

PHOTOGRAPHY

BEYOND THE BASICS : PART I

ANDREW HELLMICH : IMPACT IMAGES

DON'T BE OVERWHELMED

THERE WILL BE NUMBERS AND THEORY

BY THE END, IT WILL ALL CLICK

PART I TOPICS

- **Exposure**
- **Shutter Speed**
- **Aperture**



EXPOSURE - WHAT IS IT?

It's what the camera determines is the right amount of light
that should hit the sensor

EXPOSURE IS MADE UP OF

- shutter speed
- aperture
- ISO - we'll cover ISO in the next lesson



EXPOSURE IS EXPRESSED AS

1/25th of a second at f5.6 at ISO 400

OR

1/25th at 5.6 at 400

This is what I'd
say if another
photog asked
me the

Let's look at how exposure is determined

THE CAMERA IS A FANCY LIGHT METER

- it looks at the scene
- measures the reflective light (the light hitting the sensor)
- determines the correct settings
- you take the photo
- this all happen automatically in automatic mode



How does the camera determine the correct exposure?

The camera “thinks” every scene is grey

| 8% grey to be exact

Why Grey?

Imagine a scene you are about to photograph
it can be any scene... anything



Now imagine that same scene as a fresh painting



still wet

Now imagine that fresh painting and you smudge it



Once you finish smudging, you get:

18% Grey

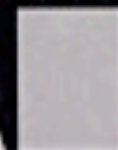
“most of the time”



KODAK Gray Cards



Improved surface characteristics
Now includes small
gray card



This protective, reusable
envelope contains—

- One 4 x 5-inch gray card
- Two 8 x 10-inch gray cards
- Complete instructions for use

Exposure is simply a set of values

BUT

it's the foundation of every photo

Control exposure and you control the destiny of your creativity

The problem with your camera as an exposure meter

it measures 'reflected' light

and

not every scene is 18% grey



There is reflected light

and

There is ambient light

Reflected light - is the light 'reflected' by the scene

Ambient light is the light 'falling' onto the subject

Ambient light is measured with a light meter
(a light meter can also measure reflected light)





Using a light meter
ambient light reading



Using a grey card
reflected light reading

Camera sensor
(light meter)



A camera only measures reflected light

What happens if the scene isn't 18% grey?

That's when we get overexposed or underexposed photos
(when shooting in auto)



The Important Part!

If you photograph a predominantly white scene
the camera still sees it as grey

just as

If you photograph a predominantly black scene
the camera still sees it as grey

Again

If you photograph a predominantly white scene
the camera still sees it as GREY

Which means, your camera will **underexpose** the image
(your photo will be darker than it should be)



A white wall



Taken in Auto



Overexposed by the photographer
in manual

On the flip side

If you photograph a predominantly black scene
the camera still sees it as GREY

Which means, your camera will **overexpose** the image
(your photo will be lighter than it should be)



This photo is overexposed - the suits are black in 'real life'



You can override the camera!

We'll get to that shortly!



Questions?

The Other Parts of the **EXPOSURE** equation

Shutter speed

Shutter speed is how long the shutter stays open

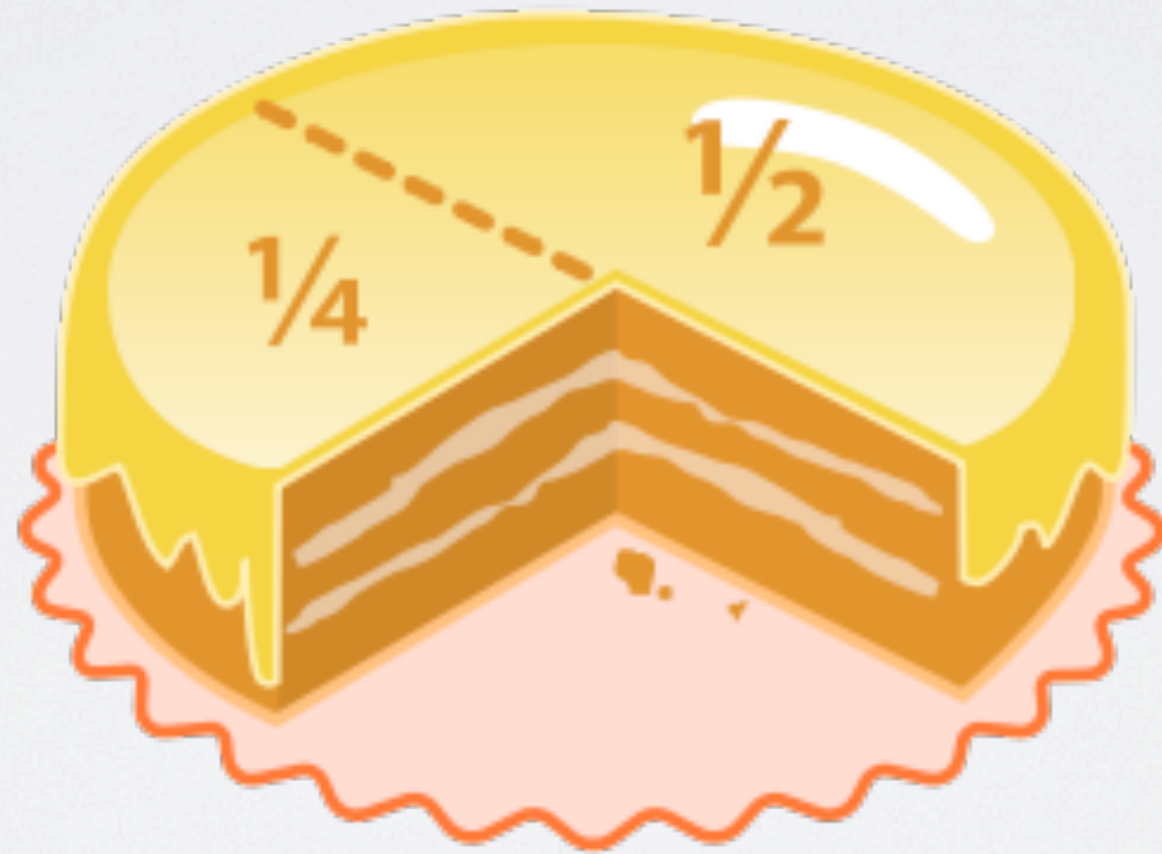


THE LONGER THE SHUTTER IS OPEN

- the more light hits the sensor
- the brighter/lighter the photo
- the harder to hand hold the camera



Shutter speeds are expressed as fractions of a second



SHUTTER SPEEDS

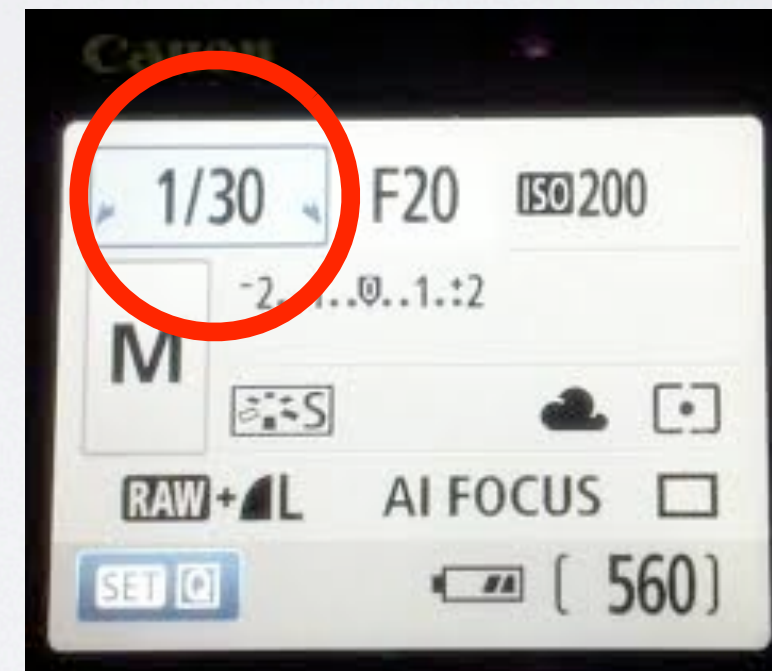
- 1/1000th of a second
- 1/500th of a second
- 1/250th of a second
- 1/125th of a second
- 1/60th of a second
- 1/30th of a second
- 1/15th of a second
- 1/8th of a second
- 1/4 of a second
- 1/2 a second
- 1 second
- 2 seconds

The shutter speed is controlled by one of the command dials on your camera when in manual mode



Take your camera now, turn it on and change the mode to manual

Once in manual mode, rotate the dial and you should see the shutter speed values change



You may see numbers that differ from what I mentioned

That's ok - you are seeing fractions or 'stops' between the 'traditional' shutter speeds

See if you can find 125th of a second on your camera

SHUTTER SPEED CONTROLS MORE THAN JUST LIGHT

- it controls the movement of your subject
- and it controls the movement in your camera



USE SLOW SHUTTER SPEEDS

- to create blur
- to show movement
- to allow more light into the camera



USE FAST SHUTTER SPEEDS

- to reduce or eliminate blur
- to reduce or eliminate camera movement
- and to allow less light into the camera



Questions?



The 2nd Part of the Exposure Equation



Aperture



Aperture is how big the hole in the lens is

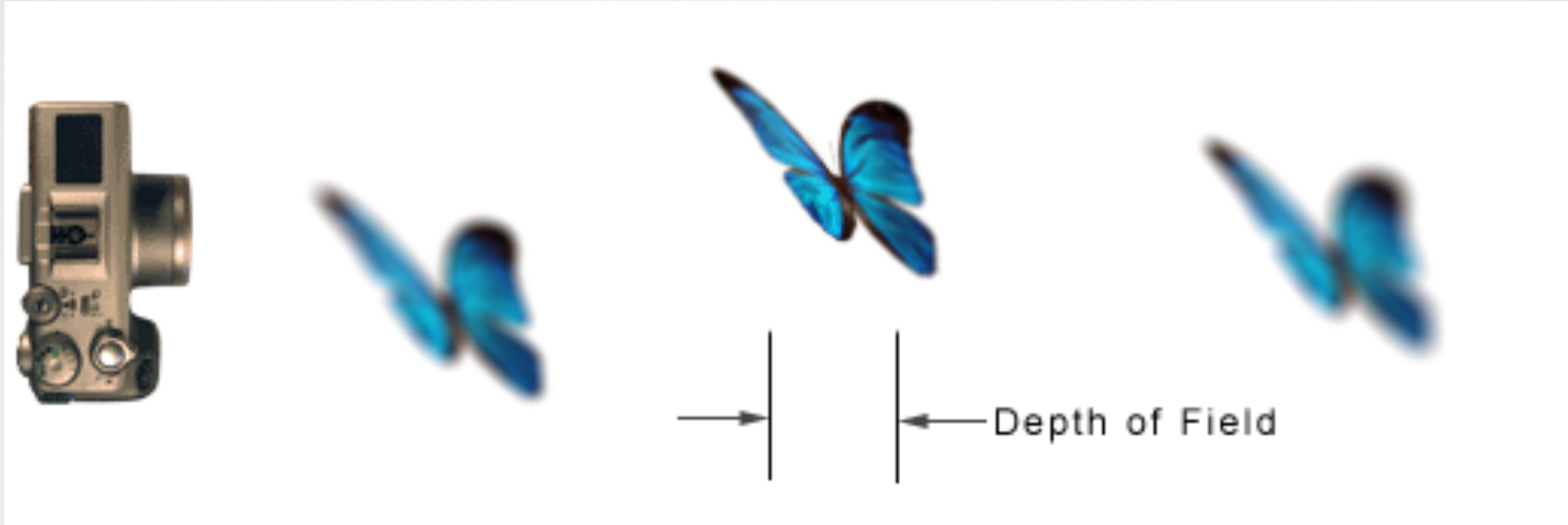
THE LARGER THE APERTURE (HOLE)

- the more light on the sensor
- the brighter/lighter the photo
- The shallower the depth of field (DOF)



DEPTH OF FIELD (DOF)

is simply how much of the image is in focus



... of the lens, the closer the object is to the lens, the shallower the depth of field. The scales on a lens barrel indicate the hyperfocal distance opposite the aperture you are using. If you then focus the lens at the hyperfocal distance, the depth of field will extend from half that distance to infinity. ◁ For example, if a camera has a hyperfocal distance of 18 feet, and you focus at 18 feet, the depth of field will extend from 9 feet to infinity.

Shallow depth of field

weird
Apertures are expressed as numbers



APERTURES

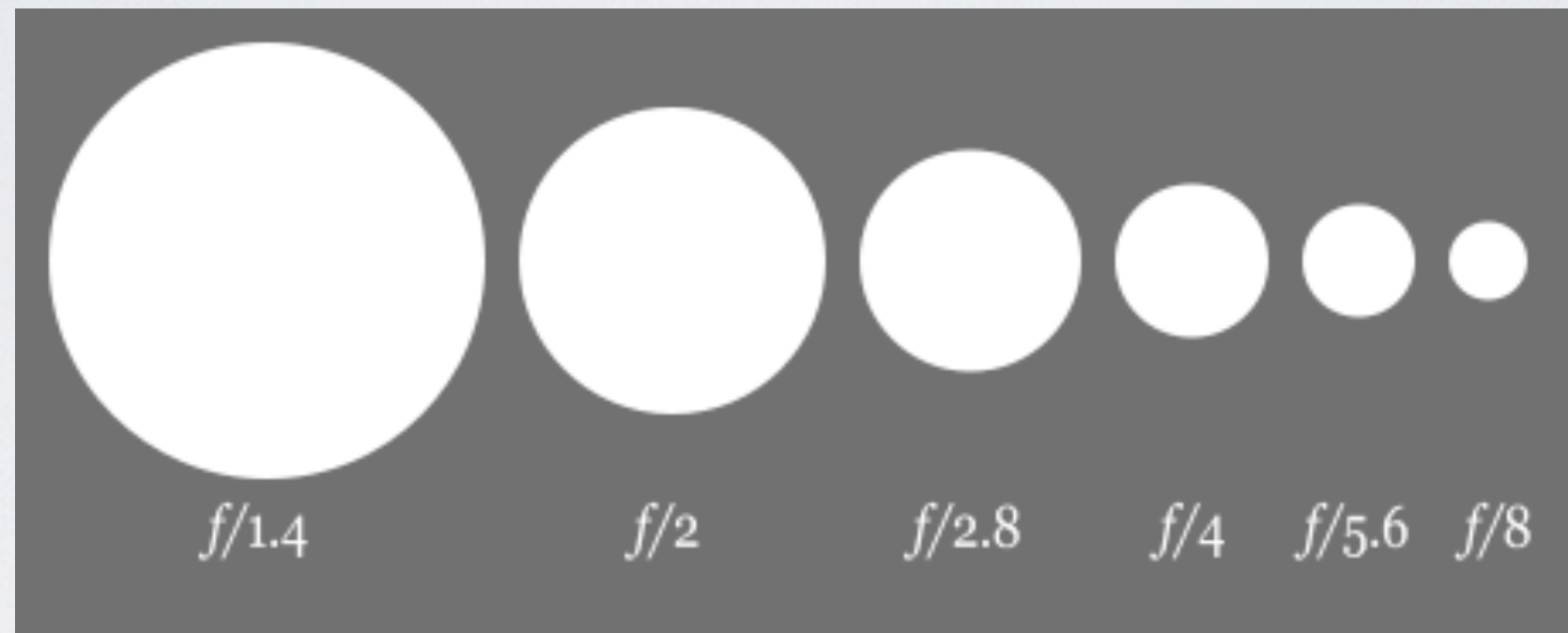
- f32 - very small aperture
- f22
- f16
- f11
- f8
- f5.6
- f4
- f2.8
- f2
- f1.4 - very large aperture

DOF Scale

aperture settings



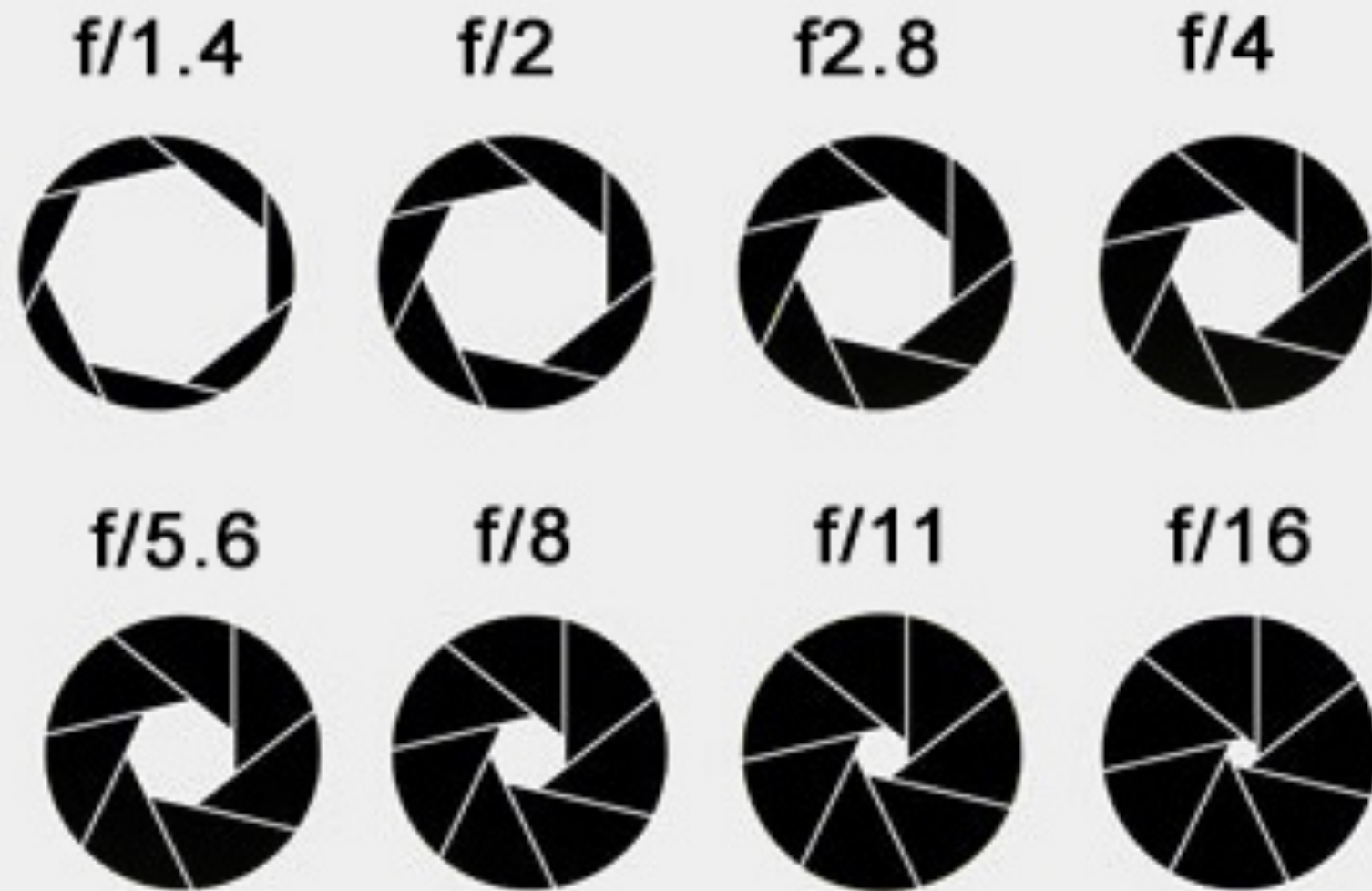
Apertures are literally the 'hole' inside the lens



The larger the aperture, the shallower the DOF

NOTICE: the larger the aperture the smaller the number!

Inside the lens there are a series of 'leaves' that form the hole

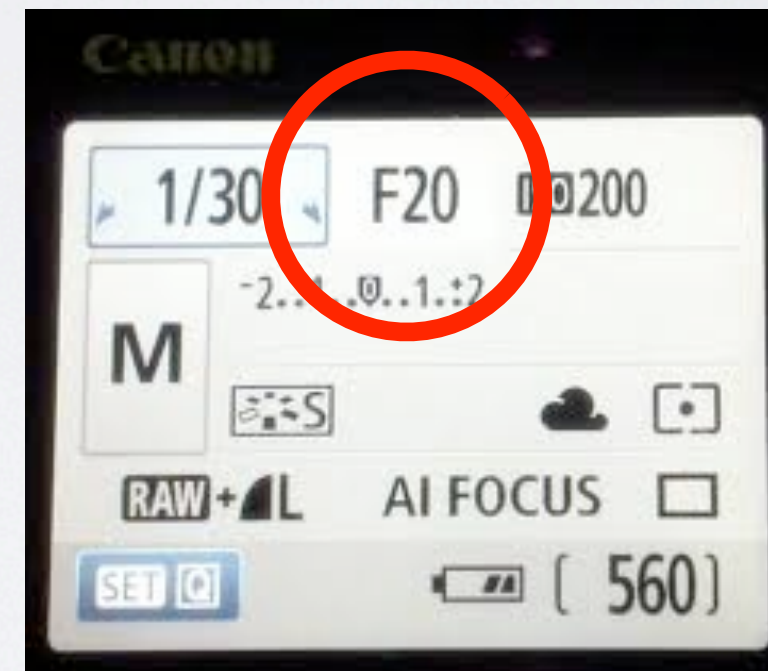


The aperture is controlled by one of the command dials on your camera when in manual mode



Take your camera now, turn it on and change the mode to manual

Once in manual mode, rotate the sub command dial and you should see the aperture values change



You may see numbers that differ from what I mentioned?

That's ok - you are seeing fractions or 'stops' between the 'full' aperture values

See if you can find f8 on your camera

Aperture controls the light hitting the sensor

and it controls the Depth of Field

LARGE APERTURE (SMALL NUMBER)

- for a shallow DOF
- to allow more light into the camera
- to get a faster shutter speed



SMALL APERTURE (LARGE NUMBER)

- for a large DOF
- to allow less light into the camera
- to get a slower shutter speed



© Ken Duncan

All clear... so far?



Questions?



Then a short break

Back to Exposure now



Let's look at an example

Your camera selects 1/1000 @ f11 for a general scene

you want a shallower DOF (possibly for a portrait)
so in manual, you choose:

f8 which is 1 stop wider than f11

if you don't change the shutter speed the photo will be 1 stop
overexposed (lighter/brighter)

so you change the shutter speed to $1/2000$ sec

which is 1 stop faster than $1/1000$

this results in the same exposure

but a shallower DOF

Let's go back and do that again!

Your camera selects 1/1000 @ f11 for a general scene

you want a shallower DOF so in manual, you choose:

f8 which is 1 stop wider than f11

if you don't change the shutter speed the photo will be 1 stop overexposed

so you change the shutter speed to $1/2000$ sec

which is 1 stop faster than $1/1000$

this results is the same exposure

but a shallower DOF

If you open the Aperture you must speed up the shutter speed
for the same exposure



Questions?

ANOTHER EXAMPLE:

- this exposure: 1/500 @ f8
- is the same exposure as
- 1/1000 @ f5.6
- is the same exposure as
- 1/2000 @ f4
- is the same exposure as
- 1/4000 @ f2.8

**In each of these
examples
the DOF is decreasing
but the exposure
remains the same**

AND ANOTHER EXAMPLE:

- this exposure: 1/500 @ f8
- is the same exposure as
- 1/250 @ f11
- is the same exposure as
- 1/125 @ f16
- is the same exposure as
- 1/60 @ f22

**In each of these
examples
the DOF is increasing
but the exposure
remains the same**

THE EXPOSURE REMAINS THE SAME: WHAT DOES THAT MEAN?

- the amount of light reaching the camera sensor is unchanged
- the colours and tones of each photo are identical
- only the DOF changes
- and motion is frozen or blurred

Do you see the possibilities now?

In manual, you have complete control of every image!





Questions?

LET'S TIE IT ALL TOGETHER

Say you are taking a general photo and your camera selects an exposure of:
1/1000 sec at f11

This is a fast shutter speed that will freeze most action

and **f11** will give a good general DOF

Great for an 'average' photo

But Nothing Special

Original exposure
1/1000 sec at f11

Let's say you are shooting a portrait

You want a shallow depth of field

Say **f5.6**

That's 2 stops wider than **f11** (f8 then f5.6)

Original exposure
1/1000 sec at f11

If we left the shutter speed the same, we would be 2 stops

OVEREXPOSED

Original exposure
1/1000 sec at f11

So we change the shutter speed to 1/4000th of a second

Original exposure 1/1000 sec at f11

is the same as 1/2000 sec at f8

is the same as 1/4000 sec at f5.6

Remember:

What you do to the aperture, you must compensate with the shutter speed
and vice versa

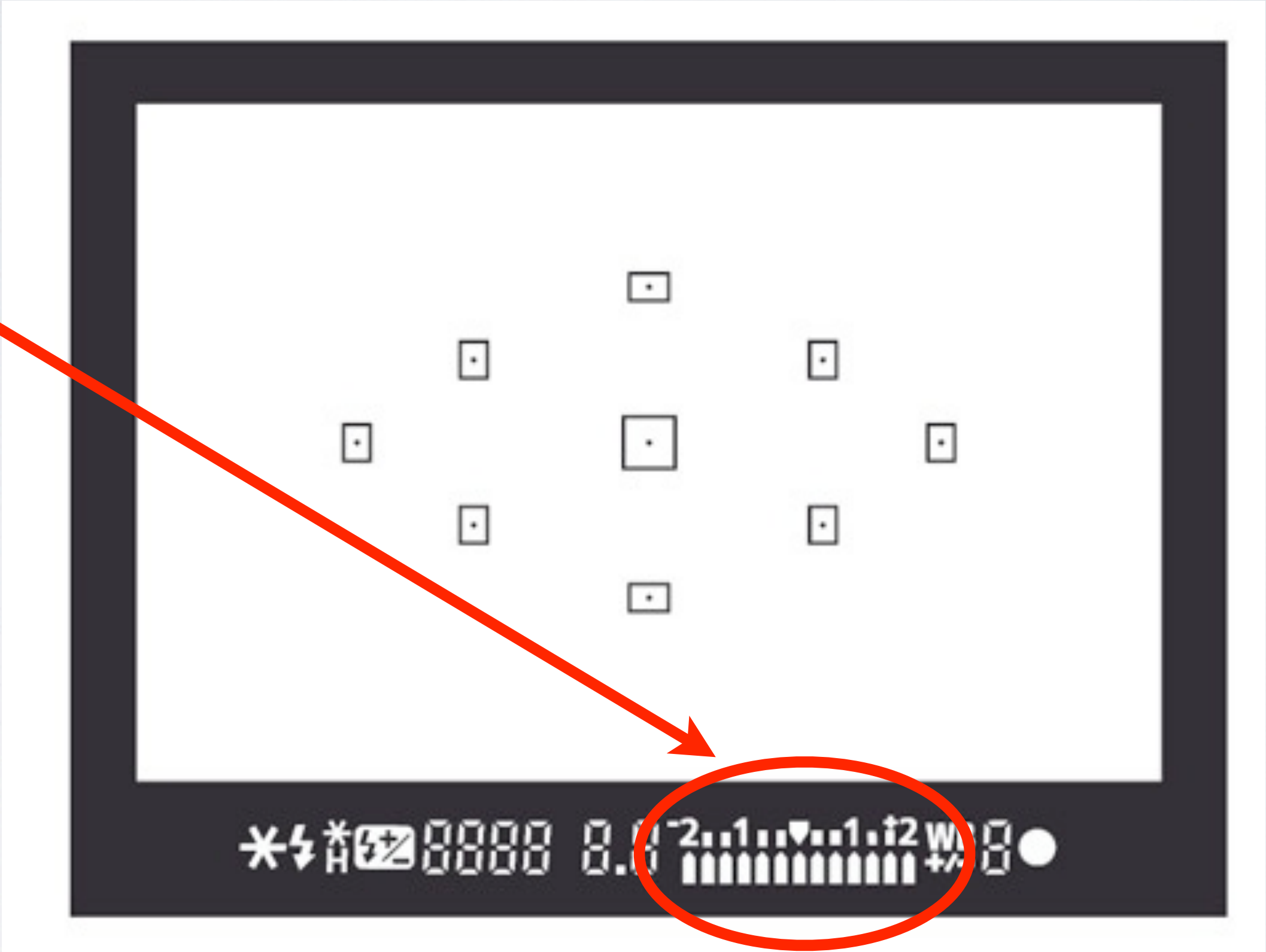
Questions?





So, how do you use your camera as a light meter in manual mode?

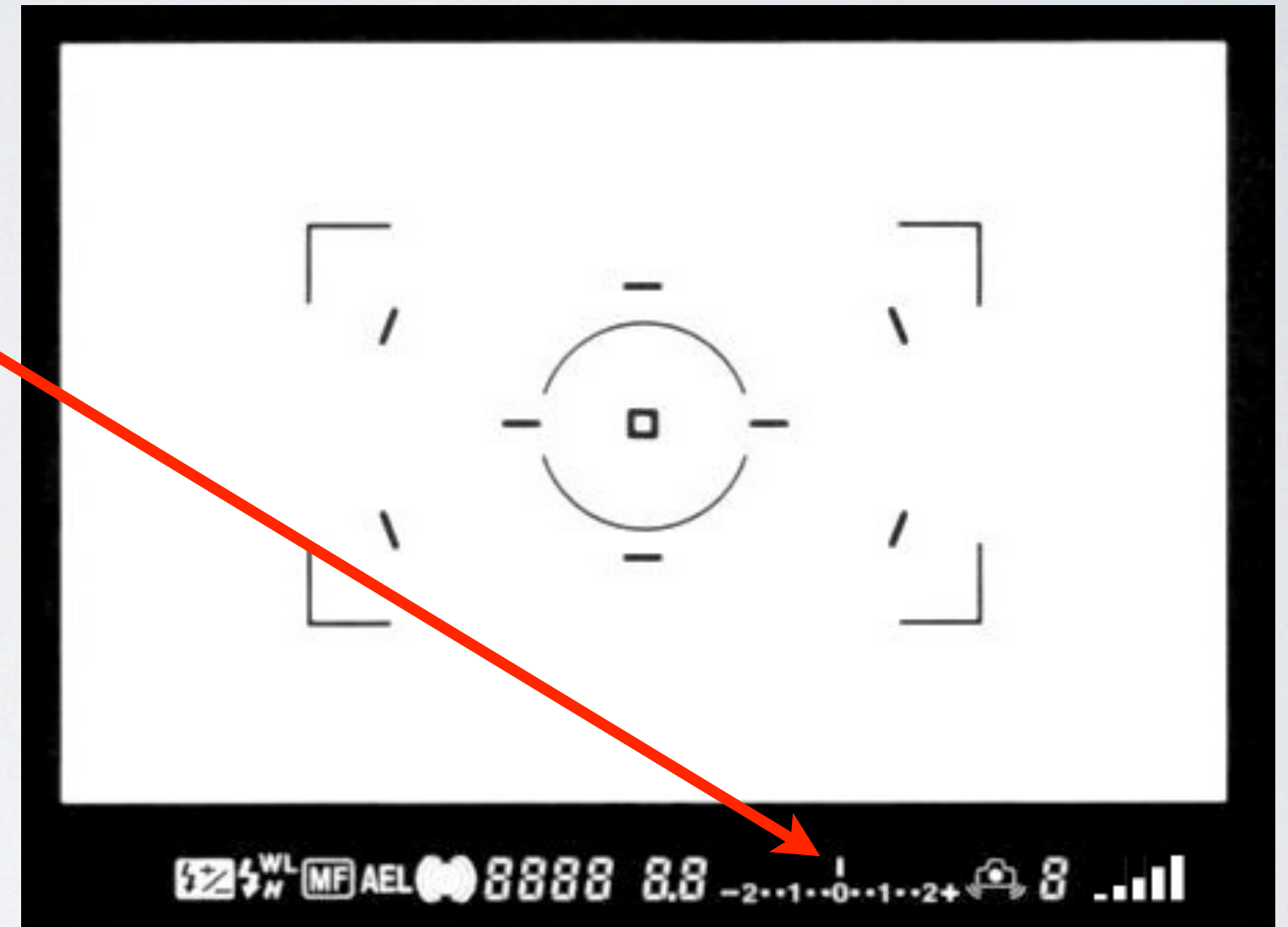
exposure display



The little icon over the '0'
indicated the correct
exposure

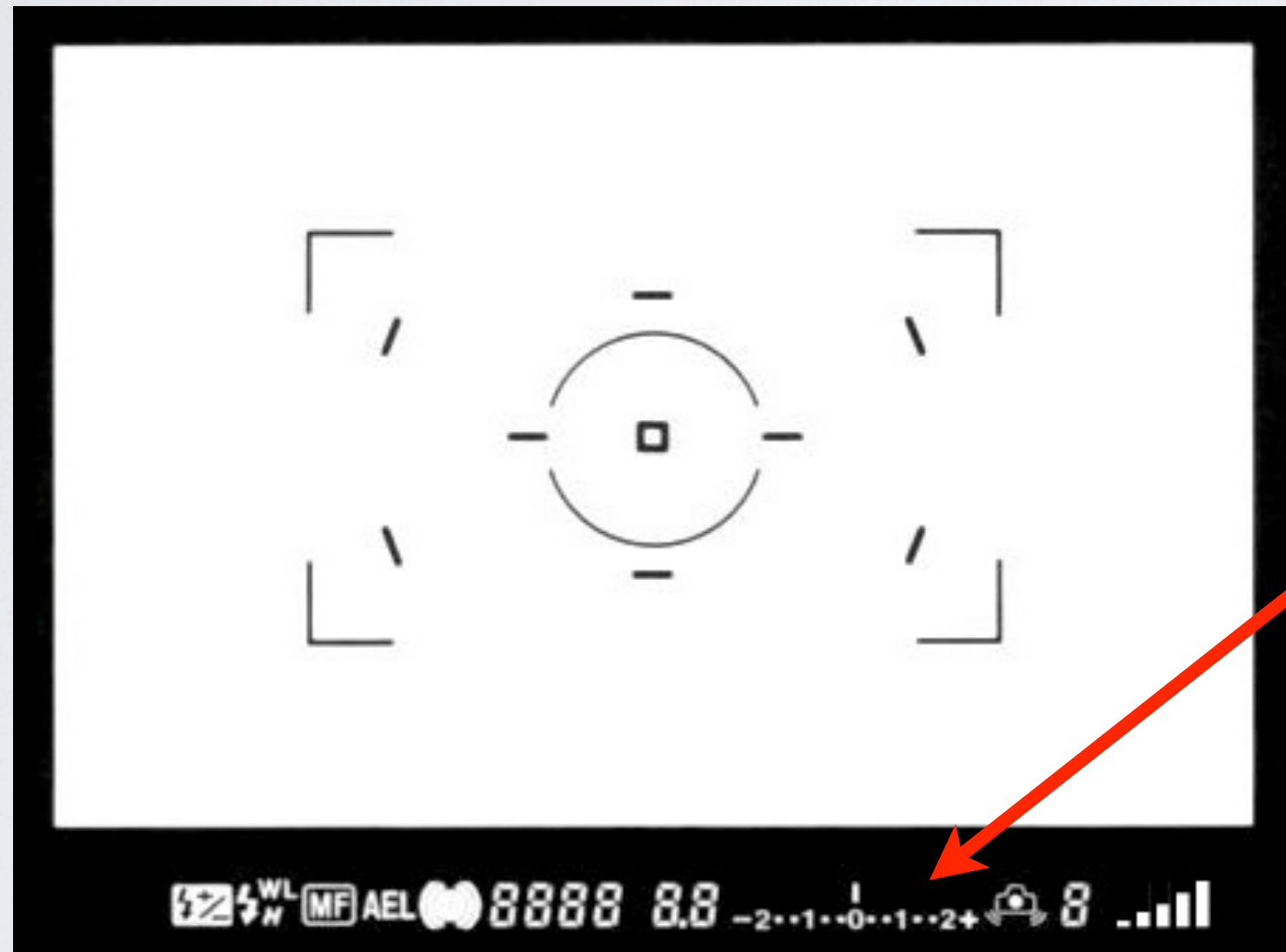
You control it by adjusting
aperture or
shutter speed

+ is overexposed
- is underexposed



If your photo is too dark

Change your shutter speed or aperture to lighten it

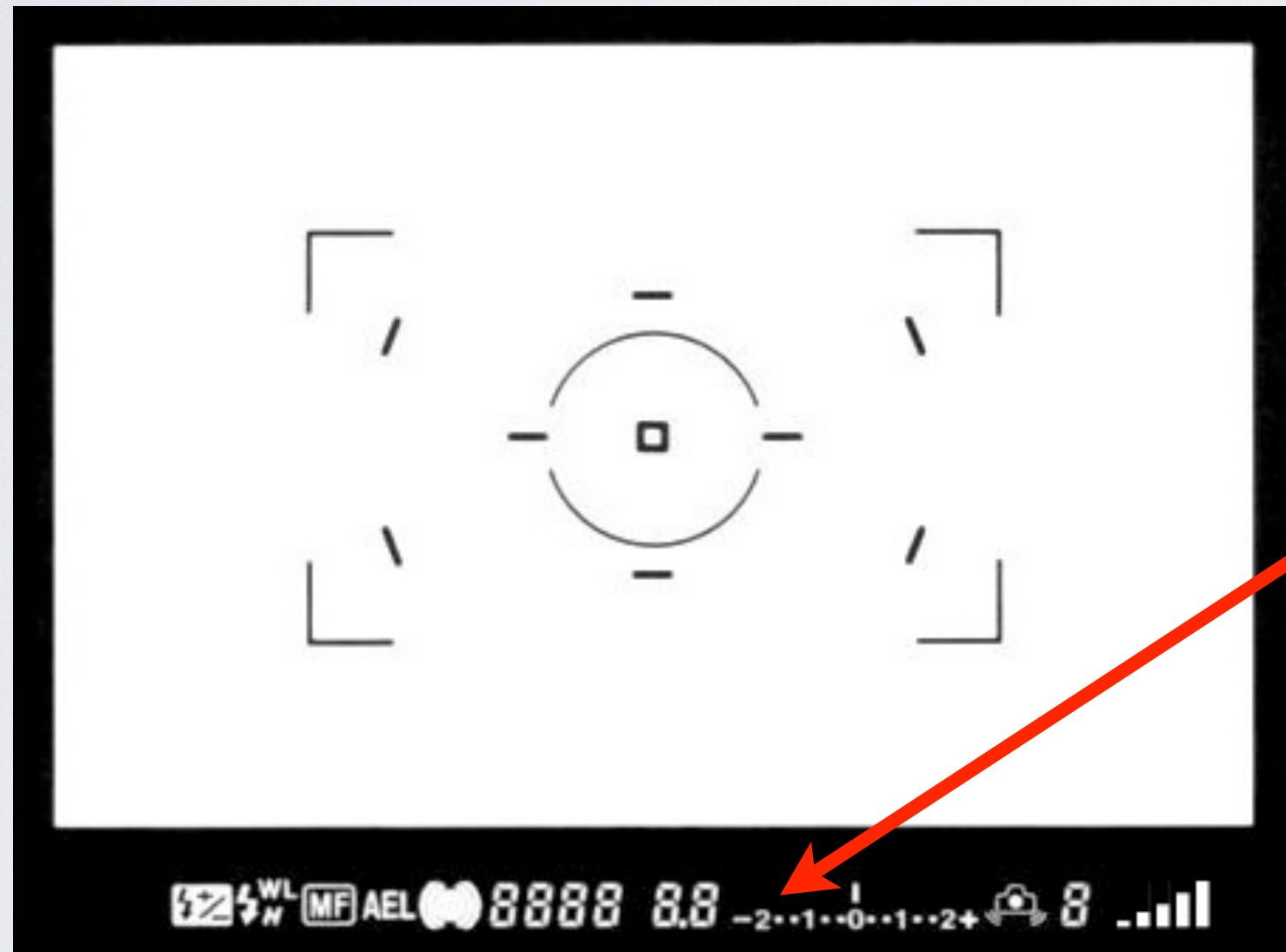


the indicator will
move to the right

It's the opposite if your images is too light

If your photo is too light

Change your shutter speed or aperture to darken it



the indicator will
move to the left

Remember - you have the ability to override the cameras meter

Also remember - the camera sees everything as grey

Homework

1. Photograph a 'predominately white' object against a white wall
2. Prove to yourself that you understand depth of field



**Any Final
Questions?**