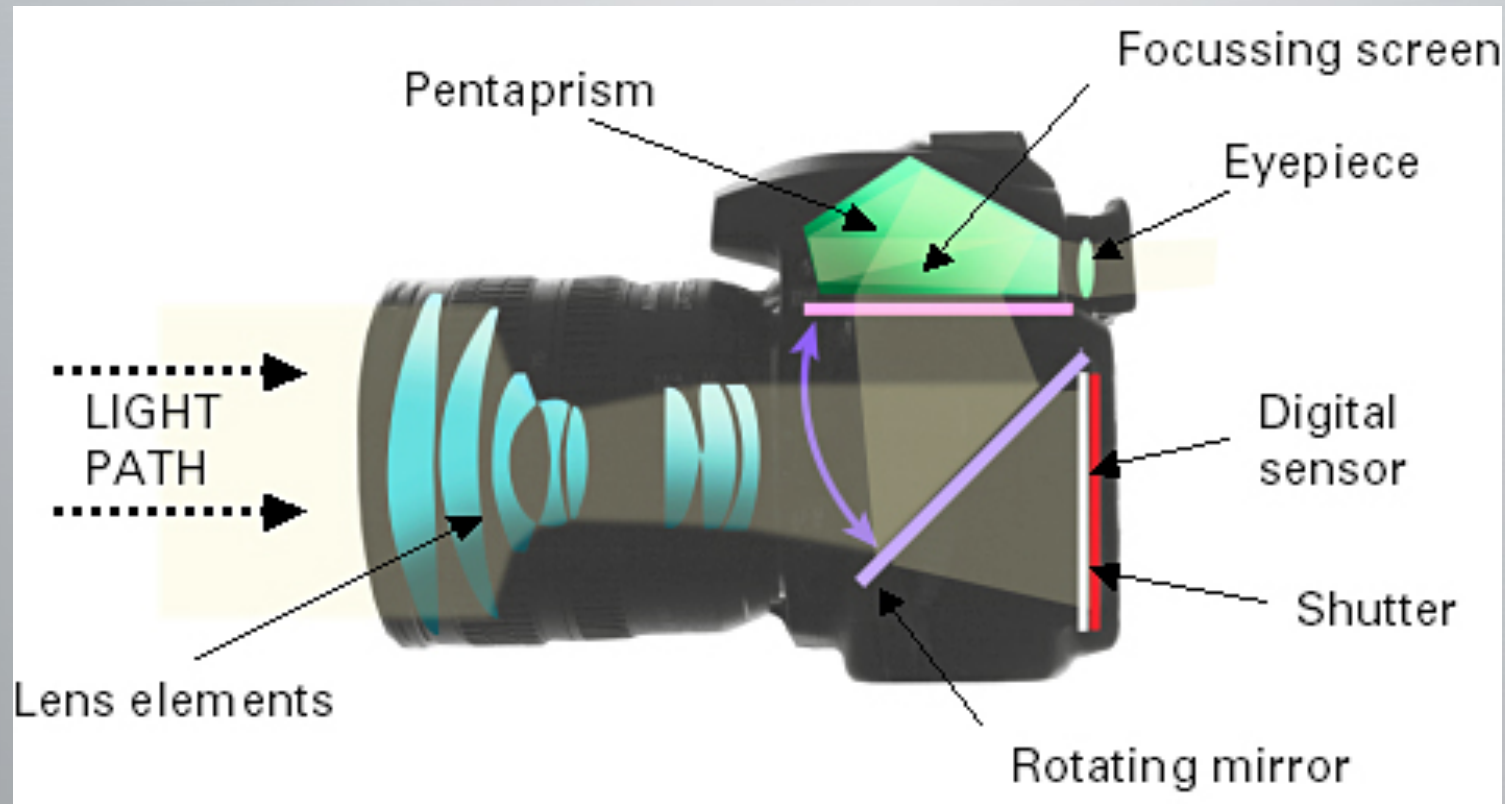


# Parts 6

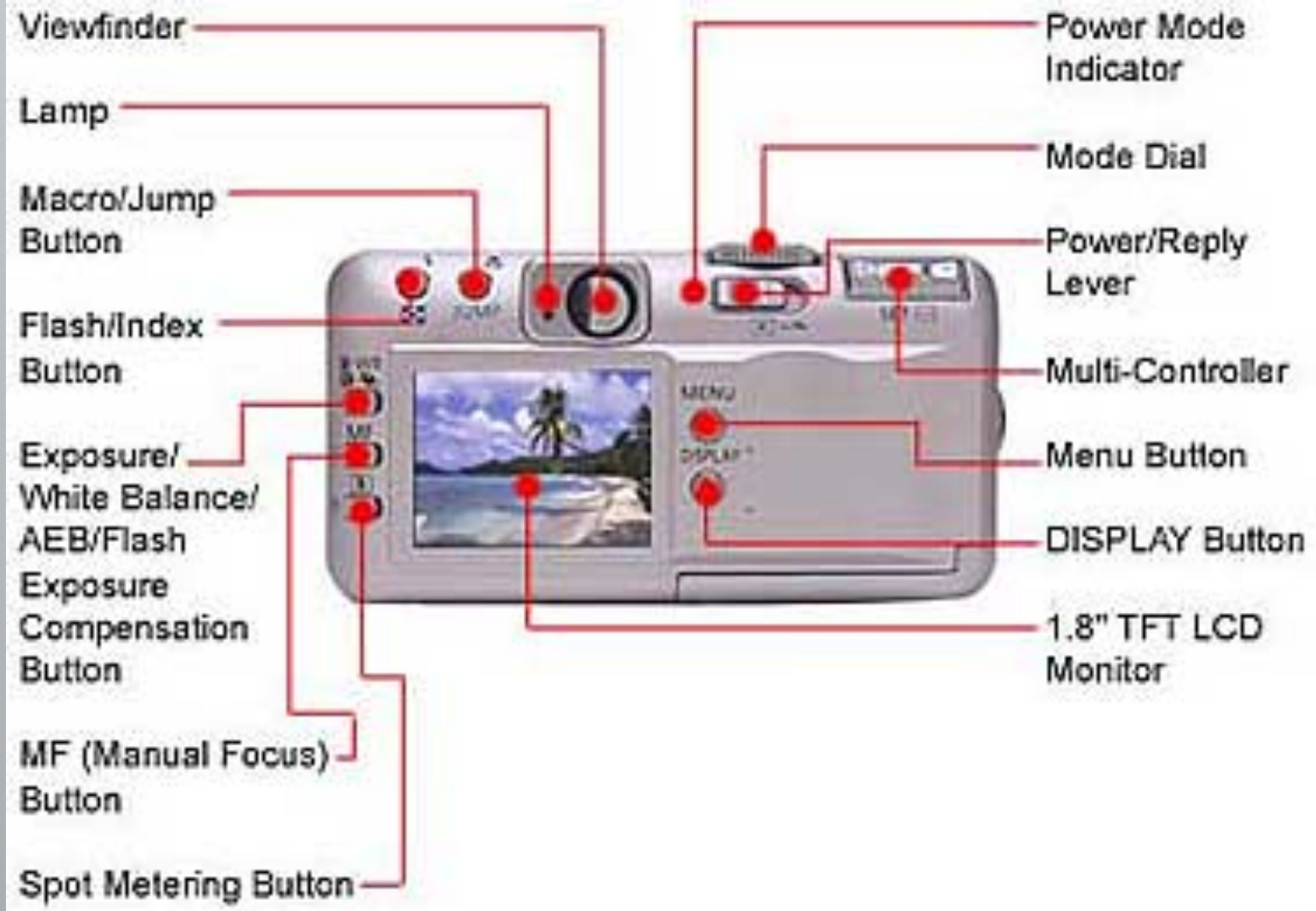




# Parts 7



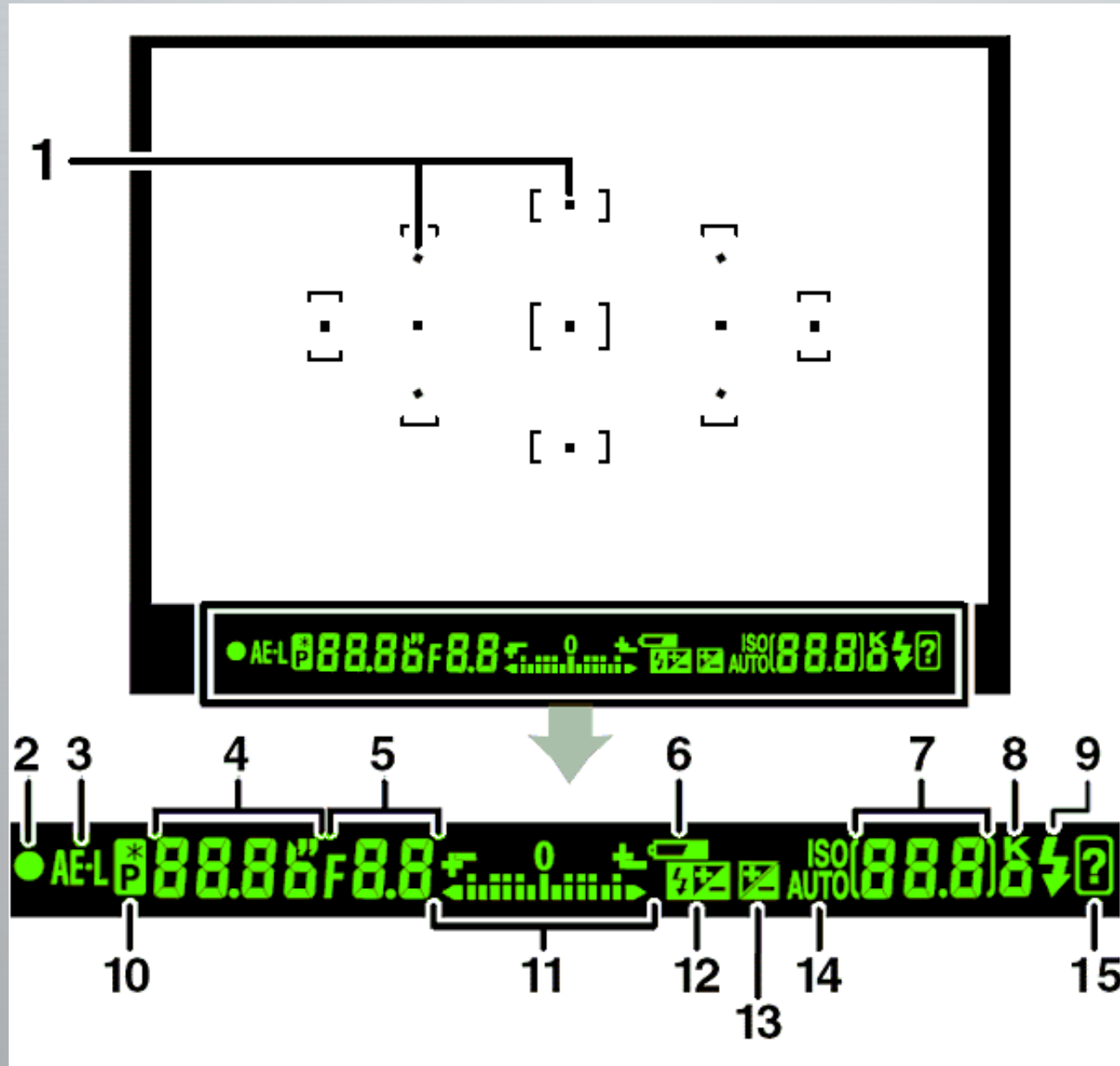
# Parts 7



# Viewfinder

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# Viewfinder Screen 1



# Light Meters

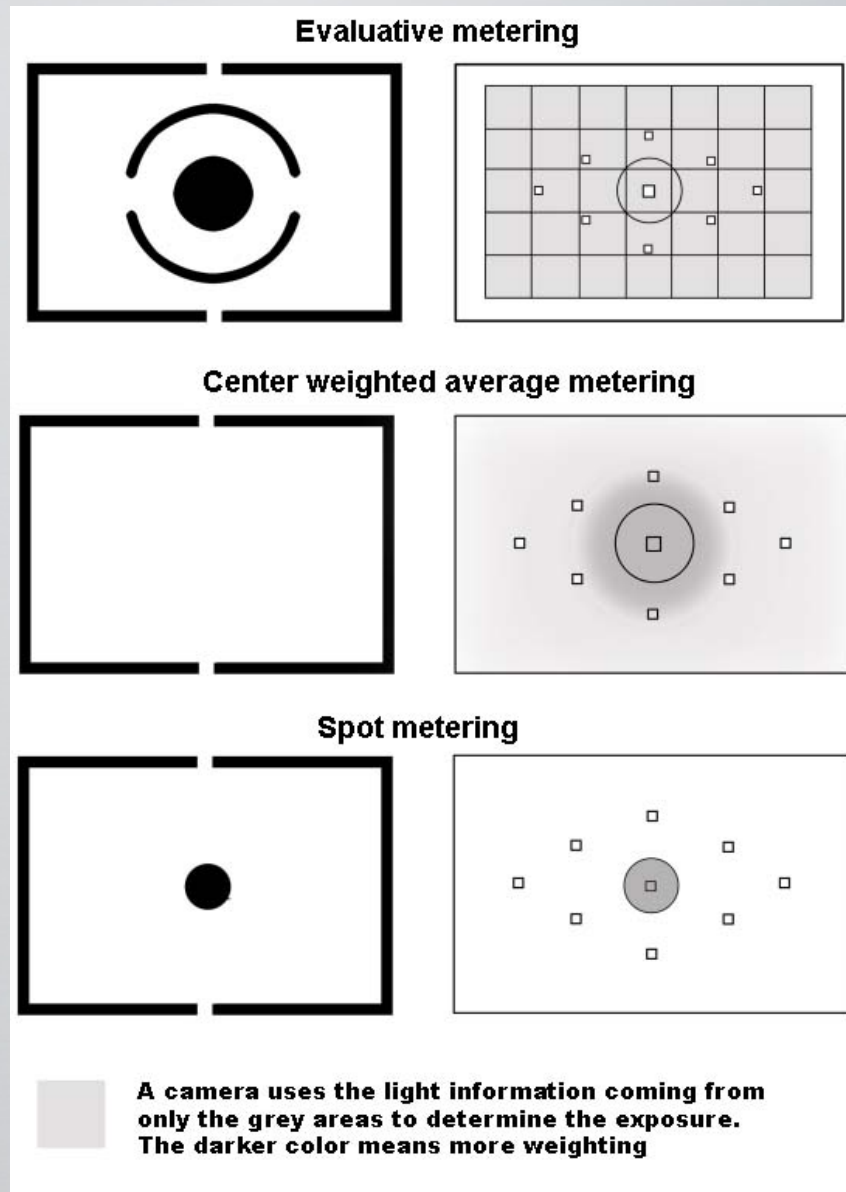
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**Exposure Meters**

# Viewfinder Screen 2

## Metering Systems

[Understanding camera metering modes \(Matrix, Centre-weighted & Spot metering\)](#) 4 min.



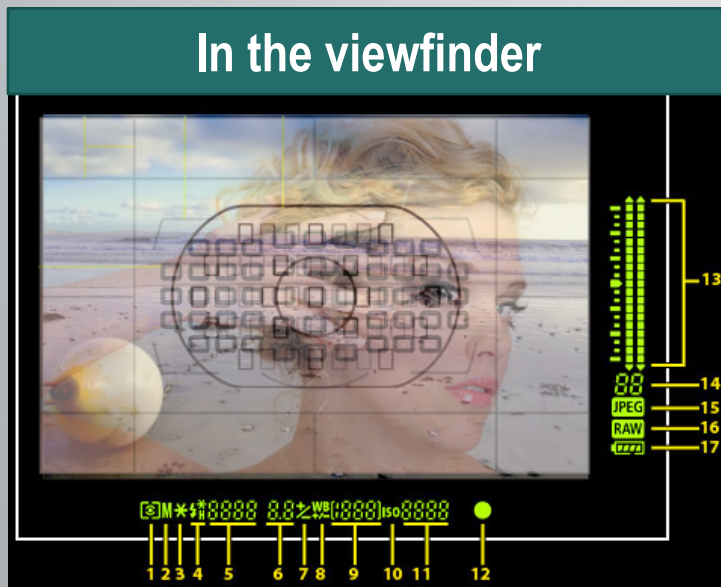
# The camera's light meter

## In the viewfinder



- Find the camera's light meter.
  - Along the bottom in the viewfinder
  - Along the side in the viewfinder
  - In the LCD view screen
  - On top camera LCD screen

# The camera's light meter



- Find the camera's light meter.
  - Along the bottom in the viewfinder
  - Along the side in the viewfinder (rare)
  - In the LCD view screen
  - On top camera LCD screen



# The camera's light meter

In the LCD view screen



- Find the camera's light meter.
  - Along the bottom in the viewfinder
  - Along the side in the viewfinder (rare)
  - In the LCD view screen
  - On top camera LCD screen

# The camera's light meter

In the top LCD screen

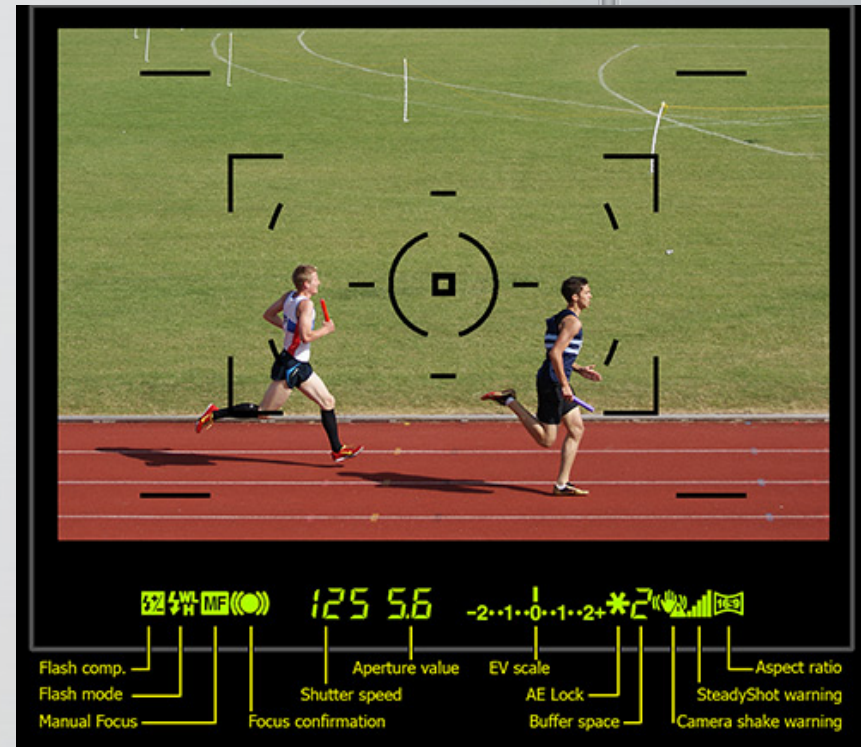


- Find the camera's light meter.
  - Along the bottom in the viewfinder
  - Along the side in the viewfinder (rare)
  - In the LCD view screen
  - On top camera LCD screen



# — Your turn

- Find your light meter
- Set ISO to 800
  - Line up your light meter while pointing the camera at the closest light above you. What is your reading?
  - Point camera at wall w/o windows. Now what is your reading?



# Lenses

## Focal Length



# Cut Lens

A lens is made of several different lenses.



# Focal Length

- Measured when lens is set to infinity
- Measure from lens rear to sensor plane.
- Most lens' focal length are compared to 35 mm film format.

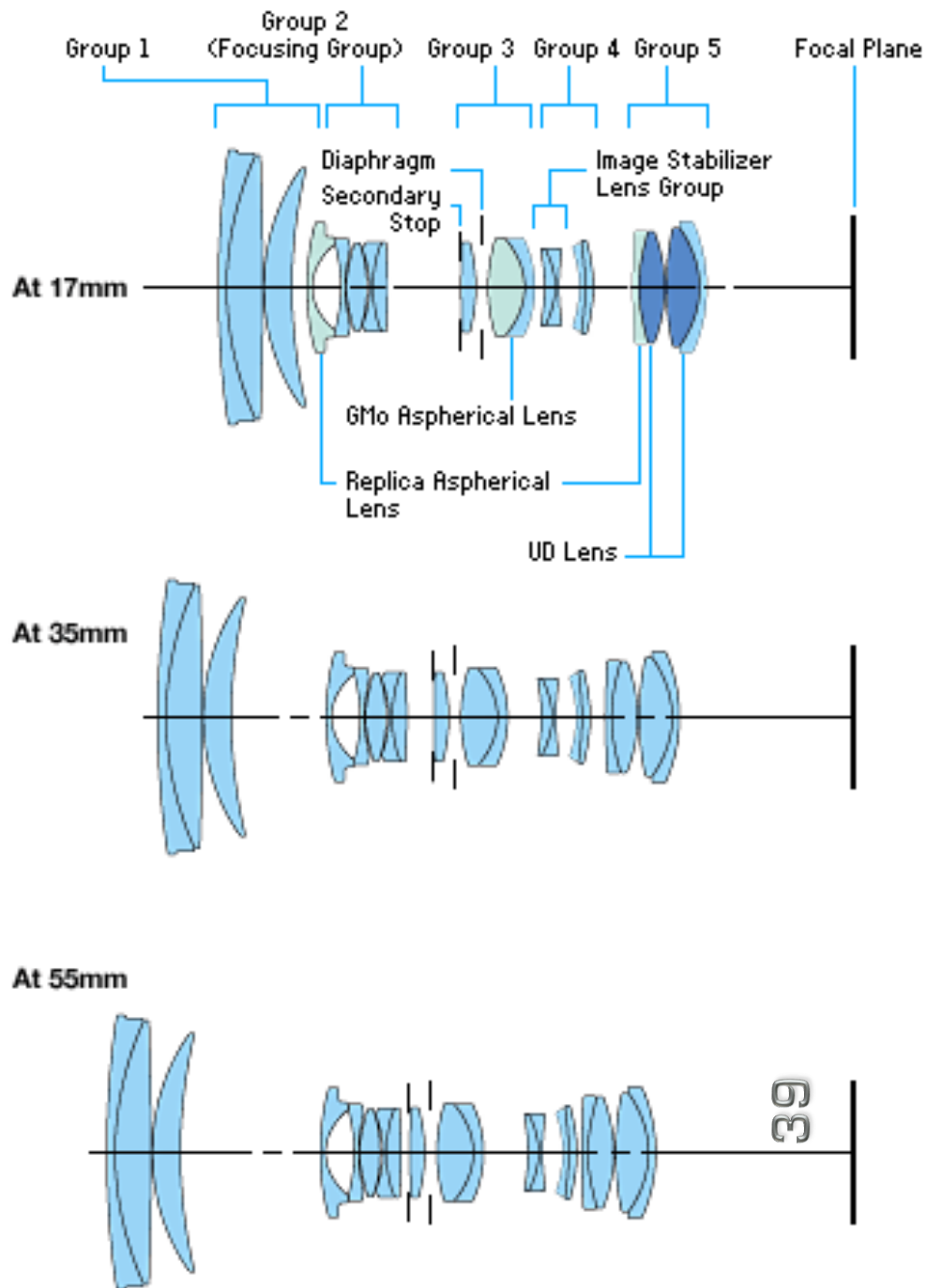


# Internal Lens Elements

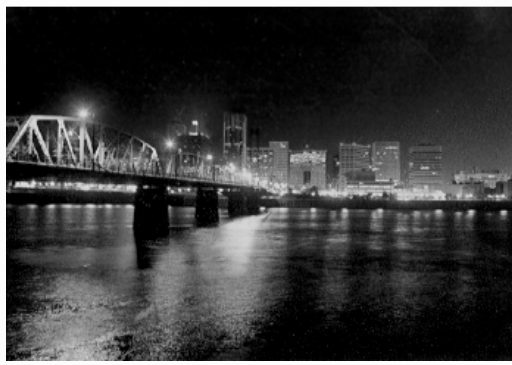
Lens elements move when changing:

1.Focus

2.Focal Length



24mm  
Wide Angle



# Basic 35mm Format Focal Lengths

50mm  
“Normal”

What the eye sees



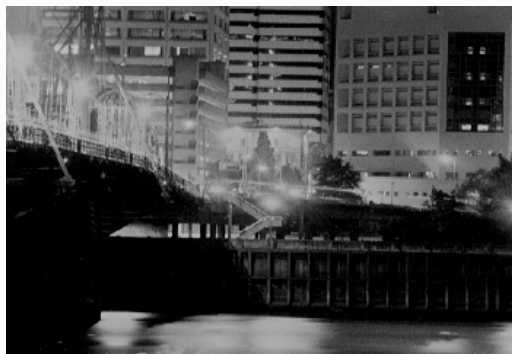
85mm

Short Telephoto



200mm

Telephoto



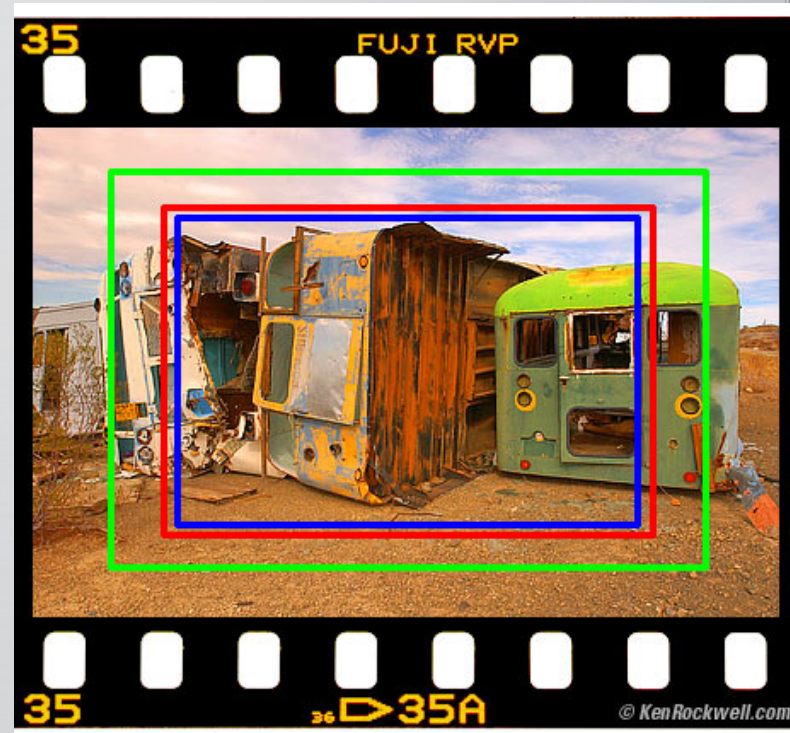




# — Your turn

1. Describe focal length.
2. What is your camera lens' focal length?
3. How long is a normal angle lens (in mm)?
4. How long is a wide angle lens (in mm)?

5. How long is a telephoto lens (in mm)?



# Basic 35mm Format Focal Lengths

24mm  
Wide Angle



35mm  
Wide Angle



50mm  
"Normal"  
What the eye sees



70mm  
Short Telephoto

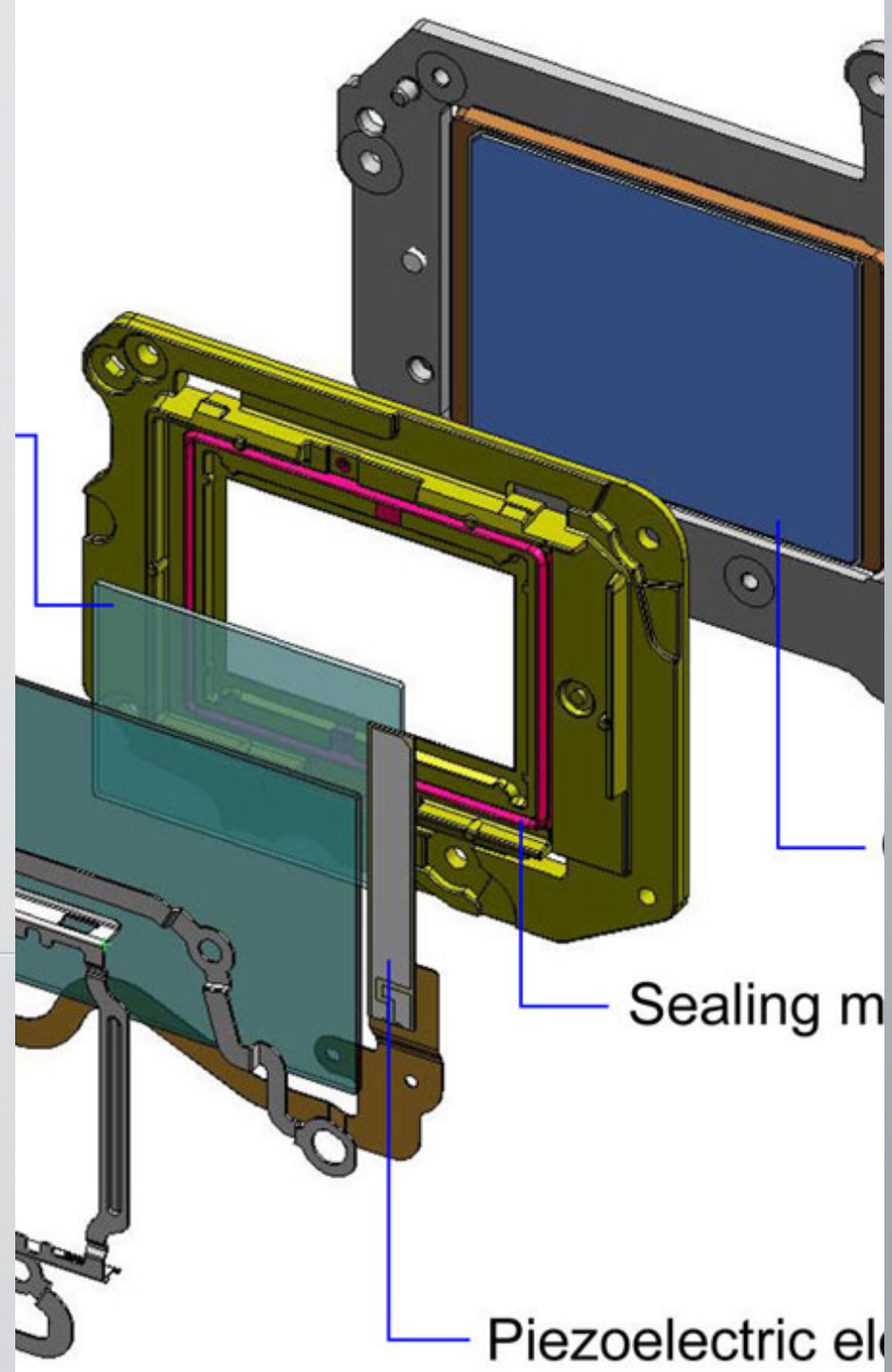


105mm  
Short Telephoto

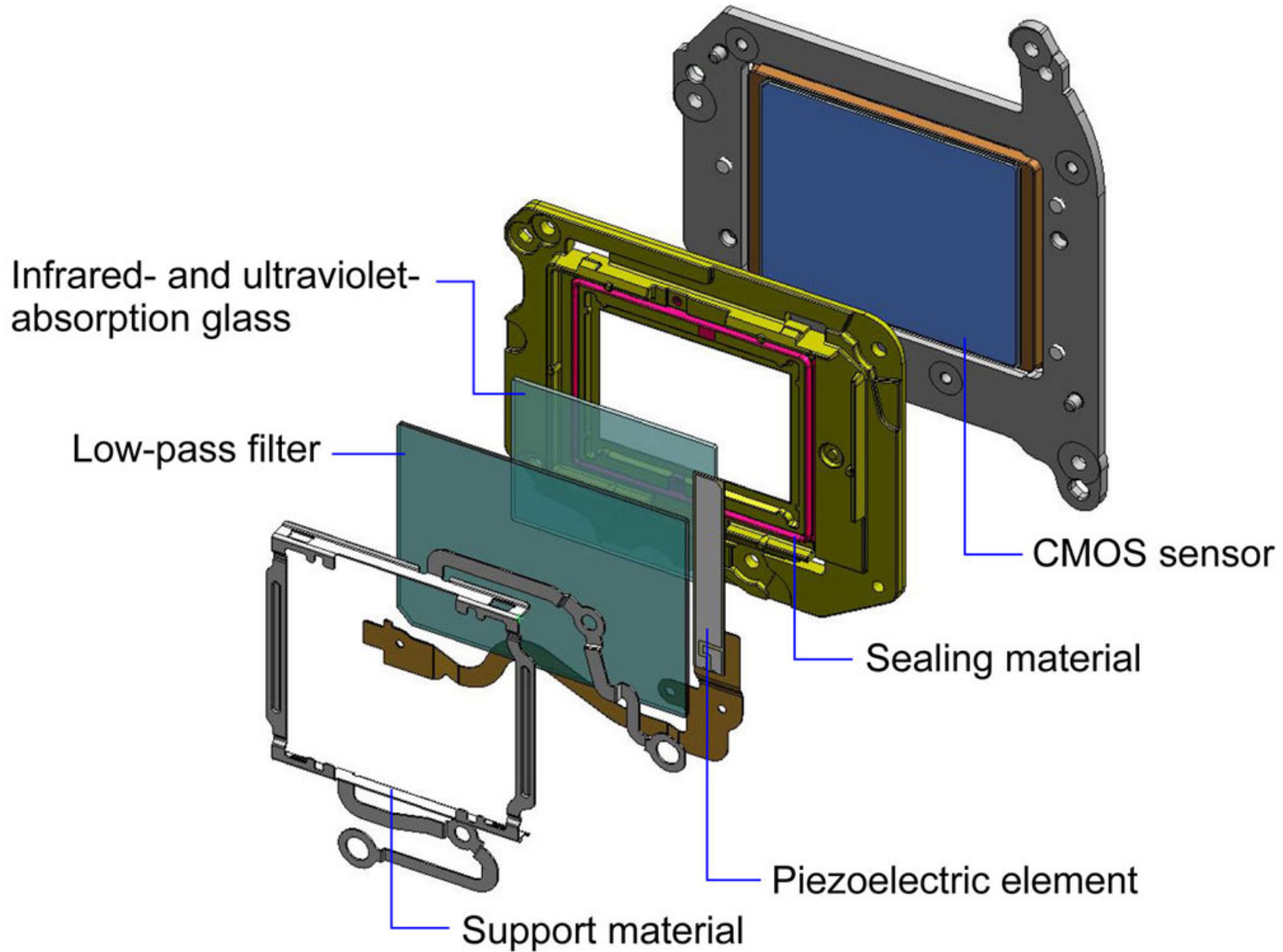


# Sensors

## Pixels & Resolution



# Sensor Assembly

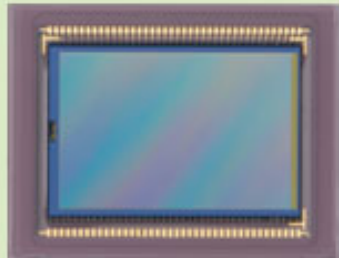


# Sensor Size & Focal Length

- Size of sensor determines the angle of view (focal length of lens).
- Full size refers to 35mm film equivalent.
- Most consumer SLR are APS-C sensors and have about 1.5 to 1.6 crop factor.



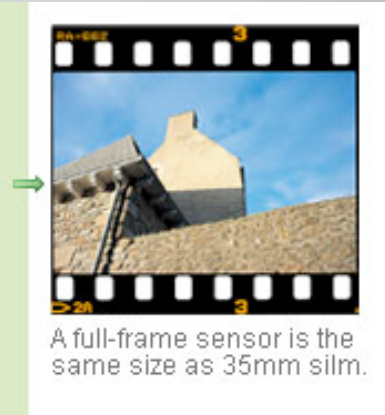
Approx. 15x23mm  
(APS-C size)



Approx. 19x29mm  
(APS-H size)



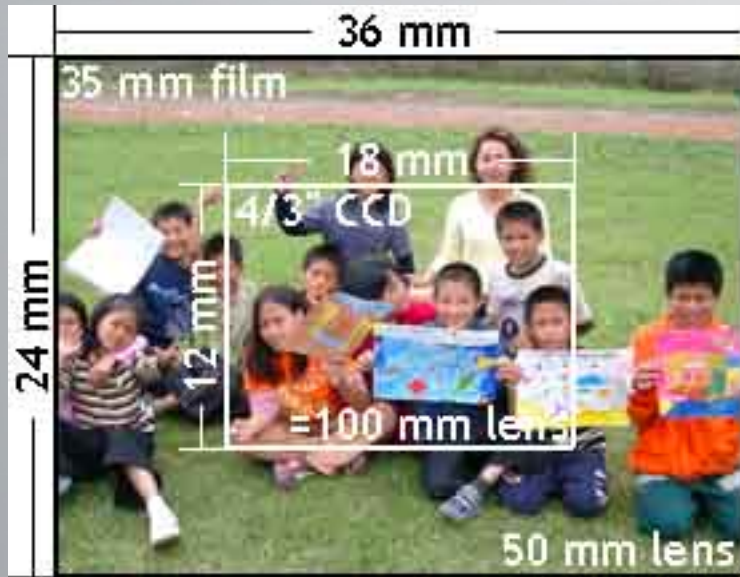
Approx. 24x36mm  
(Full frame)



A full-frame sensor is the same size as 35mm film.

# Crop Factor

- **“Crop Factor”** is the ratio of the dimensions of a camera's imaging area compared to a reference format (usually 35 mm).
- Also known as a **focal length multiplier** (“FLM”).



# Typical Crop Factors

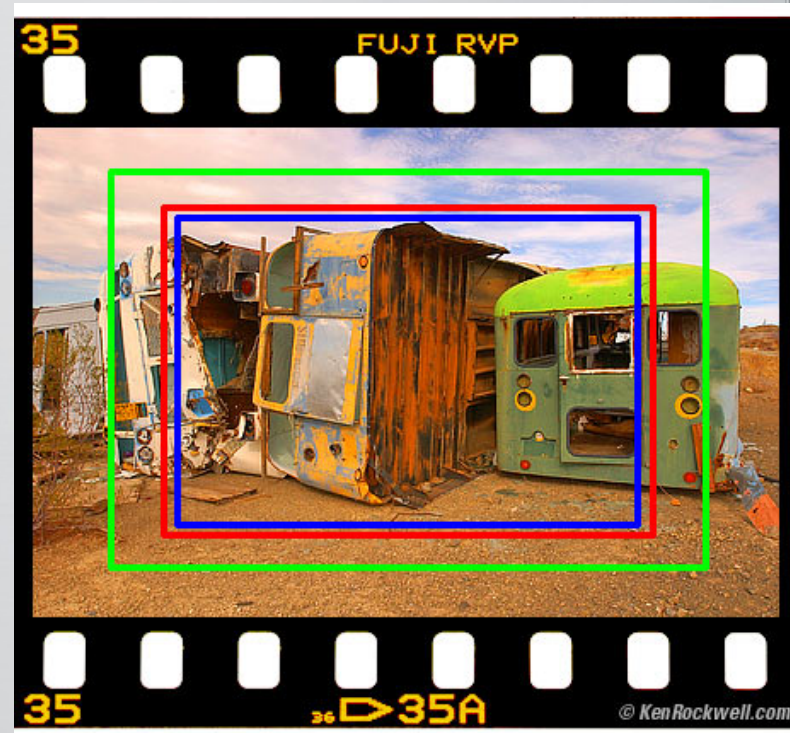
Manufacturer	Crop Factor
Canon	1.6x
Nikon	1.5x
Olympus	2.0x
Pentax	1.5x
Sony	1.5x

Crop Factor	Factor Focal Length	"Adjusted" Focal Length
1.5x	28mm	42mm
	75mm	113mm
1.6x	28mm	45mm
	75mm	120mm
2.0x	28mm	56mm
	75mm	150mm



# — Your turn

1. What is your camera's crop factor?
2. What is the equivalent length of your lens compared to a full sized sensor if it is a 55 mm lens?
3. How does it compare with those around you?
4. What did you find to be the most common crop factor?





# Exposure Basics

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## Three Controls



# Exposure Basics

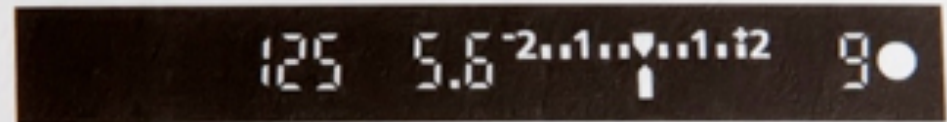
- <http://www.youtube.com/watch?v=6-NhJua5NFA>



— Your turn

1. What are the three ways you can control your camera's exposure?

Standard exposure



Decreased exposure



Increased exposure

