UNDERSTANDING
FEATURES, SETTINGS, & MYSTERIES
OF DIGITAL CAMERAS

By Clem Wehner

TYPICAL DIGITAL CAMERA FEATURES AND SETTINGS

___1. **DATE/TIME**: You set date and time. Camera records this information with each image.

___2. **AUTO POWER OFF**: Camera turns off automatically when not in use.
- **ON-** The camera shuts OFF when not being used.
- **OFF-** The camera stays ON until you shut it off. (Don't forget to set it back to "ON", or may drain the battery.)

___3. **LCD SCREEN DISPLAY**: The screen on the back of the camera.
- **OFF-** No image is shown. Really extends battery life.
- **LIVE VIEW-** (pre-view) Shows image before the shot is taken. Can be used as a "viewfinder". Lots of battery power.
- **POSTVIEW-** Shows image for a few seconds only after the shot is taken, thereby saving battery power.

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PART-1 TOPICS

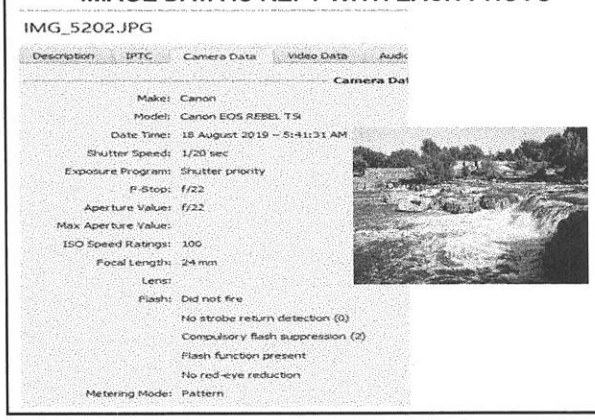
CAMERA SETUP
- DATE/TIME SETTINGS
- META DATA
- AUTO POWER CONTROL
- LCD SCREEN DISPLAY
- LIVE VIEW
- SCREEN BRIGHTNESS
- REVIEW TIME
- ISO
- IMAGE NOISE

IMAGE QUALITY
- IMAGE QUALITY SETTINGS
- IMAGE SIZE SETTING

WHITE BALANCE
- AUTOMATIC, PRESET, & MANUAL

PICTURE STYLE

IMAGE DATA IS KEPT WITH EACH PHOTO

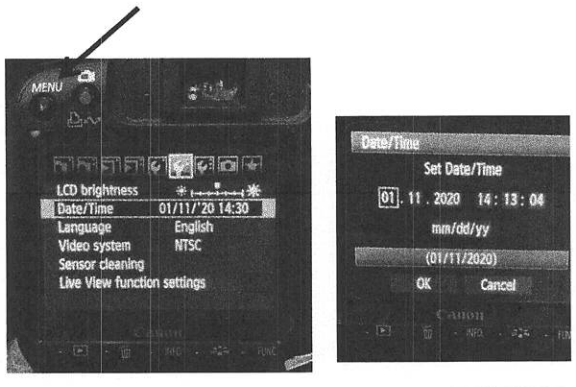


TYPICAL

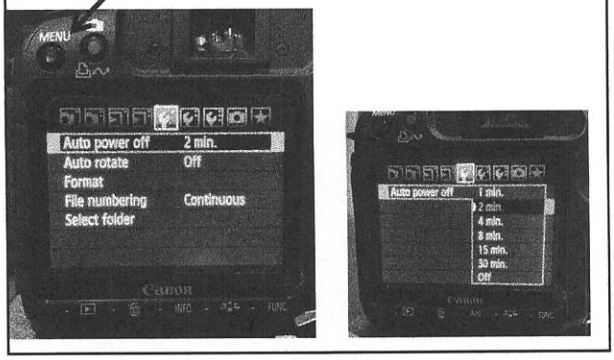
DIGITAL CAMERA

FEATURES AND SETTINGS

DATE / TIME SETTINGS



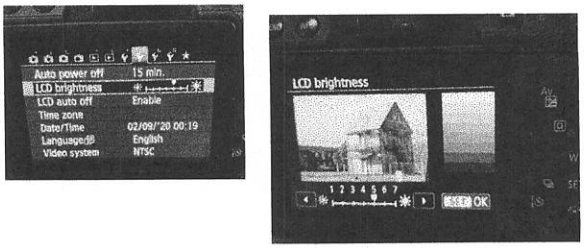
AUTO POWER OFF



SETTING LCD SCREEN BRIGHTNESS

(TO KEEP FROM BEING MISLEAD ABOUT EXPOSURE)

What's on the screen may differ from what's on the sensor!



LCD DISPLAY SETTINGS

SCREEN OFF

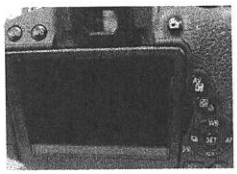
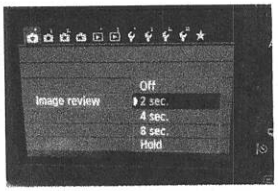
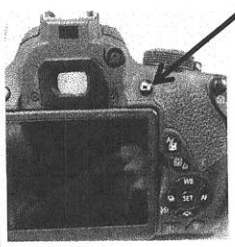
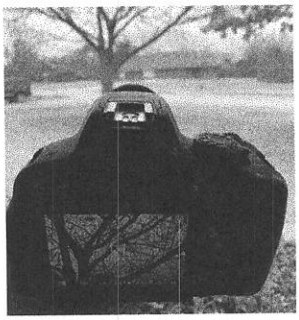


IMAGE REVIEW TIME



LIVE VIEW





___4. **ISO:** Sets the camera's sensitivity to light.

ISO 100- Lowest sensitivity. Best for brightly lit scenes. Best picture quality.
ISO 200- A good all-around setting for light sensitivity and nice images.
ISO 400- A good all-around setting for light sensitivity and nice images.
ISO 800- Good for dim scenes, but starts to reduce picture quality by causing some objectionable "noise" to appear in the image.
ISO 1600- High sensitivity. Best for dim scenes, but noise is very noticeable.

AUTO- Camera chooses the ISO setting. Might make image noisy!

___5. **IMAGE QUALITY:** The amount of fine detail saved after the image is "compressed" by the camera's computer.

LOW- Max compression- Lowest quality, largest number of images.
MEDIUM- Medium compression- good quality, average number of images.
HIGH- No compression- Highest quality, lowest number of images.

___6. **IMAGE SIZE:** You decide the number of pixels to be used in taking the picture. The more pixels used, the more memory is used, and the fewer pictures on your media card.

Examples:
2592 x 1728 - 4 megapixels. for smaller prints.
3456 x 2304 - 8 megapixels. for medium prints
5184 x 3456 -18 megapixels. for large prints.

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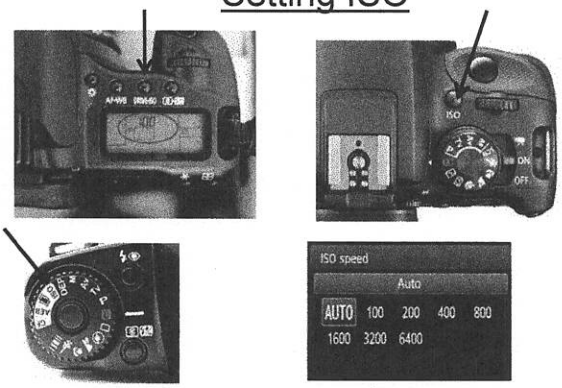
Setting ISO



High ISO settings generate "noise"

Formerly called "graininess"

FILM SPEED (ISO)

Showed the sensitivity of film to light.

Typical film speeds: 25, 64, 100, 200, 400, 800, 1000

Low ISO - less sensitive
High ISO - more sensitive

800 speed film was "grainy"

The cause of electronic noise

All electronic circuits have moving electrons in them.

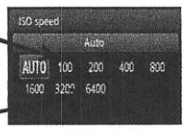
Amplifiers make them more noticeable.

ISO Setting (digital cameras)

Sets the sensitivity of the camera to light.*

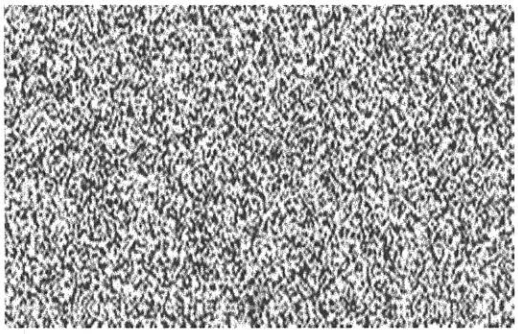
Low ISO - less sensitive

High ISO - more sensitive



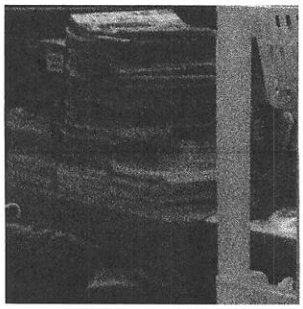
* NOTE: ISO can be changed for each photo

What noise looks like:

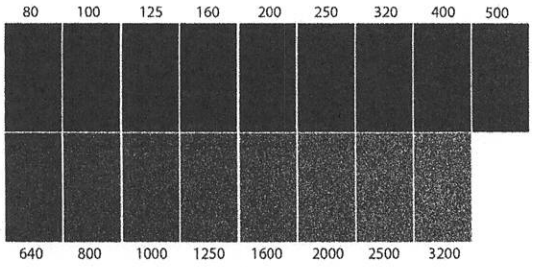


Noise in an Image

Noisy images can be also be caused by low light



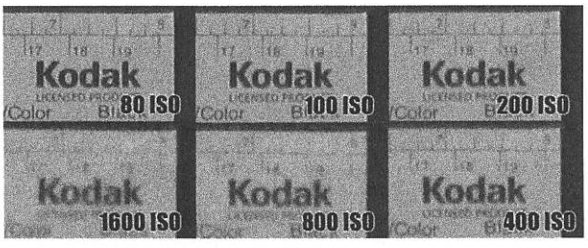
Noise vs. ISO



SOLUTIONS TO NOISY IMAGES

- **Add more light** (overcomes the noise)
- **Use lower ISO setting** (less noise)

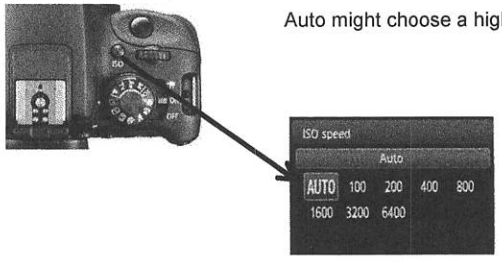
NOISE vs. ISO



Tip: Don't use AUTO ISO

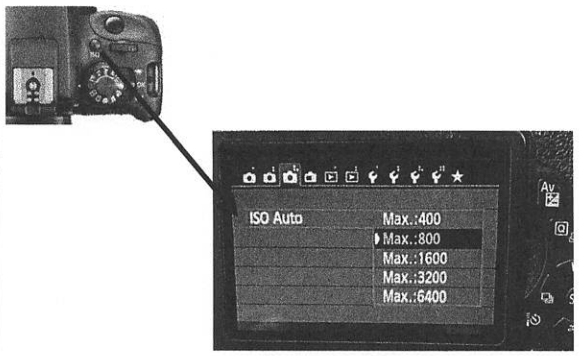
(it might cause noise in the image)

Auto might choose a high ISO



Tip: Set to ISO 200

Tip: or use ISO AUTO-LIMIT



___5. **IMAGE QUALITY:** The amount of fine detail saved after the image is "compressed" by the camera's computer and saved as a JPEG file.

LOW- Max compression- Lowest quality, largest number of images.
MEDIUM- Medium compression- good quality, average number of images.
HIGH- Minimal compression- High quality, lower number ofimages.

RAW- No compression- the best quality, lowest number of images. Not saved as a JPEG file.

___6. **IMAGE SIZE:** You decide the number of pixels to be used in taking the picture. The more pixels used, the more memory is used, and the fewer pictures on your media card.

Examples:
2592 x 1728 - 4 megapixels. for smaller prints.
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Tip: Don't use ISO for primary exposure control

TO ADJUST EXPOSURE, use:

1. **SHUTTER SPEED**
2. **APERTURE**
3. **ISO (as a last resort)**

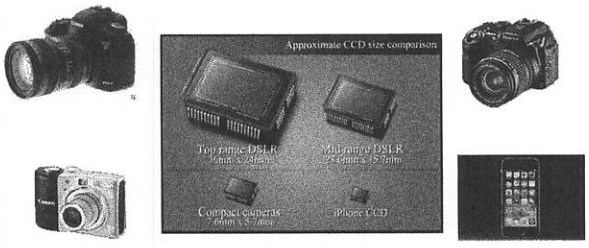
Remember, raising ISO increases noise!

JPEG COMPRESSION

Deletes picture information to reduce file size

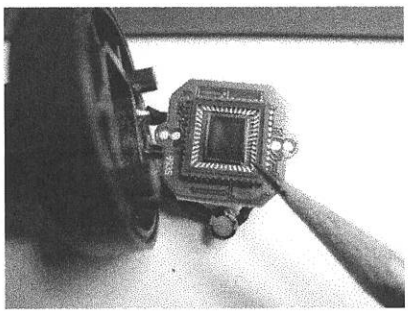
The amount of compression varies and is selected by YOU!

Sensor size affects noise

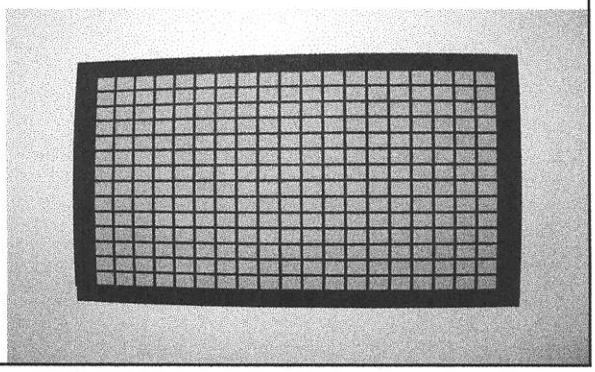


Larger sensors: Less electronic noise
More sensitive to low light
Better dynamic range

SENSOR CHIP REPLACED FILM



. Chip is divided into many sections called picture elements (pixels)

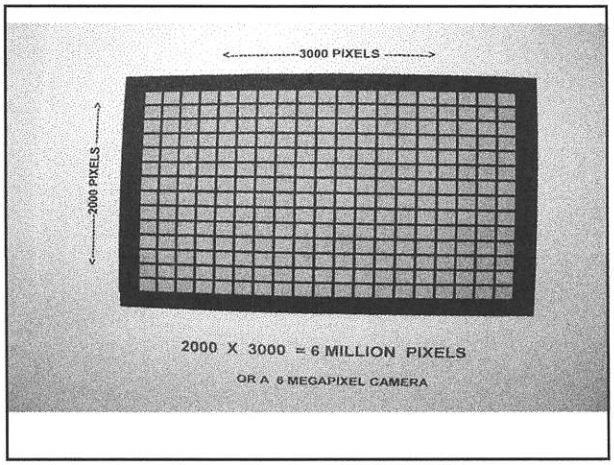


CAMERA BRANDS WITH (some) SIMILARITIES

in menus and settings

NIKON, FUJI, SONY, OLYMPUS, KODAK, SAMSUNG, PANASONIC

CANON, PENTAX



2000 X 3000 = 6 MILLION PIXELS

OR A 6 MEGAPIXEL CAMERA

IMAGE QUALITY MENUS

CANON

ONE MENU FOR:
- **QUALITY**
- **SIZE**

NIKON

ONE MENU FOR:
- **QUALITY**

ONE MENU FOR:
- **SIZE**

PRINT SIZES VS. MEGAPIXELS

Megapixels	8	12	16	18	24	36	40
Print Size							
5x7"	✓	✓	✓	✓	✓	✓	✓
8x10"	✓	✓	✓	✓	✓	✓	✓
11x14"	✓	✓	✓	✓	✓	✓	✓
16x20"	X	✓	✓	✓	✓	✓	✓
16x24"	X	✓	✓	✓	✓	✓	✓
20x30"	X	✓	✓	✓	✓	✓	✓
24x36"	X	X	✓	✓	✓	✓	✓
30x40"	X	X	✓	✓	✓	✓	✓
40x60"	X	X	X	X	✓	✓	✓
Billboard	X	X	✓	✓	✓	✓	✓

✓ Perfect Quality ✓ Good Quality X Low Resolution

IMAGE QUALITY SETTINGS– CANON

one menu for: QUALITY and SIZE

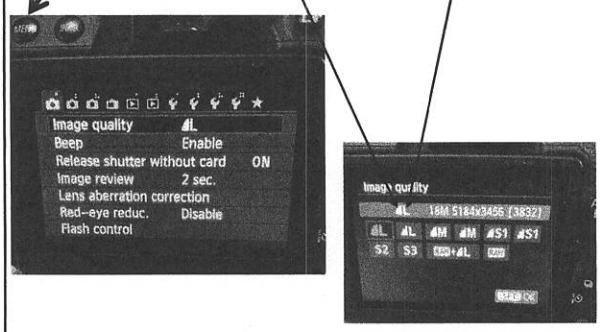


IMAGE QUALITY SETTINGS– CANON

QUALITY	SIZE	EXAMPLE PIXELS /IMAGE
HIGH	LARGE	18 MP
LOW	LARGE	
HIGH	MEDIUM	8 MP
LOW	MEDIUM	
HIGH	SMALL	4 MP
LOW	SMALL	
RAW		18 MP

IMAGE SIZE SETTINGS- NIKON

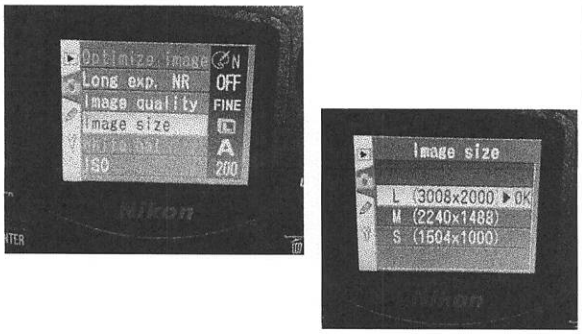
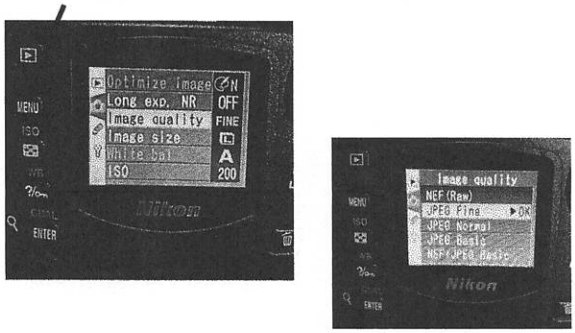


IMAGE QUALITY SETTINGS- NIKON



NUMBER OF IMAGES ON A CAMERA CARD

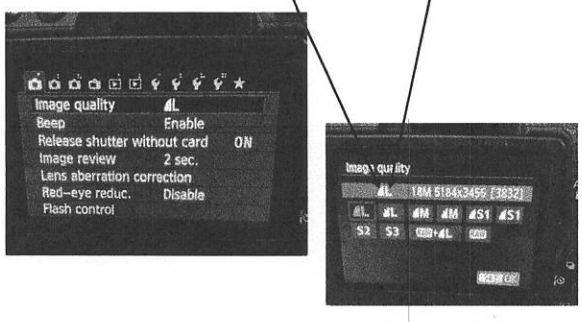
DEPENDS ON: IMAGE QUALITY AND SIZE SETTINGS

per 1-gigabyte on the card

L	140
L	
M	260
M	
S	420
S	900
RAW	140

IMAGE SIZE– CANON

one menu for: QUALITY and SIZE



___7. **WHITE BALANCE:** Tells the camera what "white" is under existing light.

AUTO- Camera makes an educated guess about what white is.

If AUTO can't get the color right, try other settings like:

INCANDESCENT- Compensates for the yellow in regular light bulbs.
FLUORESCENT- Compensates for the green in fluorescent bulbs.
SHADE- Compensates for the lack of warm tones in shade.
CLOUDY- Compensates for the lack of warm tones.

CUSTOM- To show the camera what white is by letting it "see" something white even in very colored light.

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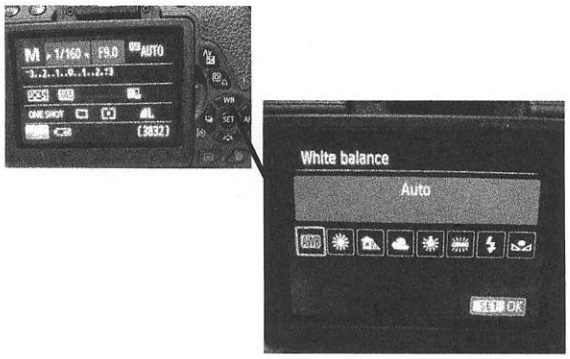
WHITE BALANCE



---------- PICTURE STYLE – "artistic Settings" ----------

___ **MONOCHROME (B&W)-** Camera takes pictures in black and white.

___8. **COLOR:-** Adjusts the **density** of the colors.

STANDARD- Sets the standard color density.
HIGH- Makes the color density higher than the standard.

___9. **TONE:** Adjusts the **contrast** in the image.

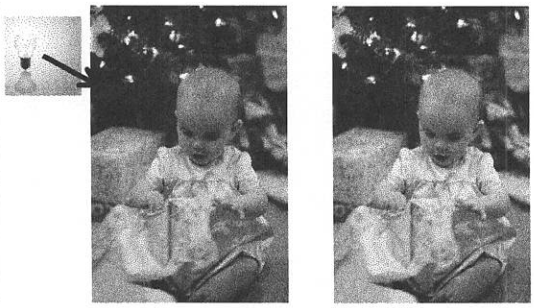
STANDARD- Sets contrast to the standard
HIGH- Sets contrast to maximum.

___10. **SHARPNESS:** Adjusts the **clarity** of objects.

STANDARD- Sets camera to the standard sharpness.
HIGH- Sets camera to sharpen the edges of objects in the image.

1

INCANDESCENT WHITE BALANCE



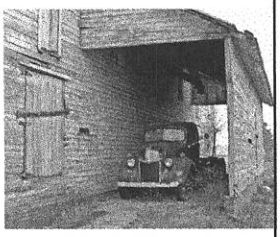
MONOCHROME (B&W) MODE

CUSTOM WHITE BALANCE

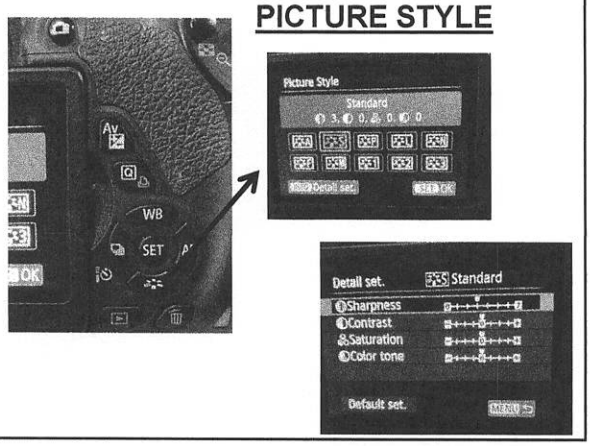
1. Take photo of a white object in the colored light (fill screen)

2. Follow the steps in your instruction manual

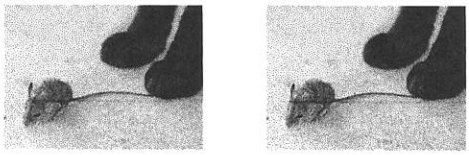
Don't forget to change back to AUTO when done!



PICTURE STYLE

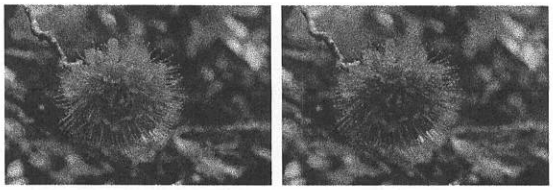


Sharpness



Photos by Sue Large

Color Density

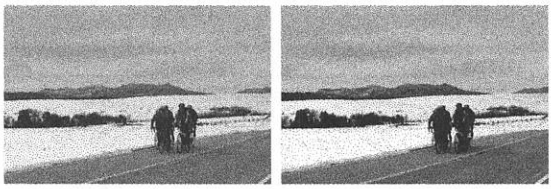


photos by John Powers

- **These are typical features on cameras.**
- **Some have more features than others.**
- **Manufacturers may use different terms.**

Read your instruction manual !

Contrast



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EXPOSURE

- AUTOMATIC
- MANUAL

PART 2 TOPICS

EXPOSURE

- **AUTOMATIC EXPOSURE**
- **PROGRAMMED AUTO**
- **SHUTTER PRIORITY**
- **APERTURE PRIORITY**
- **DEPTH OF FIELD**
- **PRE-PROGRAMMED EXPOSURE MODES**
- **PORTRAIT MODE**
- **LANDSCAPE MODE**
- **SPORTS MODE**
- **NIGHT MODE**
- **METERING MODES**
-

___11. **AUTOMATIC EXPOSURE MODES:**
Camera automatically measures the light in the scene, then sets itself for good exposure.

→ a. **AUTO** (full automatic exposure) Camera has complete control of everything to do with exposure. Camera sets aperture, shutter speed, ISO settings, metering points, etc.

b. **P** (programmed or "partial" auto) – camera gives you control of some things, like ISO, metering points, etc.

c. **SHUTTER PRIORITY (S)**- You set shutter speed, camera sets aperture. Lets you force a higher shutter speed to stop blurring of a moving object.

d. **APERTURE PRIORITY (A)**- You set aperture, camera sets shutter speed. Lets you control depth-of-field (the in-focus area).

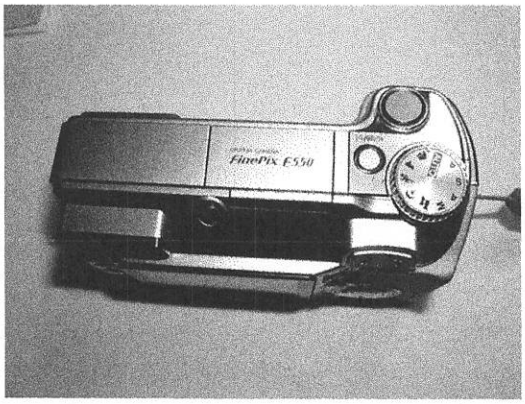
- **METERING MODES**
- **WHOLE-SCENE METERING**
- **MATRIX METERING**
- **CENTER-WEIGHTED METERING**
- **SPOT METERING**
- **AUTO EXPOSURE LOCK**
- **MANUAL EXPOSURE**
- **APERTURE & SHUTTER SPEED CONTROL**

FOCUS

- **AUTO FOCUS**
- **MANUAL FOCUS**
- **AUTO FOCUS LOCK**
- **FOCUS POINT SELECTION**

AUTOMATIC EXPOSURE

The CAMERA determines the exposure settings



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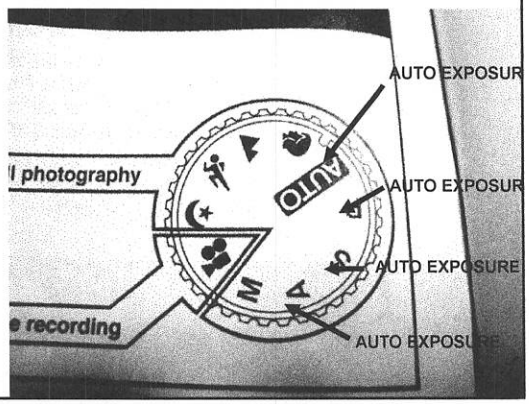
b. **P** (programmed or "partial" auto) – camera gives you control of some things, like ISO, metering points, etc.

AUTOMATIC EXPOSURE MODES



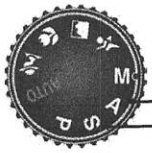
"P" is preferred!

For people who know more than zero about cameras

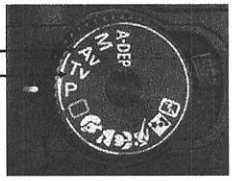
It gives you control of some important things:
ISO, exposure settings, metering points

EXPOSURE DIAL LABELS

NIKON, FIJI, SONY, OLYMPUS, KODAK, SAMSUNG, PANASONIC



CANON, PENTAX

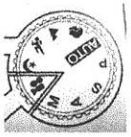


A – aperture priority ⟷ Av - aperture value

S - shutter priority ⟷ Tv – time value

Priority Modes

11. AUTOMATIC EXPOSURE MODES:
Camera automatically measures the light in the scene, then sets itself for good exposure.



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b. **P** (programmed or "partial" auto) – camera gives you control of some things, like ISO, exposure setting, metering points, etc.

→ c. **SHUTTER PRIORITY (S)**- You set shutter speed, camera sets aperture. Lets you force a higher shutter speed to stop blurring of moving object.

→ **d. APERTURE PRIORITY (A)- You set aperture, camera sets shutter speed. Lets you control depth-of-field (the in-focus area).**

CAMERA IN FULL AUTO:

MAY CHOOSE TOO SLOW A SHUTTER SPEED

When to Use Priority Modes

SHUTTER PRIORITY (S, Tv)

USE – when subject is moving significantly

GOOD FOR- sports, kids running, things blowing in wind, vehicles moving

DON'T USE- when Depth of Field matters

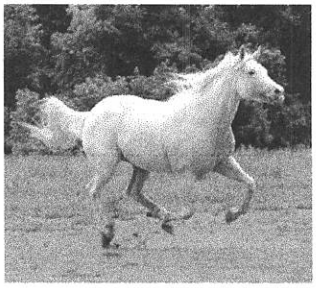
APERTURE PRIORITY (A, Av)

USE- when depth of field matters

GOOD FOR- portraits, flowers, blurring background

DON'T USE- in low light without flash

CAMERA IN SHUTTER PRIORITY:



LETS YOU CHOOSE A HIGHER SHUTTER SPEED

11. AUTOMATIC EXPOSURE MODES:
Camera automatically measures the light in the scene, then sets itself for good exposure.

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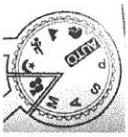

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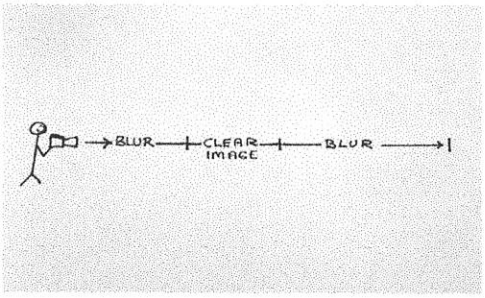
DEPTH OF FIELD

(The in-focus area of your image)



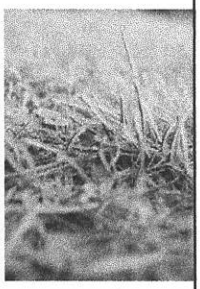
Short DOF

photo by John Powers

Long DOF

photo by Clem Wehner

Depth of Field



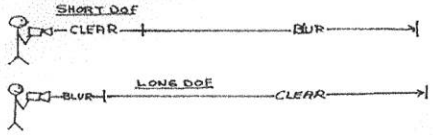
BLURRY, THEN CLEAR, THEN BLURRY

Aperture vs. Depth of Field

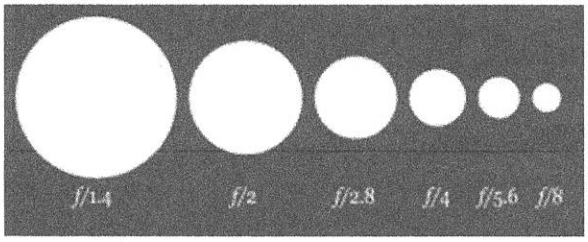
Large aperture = short Depth of Field

Small aperture = long Depth of Field

DOF CAN BE CHANGED



Aperture is expressed in f/stops



Large aperture = small f/stop number

Small aperture = large f/stop number

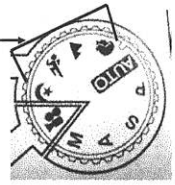
Summary

Small f/stop number = short Depth of Field

(f/1.4, f/2.8, f/4.0)

Large f/stop number = long Depth of Field

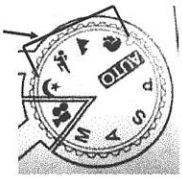
(f/11, f/16, f/22)

Pre-programmed modes 

ADVANTAGE- Simple, good if you don't understand camera

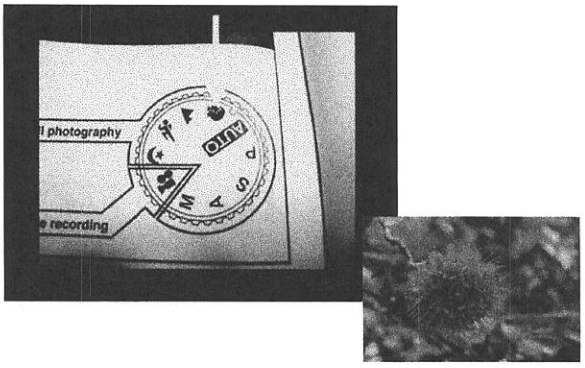
DISADVANTAGE- Won't know the settings camera is using.
Can ruin your shots & you won't know why.

Pre-programmed modes

Pre-programmed modes 

"Portrait" setting

(gently blurs the background)



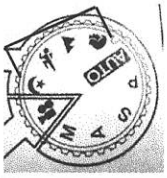
__12. **EXPOSURE PROGRAM MODES**: Pre-programmed aperture and shutter speed

PORTRAIT- **Softly blurs the background.**

LANDSCAPE- **Puts near and distant objects in sharp focus.**

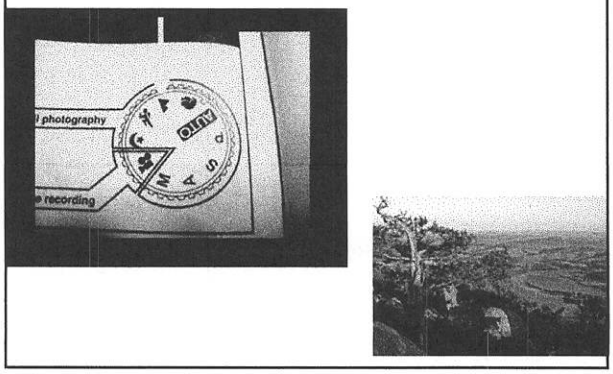
SPORT- **Sets a fast shutter speed to freeze motion.**

NIGHT- **Sets a slow shutter speed for dim scenes**

Pre-programmed modes 

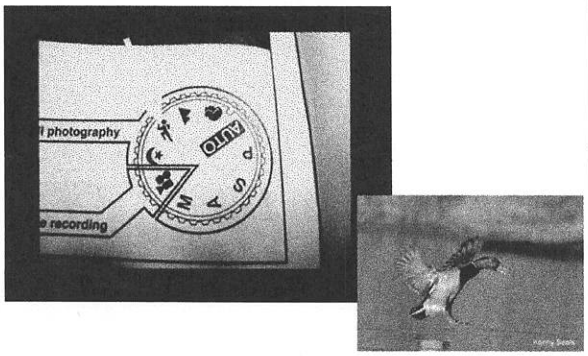
"Landscape" setting

(for large depth of field)



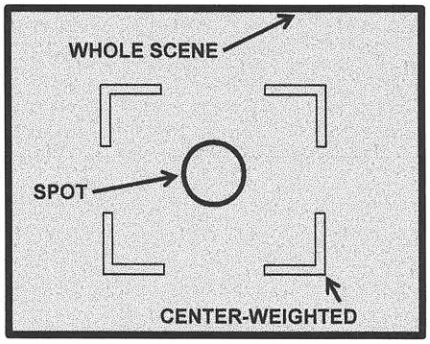
"Sports" setting

(freezes motion)



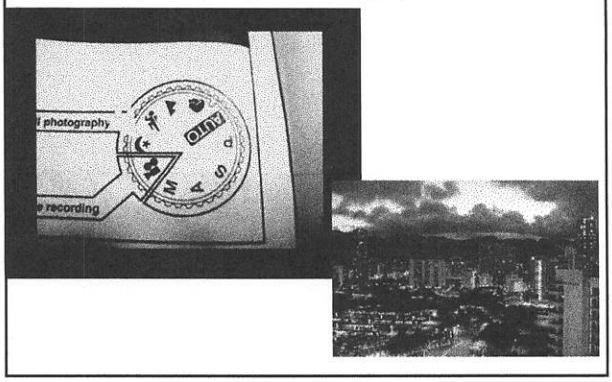
METERING AREAS

AS SEEN IN THE VIEWFINDER



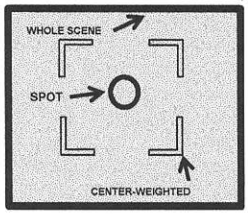
"Night" setting

(takes photos in low light)



METERING AREAS

(AS SEEN IN THE VIEWFINDER)



WHOLE SCENE- Light in whole viewfinder is measured

CENTER-WEIGHTED- Light in center of viewfinder is measured

SPOT- Light only inside the spot is measured

___13. **METERING MODES:** You chose how the camera meters the light

WHOLE SCENE- Camera measures light in the entire scene.

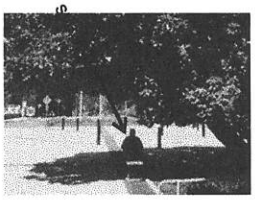
CENTER WEIGHTED- Camera measures light in just the center part of the scene.

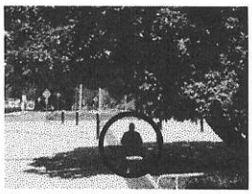
SPOT- Camera measures light in just a small spot in the center of the scene.

EXPOSURE LOCK- Captures the exposure setting in part of the scene

WHEN TO USE SPOT METERING

When the subject brightness is very different from the surrounding area.





1. Put spot on subject
2. Press shutter button down halfway to <u>lock exposure</u>
3. Move camera to recompose the shot (if needed)
4. Finish pressing shutter all the way down

EXPOSURE

- **GOOD EXPOSURE-** NOT TOO BRIGHT, NOT TOO DARK
- **WHAT CONTROLS EXPOSURE?**
  1. SHUTTER SPEED
  2. APERTURE
  3. ISO

___14. **MANUAL EXPOSURE-** Auto exposure is turned off. You decide what to set.

APERTURE- You chose the correct aperture setting.
f/stops: 1.4, 2.8, 4.0, 5.6, 8.0, 11, 16, 22, 32

SHUTTER SPEED- You chose the correct shutter speed setting.
Seconds: B, 30, 15, 5, 2, 1, ¼, 1/8, 1/15, 1/30, 1/60 ,1/125, 1/250, etc.

SHUTTER SPEED AND APERTURE

- **<u>SHUTTER SPEED-</u> THE TIME THE SHUTTER IS OPEN**

  LONGER TIME = MORE LIGHT
  EXPRESSED AS SECONDS OR FRACTIONS
  (e.g. 1 SEC, 1/60TH, 1/1000TH etc.)

- **<u>APERTURE-</u> DIAMETER OF THE LENS OPENING**

  WIDER OPENING = MORE LIGHT
  EXPRESSED AS f/stops
  (e.g. f/2.0, f/4, f/5.6, f/8, etc)

<u>MANUAL EXPOSURE</u>

Auto exposure is turned off.

You decide:
APERTURE
SHUTTER SPEED

<u>EFFECT OF f/stop CHANGES</u>

A ONE STOP CHANGE
DOUBLES OR HALVES THE LIGHT COMING IN

	BIG APERTURE							SMALL APERTURE
f/stops:	**2.0**	**2.8**	**4**	**5.6**	**8**	**11**	**16**	**22**
	More light comes in							Less light comes in

EFFECT OF SHUTTER SPEED CHANGES

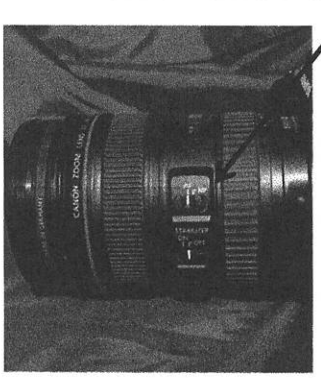
Halving the speed doubles the light coming in

Doubling the speed halves the light coming in

shutter: 1/8 1/15 1/30 1/60 1/125 1/250

SLOW SPEED FAST SPEED

AUTO / MANUAL FOCUS SWITCH



Remembering Exposure Relationships

OPPOSITE:

F/STOP ----- Opposite (lower f/stop= more light)

SHUTTER--- Opposite (slower speed= more light)

SAME:

ISO ---------- Same - (lower ISO= less light)

DEPTH OF FIELD- Same- (lower f/stop= less DOF)

PROBABLY BETTER THAN YOUR EYES

___15. **FOCUS MODES:**

AUTO- Automatic focus is turned on and focuses the camera for you.

MANUAL - Autofocus is turned off. You focus the camera manually.

AUTO FOCUS LOCK- Lets you temporarily "hold" the focus while moving the camera around to compose the best shot.

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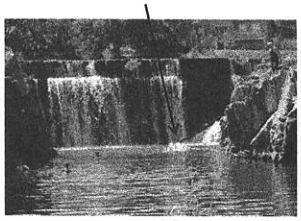
Use FOCUS LOCK

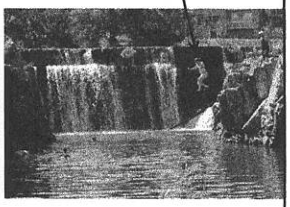
To pre-focus before the action happens

(because auto focus may take too much time)

Slow focus missed the jumper



Pre-focus so action can be stopped



Auto focus assumes the subject is:
in the center of the screen
and closest to the camera!

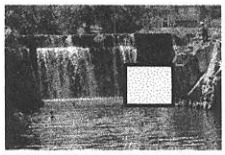
Examples:
1. **ZOO- cage between you and the tiger**
2. **BASEBALL- fence between you and the batter**

So, turn off auto-focus and use manual focus

How to Use PRE-FOCUS

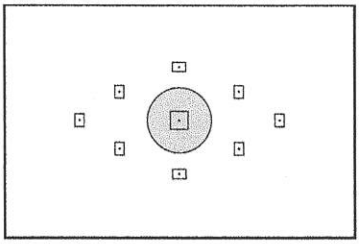
1. Point camera to where action will soon happen

2. Hold shutter halfway down
(this locks the focus)



3. When the action happens, finish pressing shutter

FOCUS POINTS

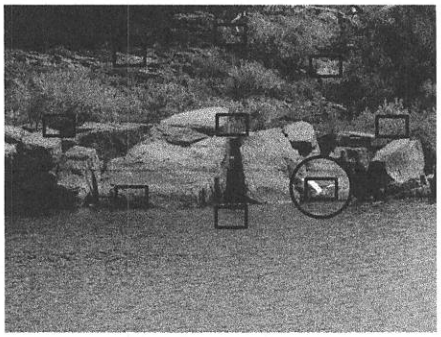


Lets you select where the camera focuses
in the viewfinder scene

MANUAL FOCUS

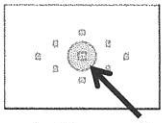
USE WHEN AUTO FOCUS DOESN'T FOCUS CORRECTLY

FOCUS POINTS



Lets you select where the camera focuses in the viewfinder's scene

FOCUS POINTS

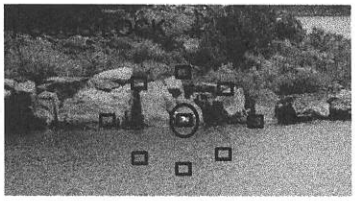


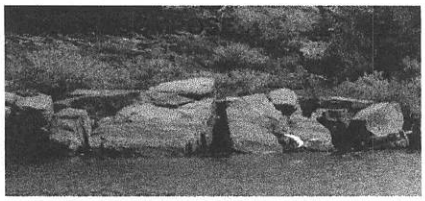
Tip: Set the camera to the <u>center</u> focus point

(because if you use a different point,
you'll forget to reset it and mess up future shots)

then,

1. **Put the center focus point on the subject**
2. **Press the shutter halfway down to lock the focus**
3. **Move camera to recompose the shot**
4. **Finish pressing shutter down to take the shot**





AND TAKE THE SHOT

- **These are typical features on cameras.**
- **Some have more features than others.**
- **Manufacturers may use different terms.**

<u>Read your instruction manual !</u>