



# Photography Workshop 1

# Topics

- Automatic vs Control
- How does a camera work
- Controlling the exposure
- How does a camera measure light

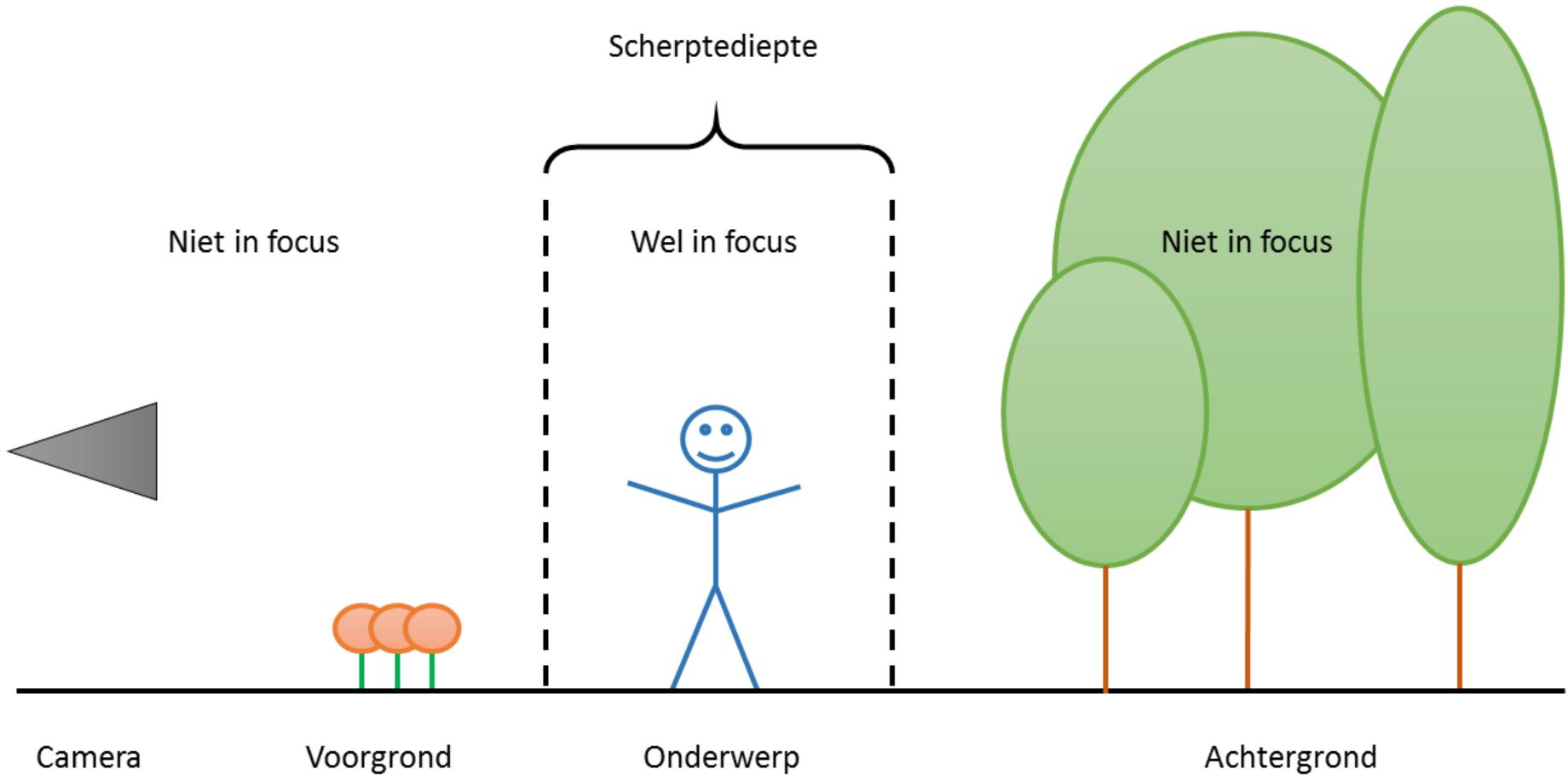


# Automatic vs Control

# No more Auto mode!

We will take pictures using the aperture priority mode  
(Av / A on camera)

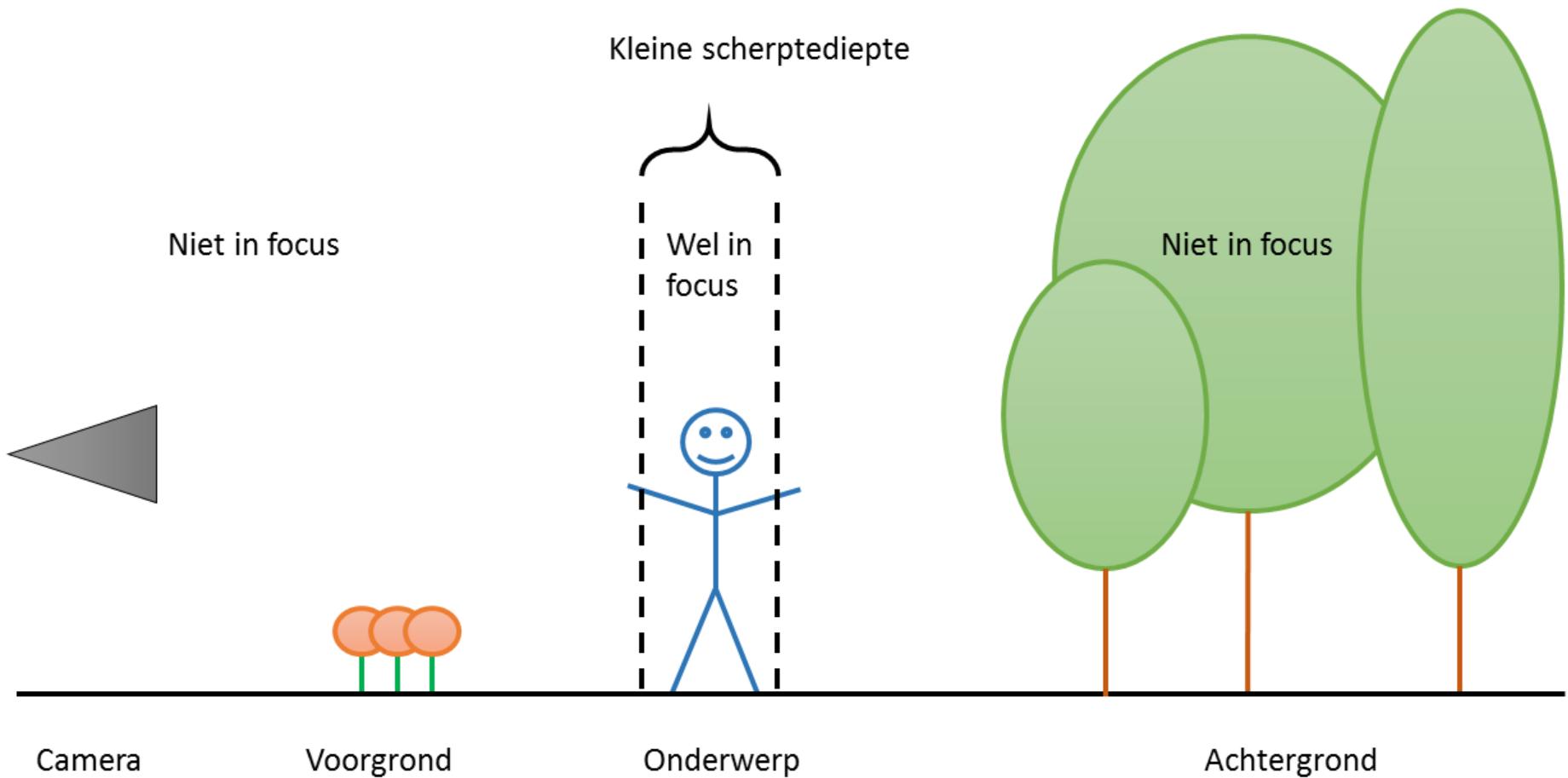
Depth of field



Examples of small and large  
depths of field

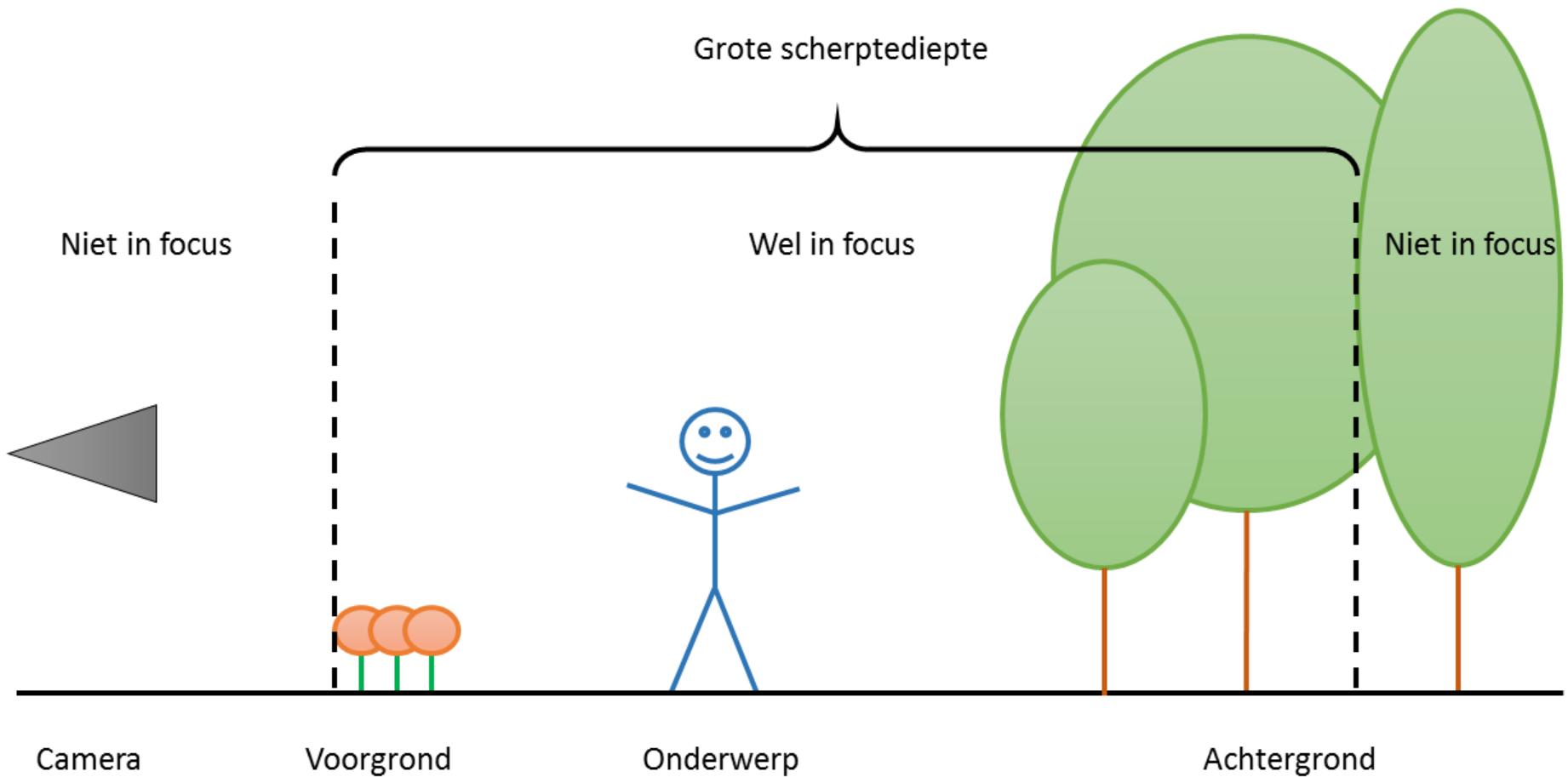


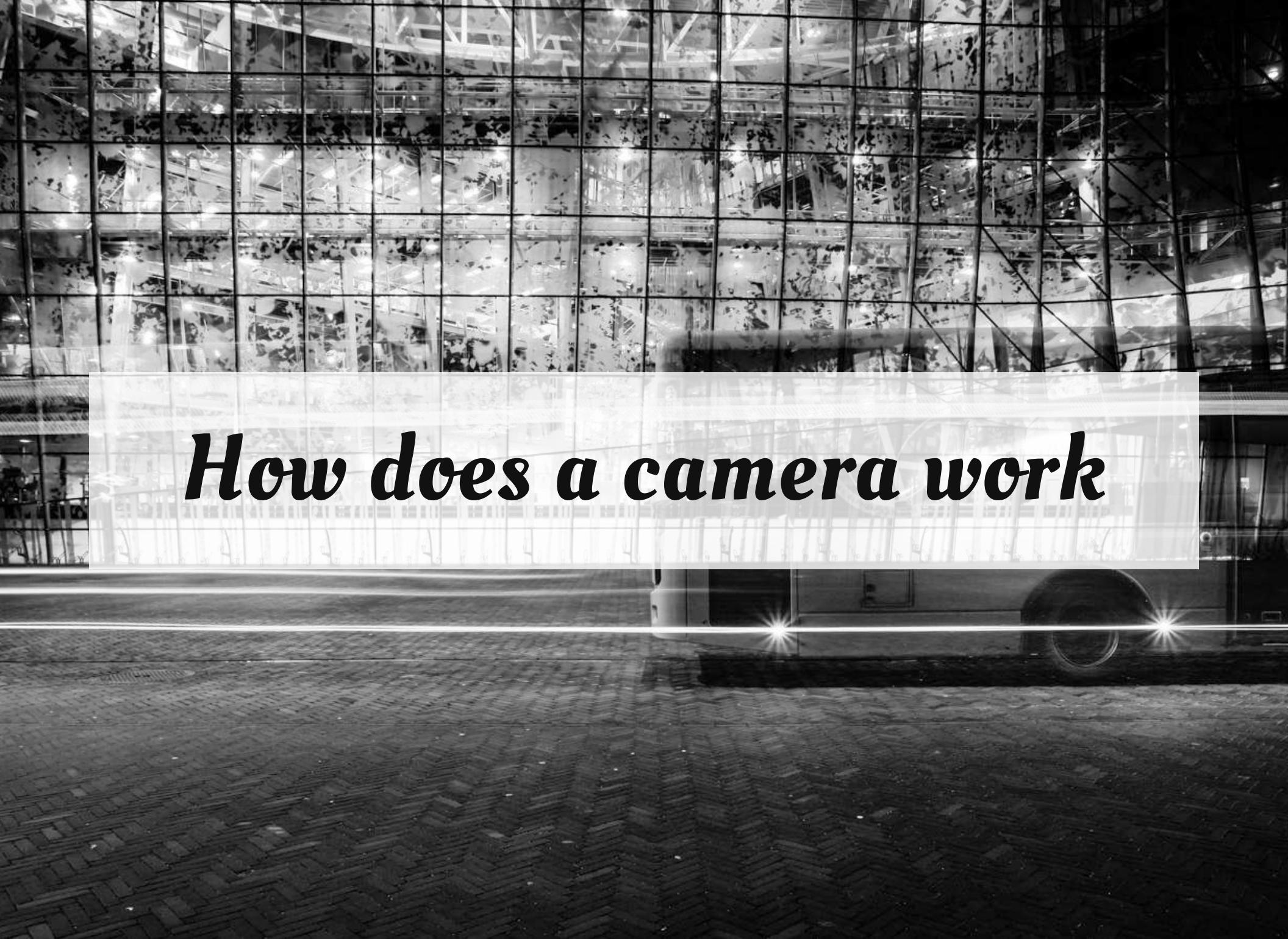
© Marc Duiker



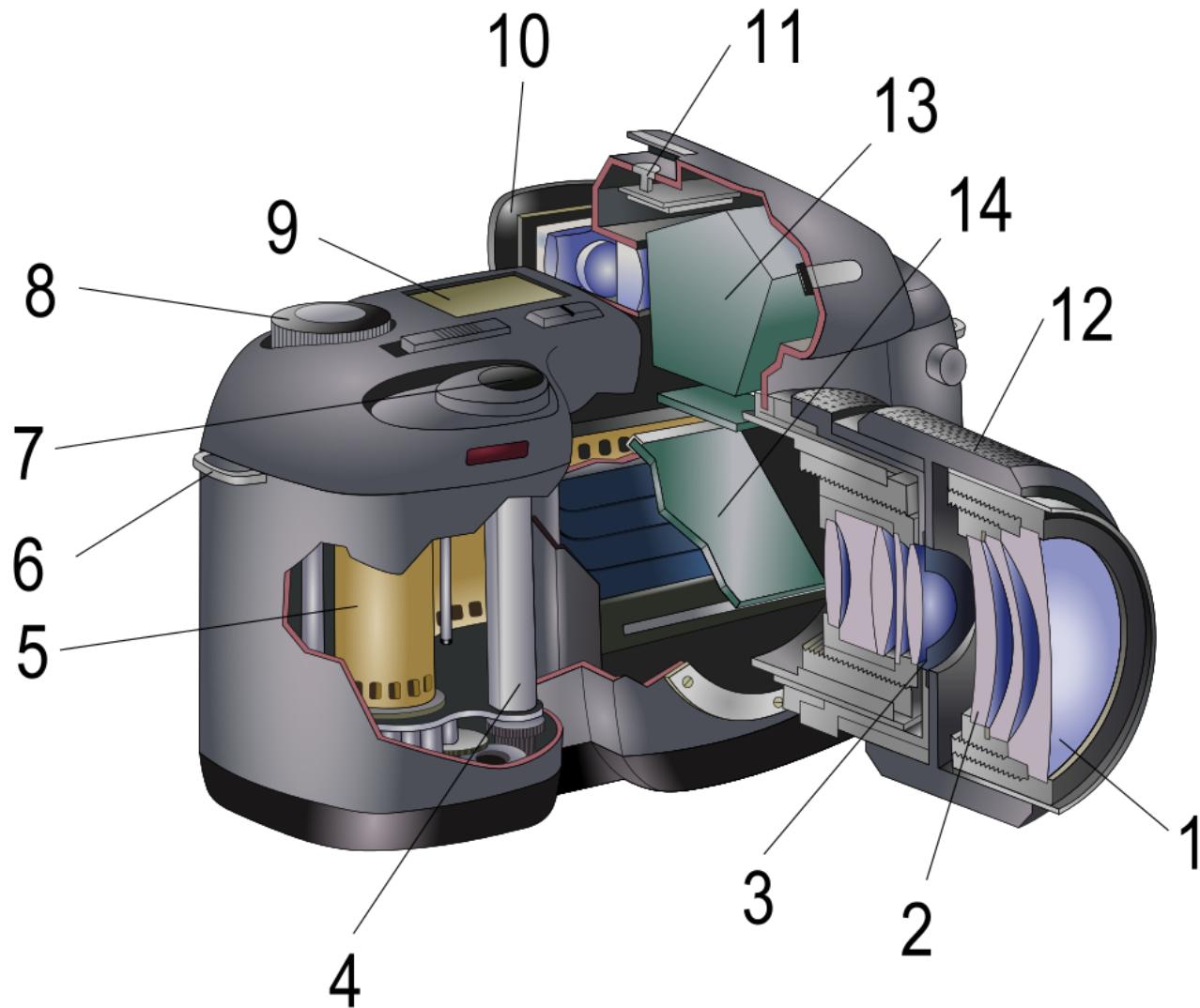


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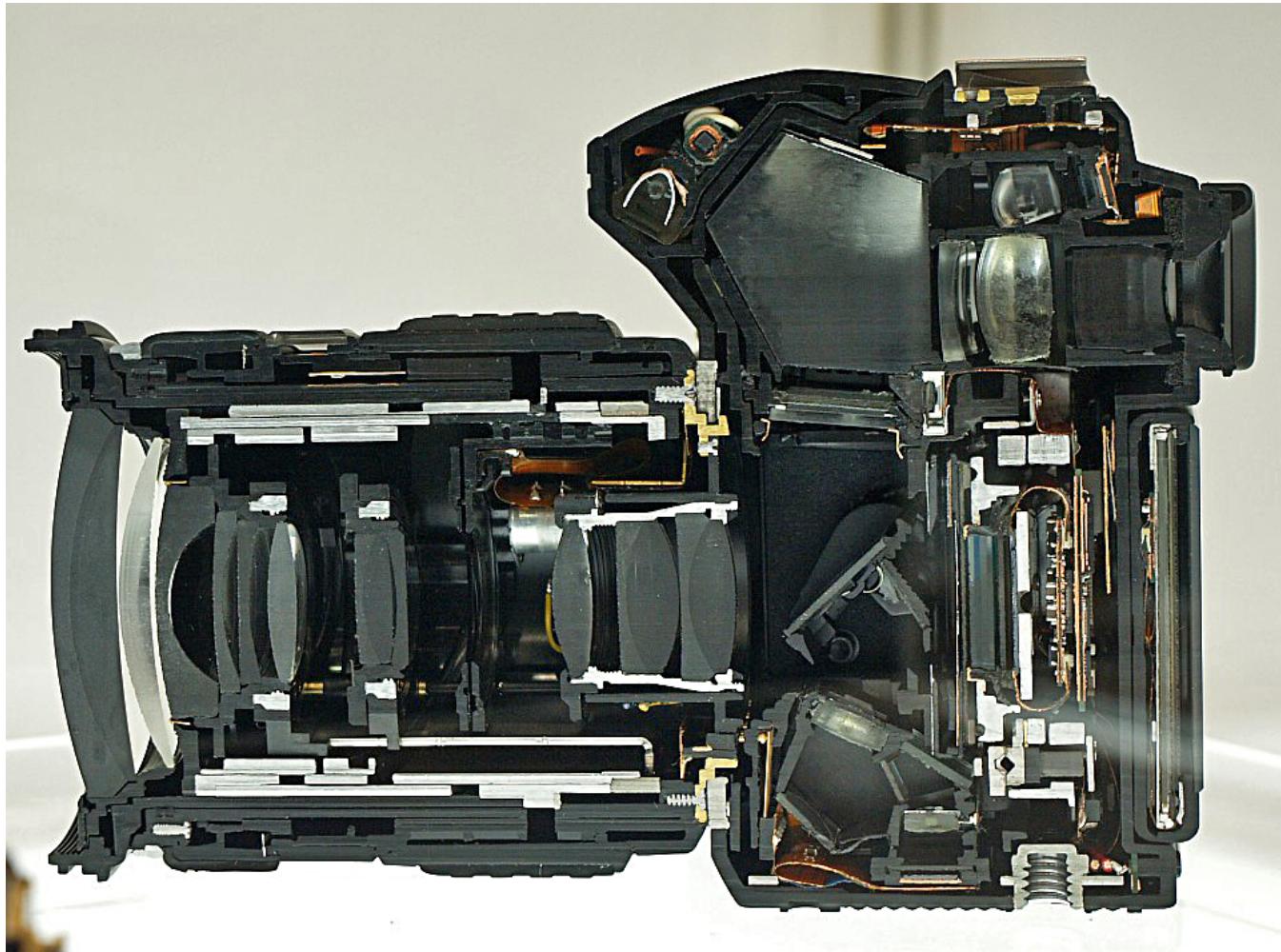




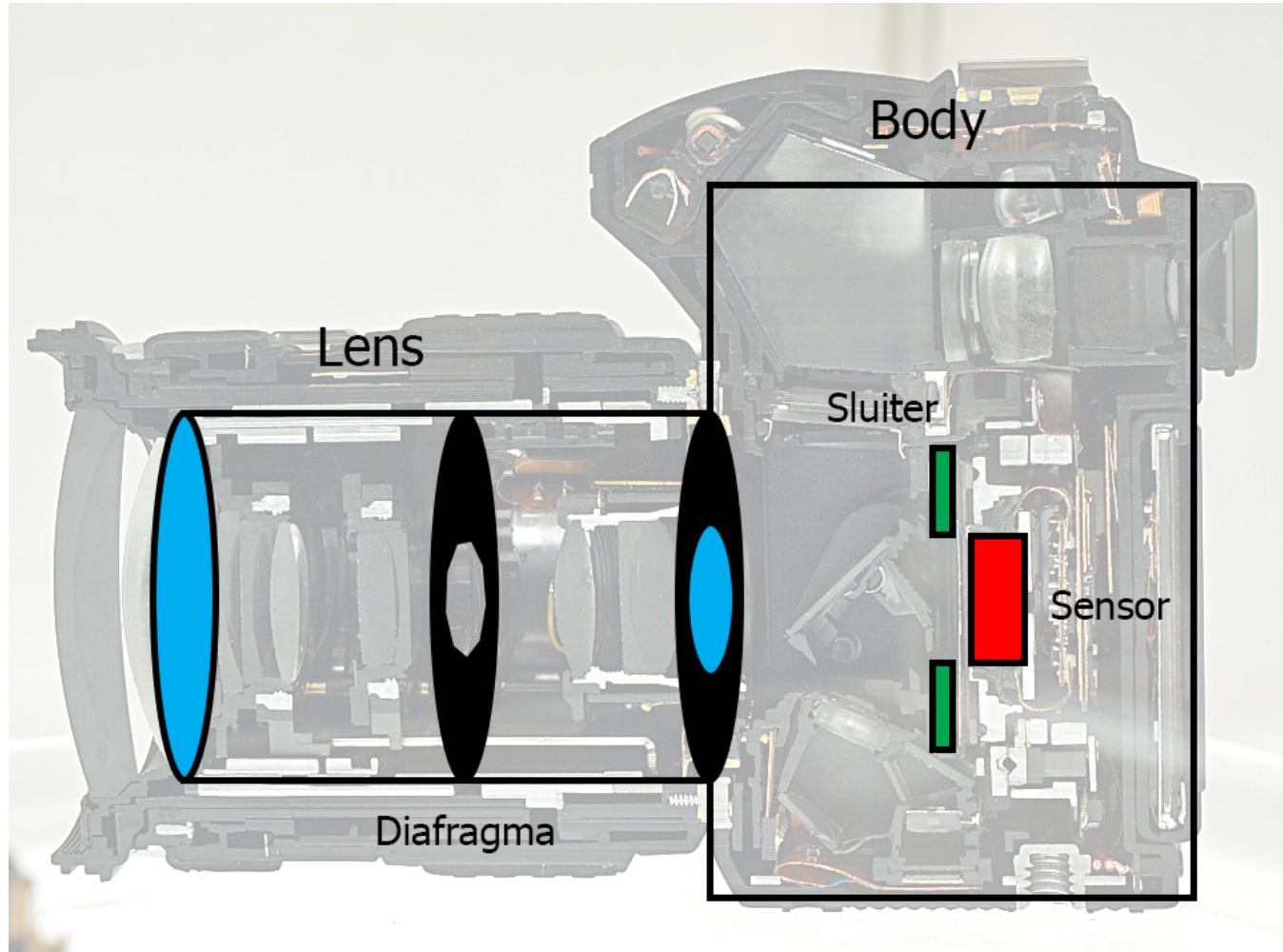
*How does a camera work*

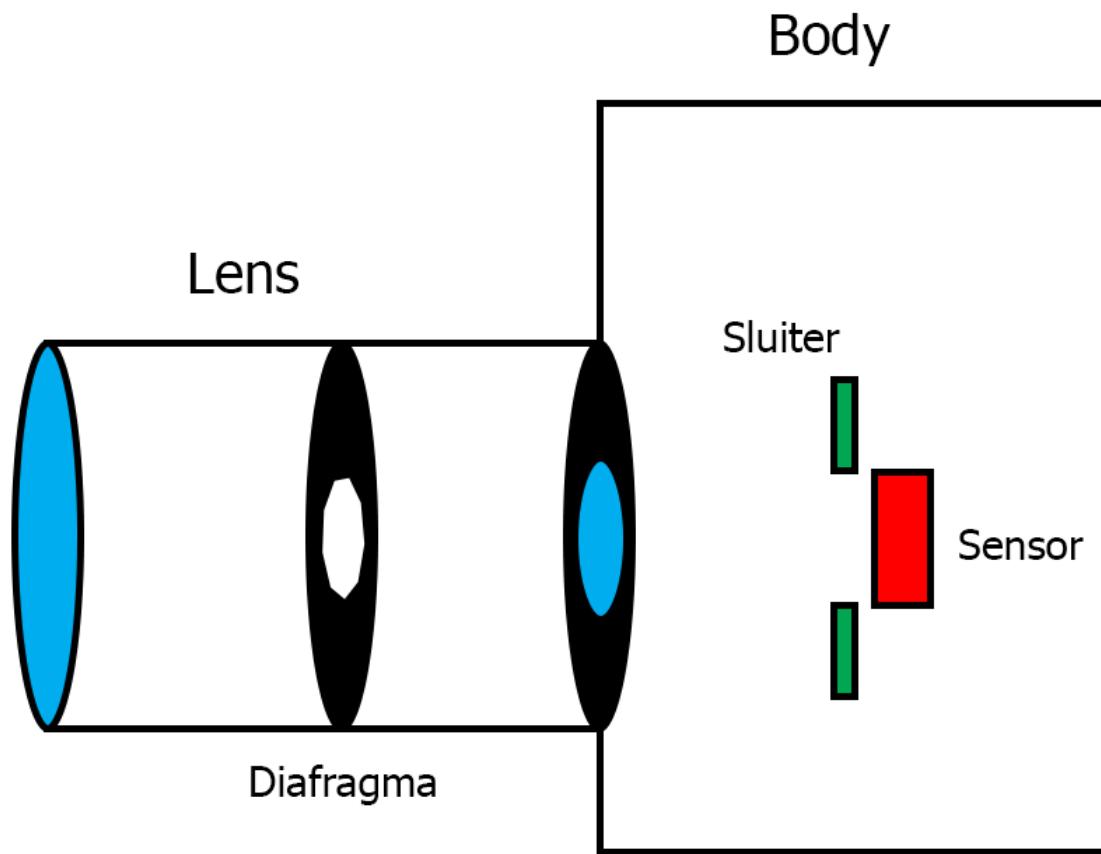


Source: [Anuskafm, CC BY-SA 3.0](#)



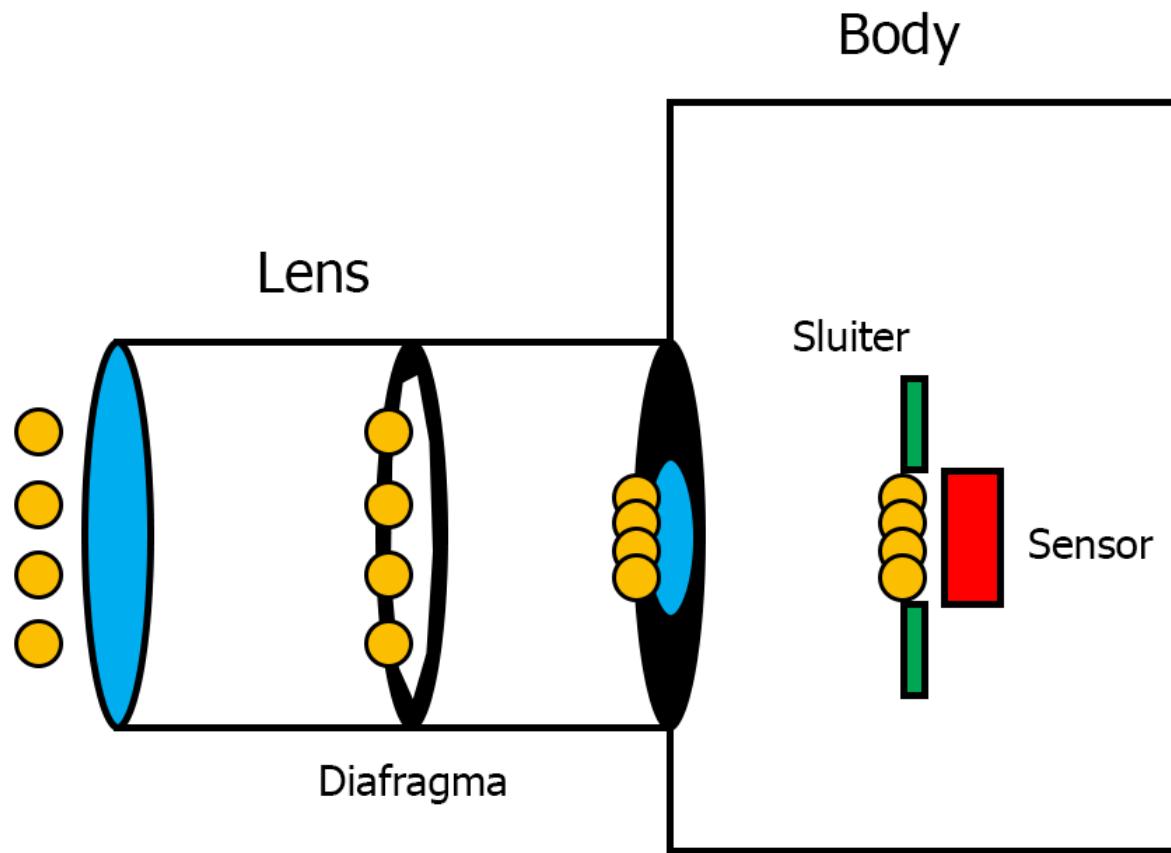
Bron: [Hanabi123](#), CC BY-SA 2.5



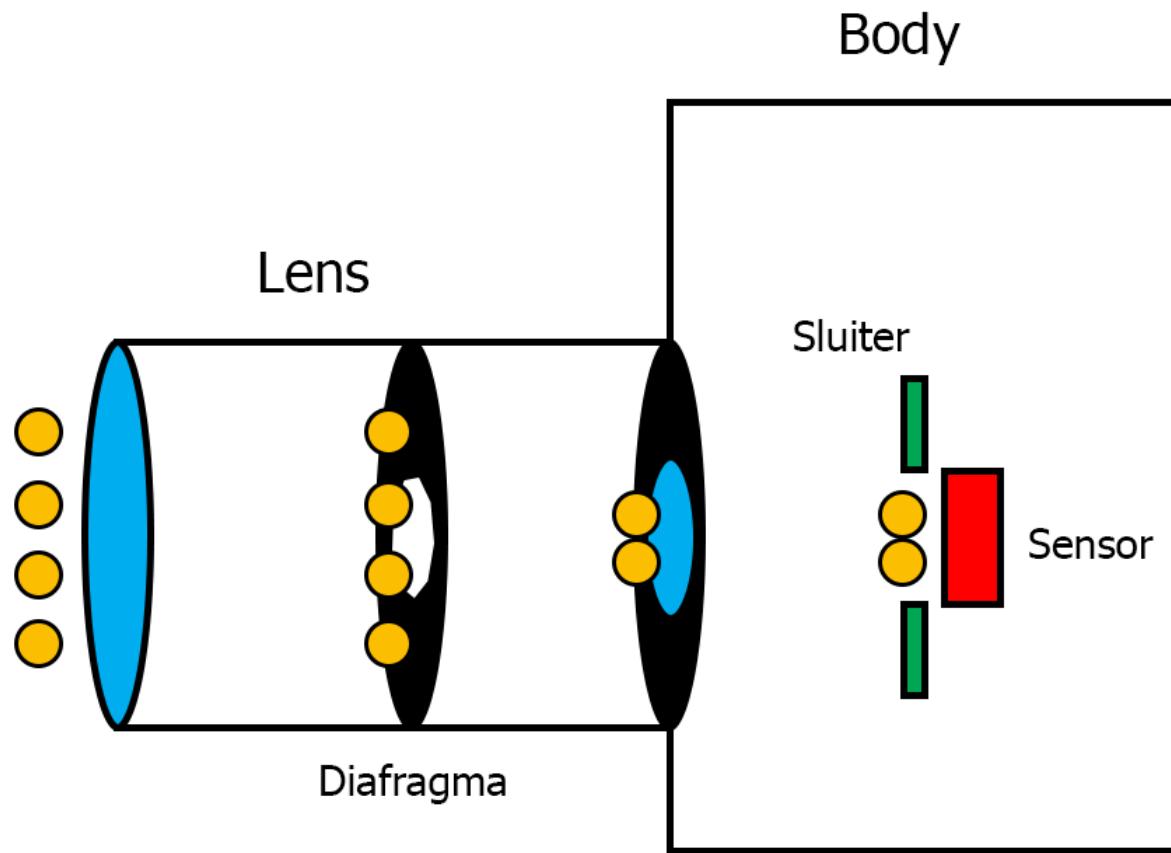


Controlling exposure

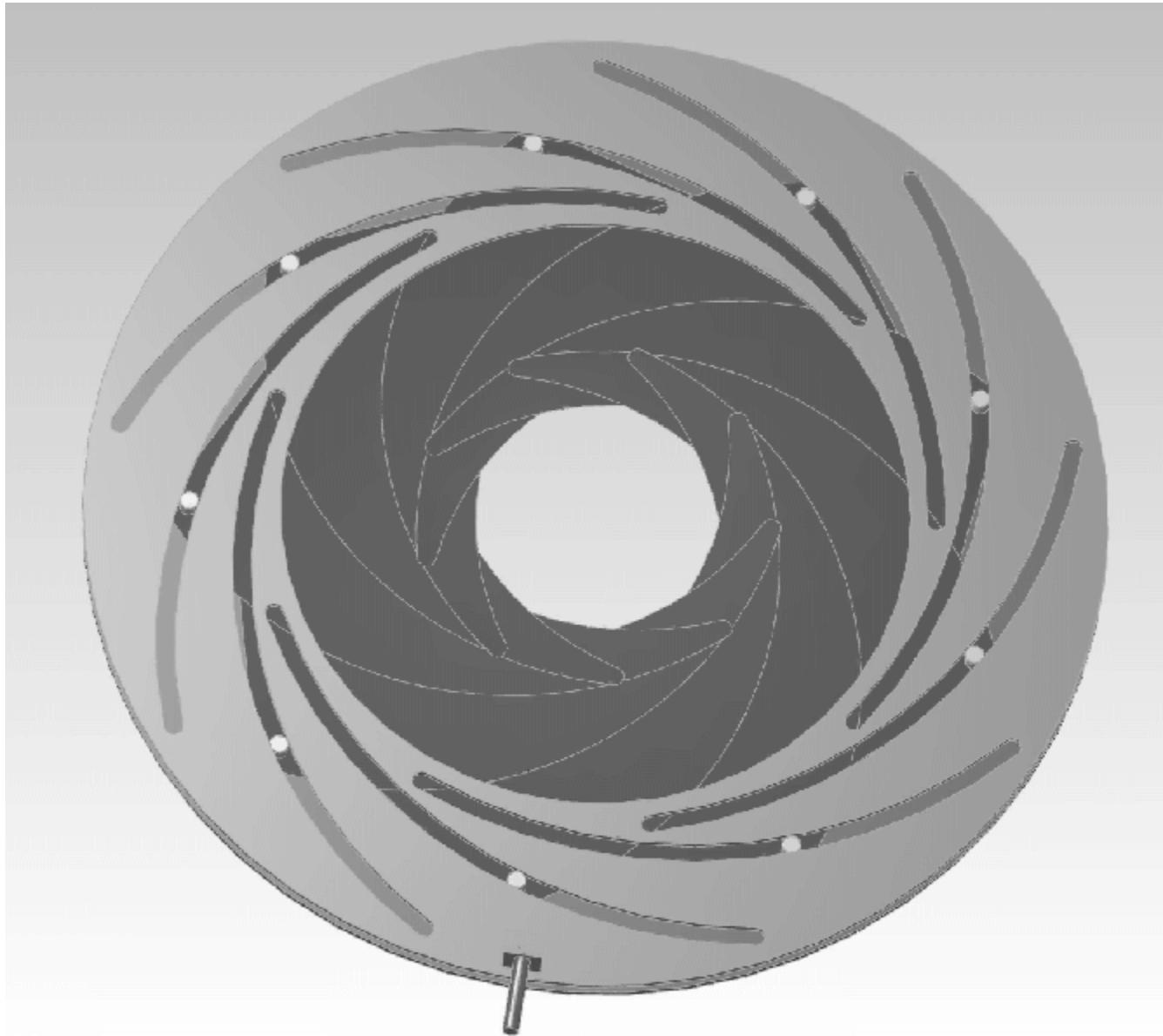
*Aperture*



Aperture completely open



Aperture half open



Aperture blades

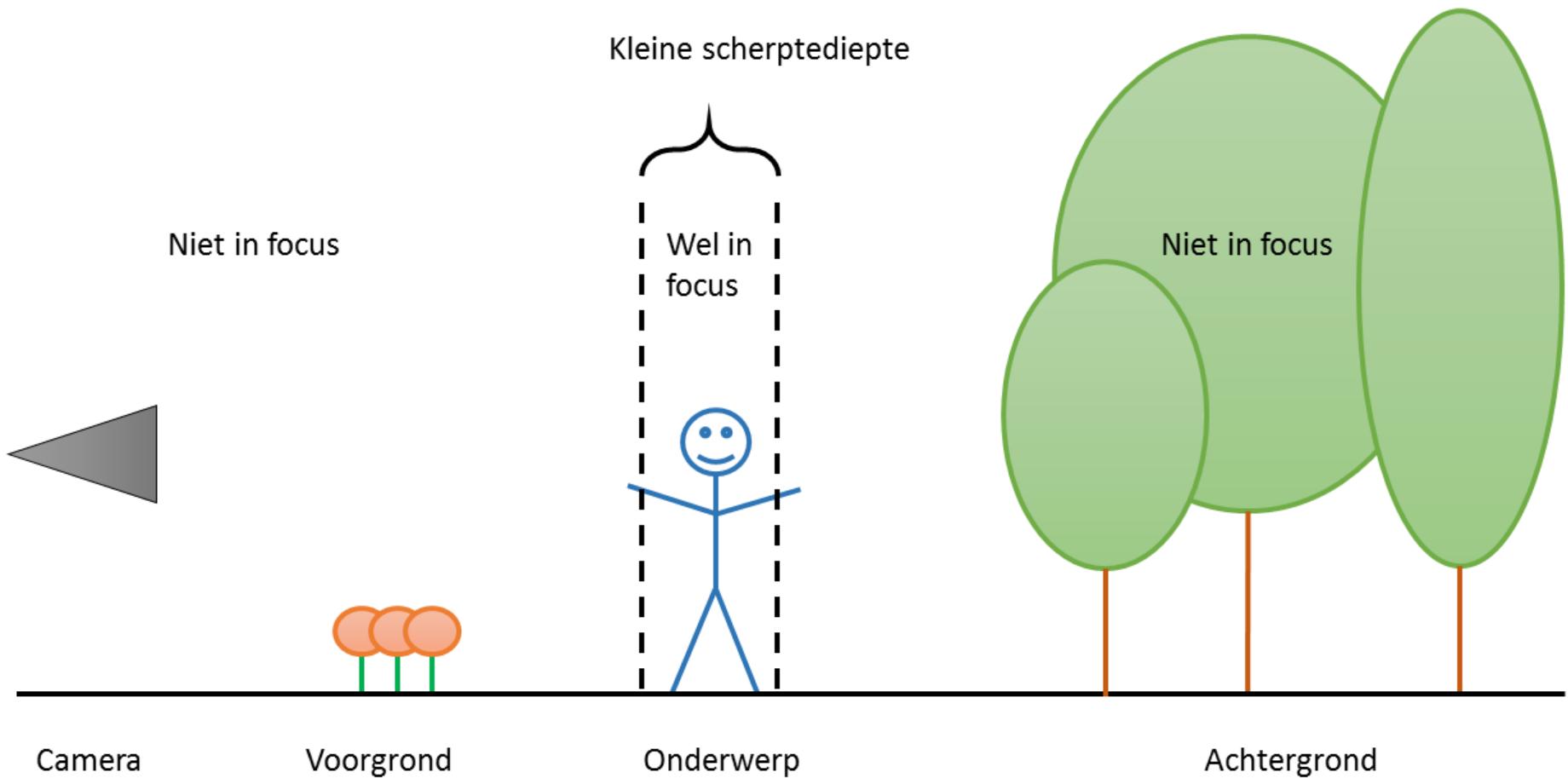
why do we want to control the  
aperture?

Control the depth of field  
(Use Av / A (or M) mode)

Examples of small and large  
depth of field

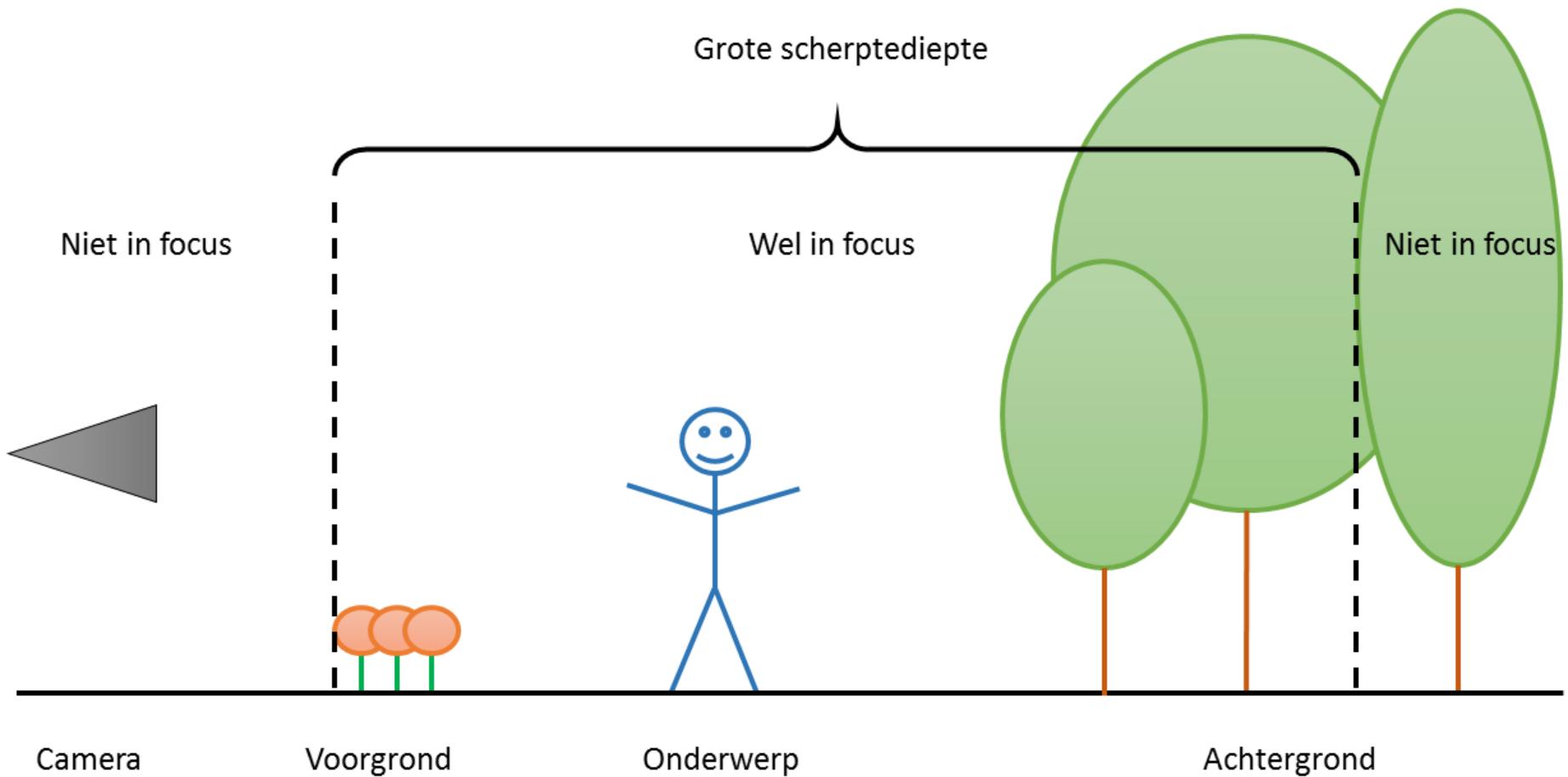


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# Aperture & f-number

Large aperture = large lens opening = low f-number

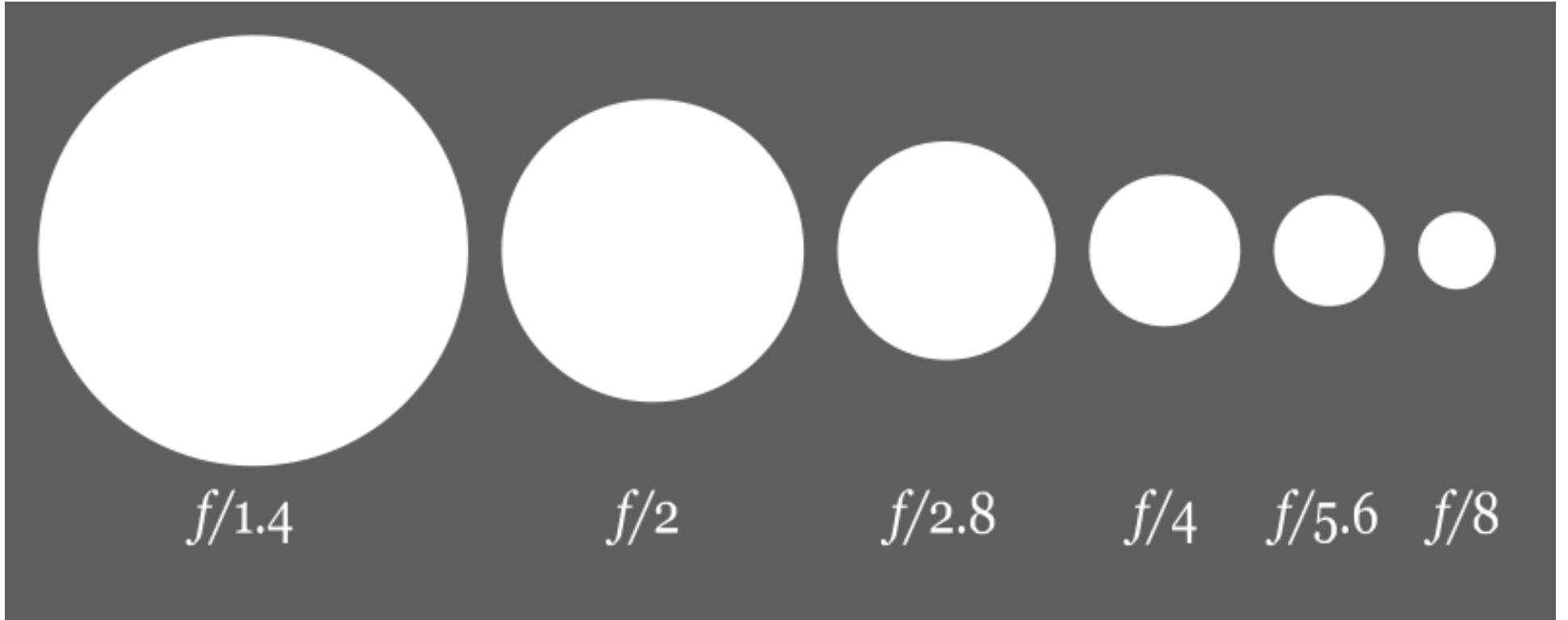
- f/1.8
- Lens is 'wide open'

# Aperture & f-number

Small aperture = small lens opening = high f-number

- f/8
- Lens is 'stopped down'

f-stop



- Each step halves the available light = (f-)stop
- From f/2.8 to f/8: light is reduced by **3 stops**
- From f/2.8 to f/8: light is reduced **8x times**

## Excercise: aperture priority

Set your camera in Av/A mode and see how the f-number changes when you turn the dial.

Aperture effect on depth of  
field



- f/1.8 (50mm, distance: 1m)
- 2.6cm depth of field



- f/5.6 (50mm, distance: 1m)
- 8.3cm depth of field



- f/8 (50mm, distance: 1m)
- 11.7cm depth of field



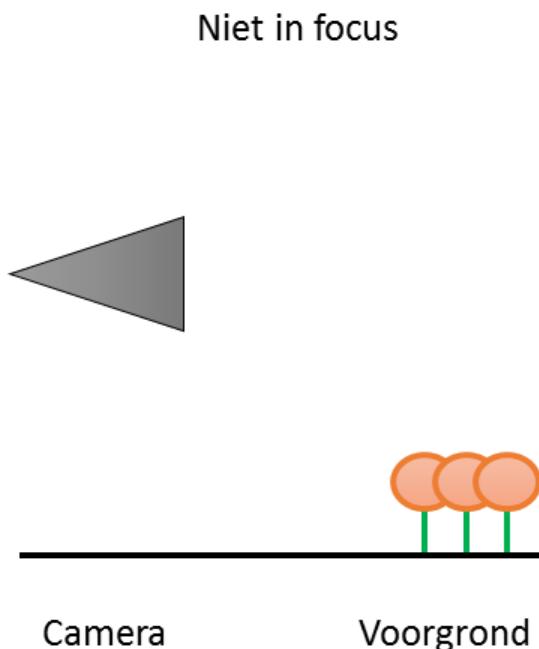
- f/11 (50mm, distance: 1m)
- 16.6cm depth of field

# what influences depth of field?

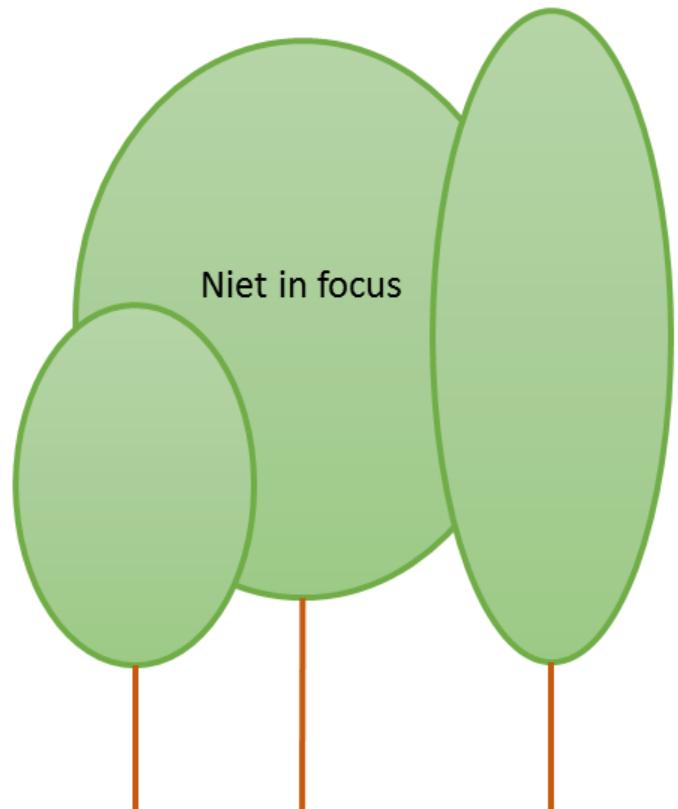
- Aperture
- Length of the lens
- Distance to subject

Formula to get an image with a  
small depth of field

- Groot diafragma (klein f-getal)
- Lange lens (hoog brandpunt in mm)
- Korte afstand tot onderwerp



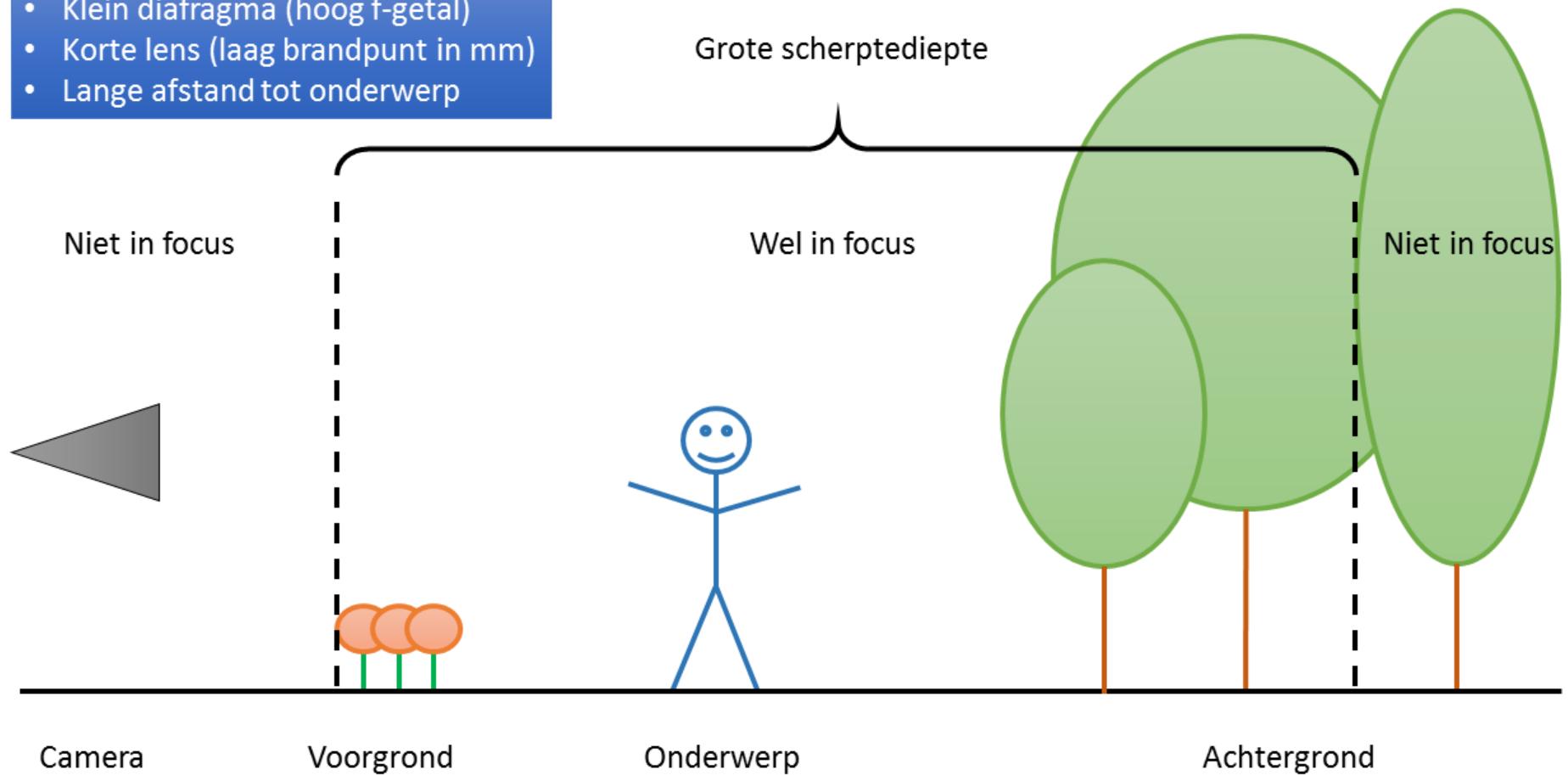
Kleine scherptediepte



Achtergrond

Formula to get an image with a  
high depth of field

- Klein diafragma (hoog f-getal)
- Korte lens (laag brandpunt in mm)
- Lange afstand tot onderwerp



# Apps to calculate depth of field

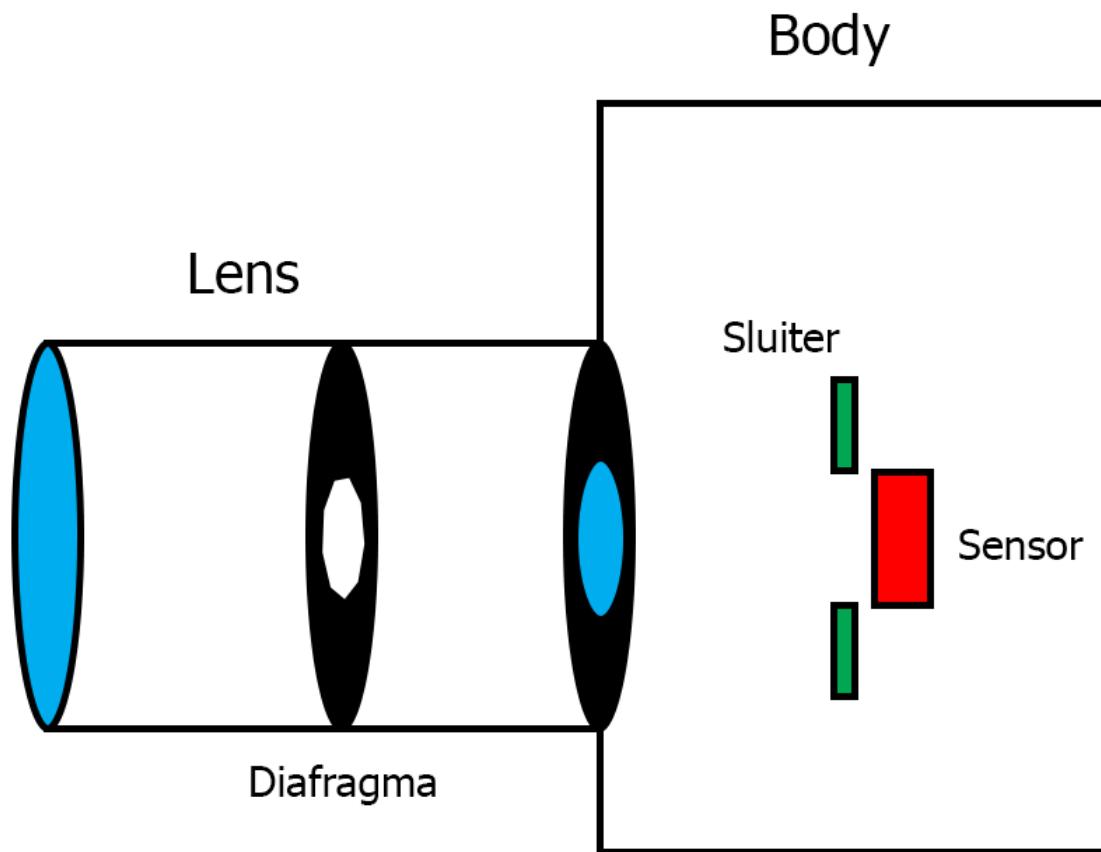
- Android: Photo Tools  
(<https://play.google.com/store/apps/details?id=ru.neverdark.phototools&hl=nl>)
- iOS: Simple DoF Calculator  
(<https://itunes.apple.com/nl/app/simple-dof-calculator/id301222730>)

# f-number

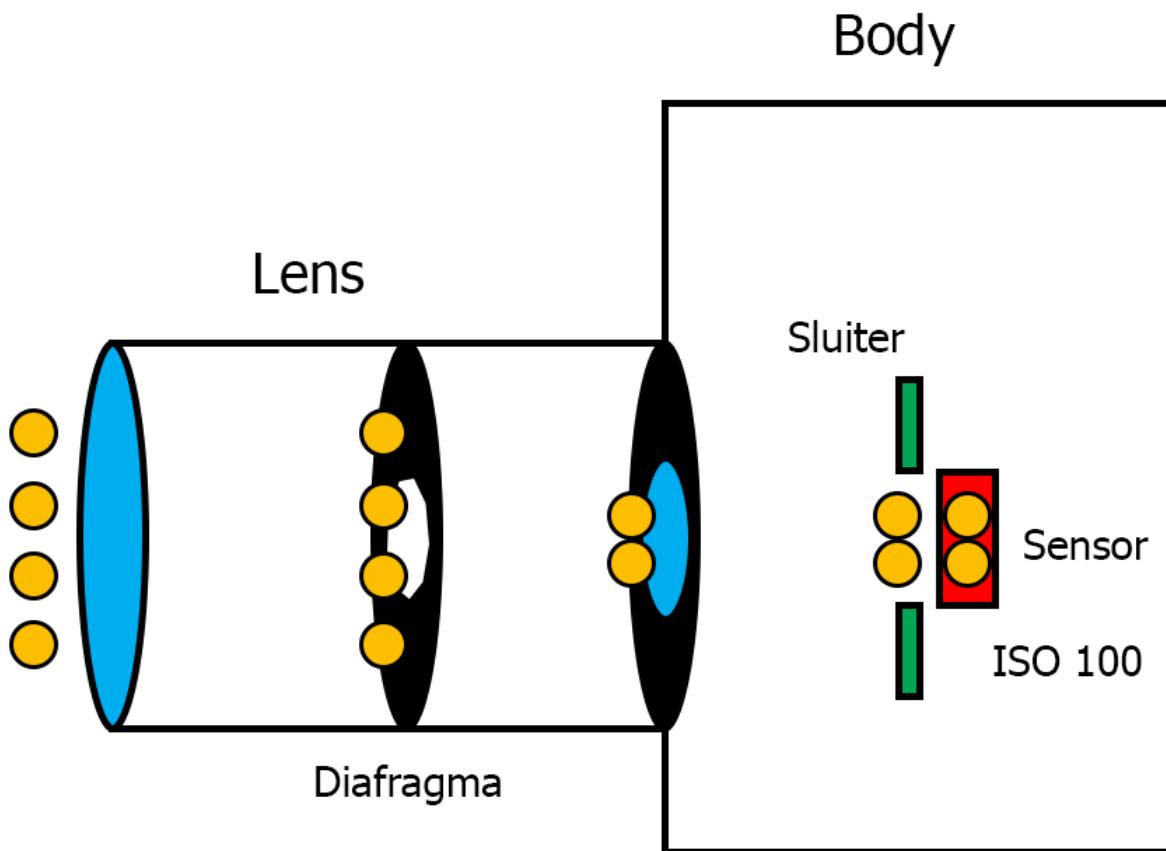
f-number = length of lens / diameter of lens

$$50\text{mm} / 35\text{mm} = f/1.4$$

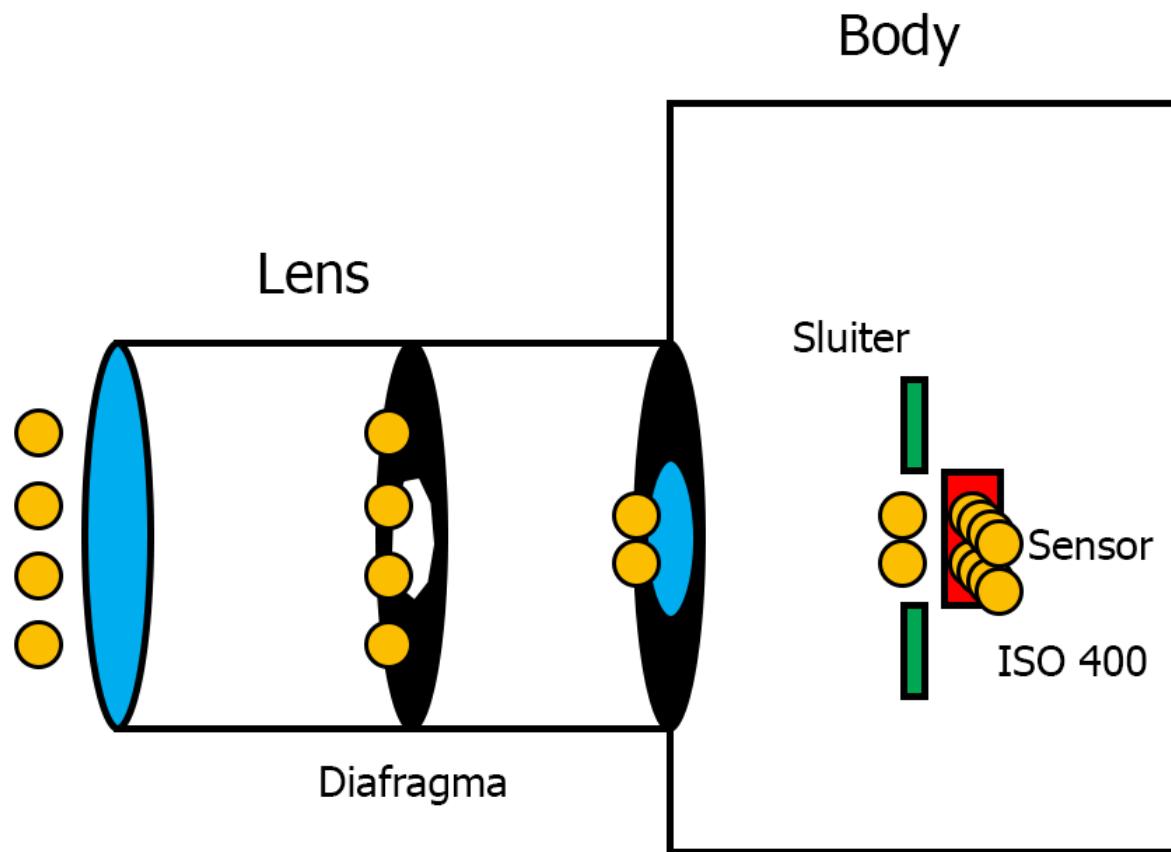
*lso*



ISO = adjustment of the sensor signal



Standard = ISO 100



Increased to ISO 400

# ISO values

... 100, 200, 400, 800, 1600, 3200, 6400 ...

- With each step the signal is doubled = (f-)stop
- The noise will also increase!
- Guidelines:
  - Sunny day: 100-200
  - Cloudy day: 400-800
  - Inside: 800-6400+

# why do we use ISO?

If we can't get away with adjusting aperture/shutter speed.

# Effect of ISO



ISO 100



ISO 6400



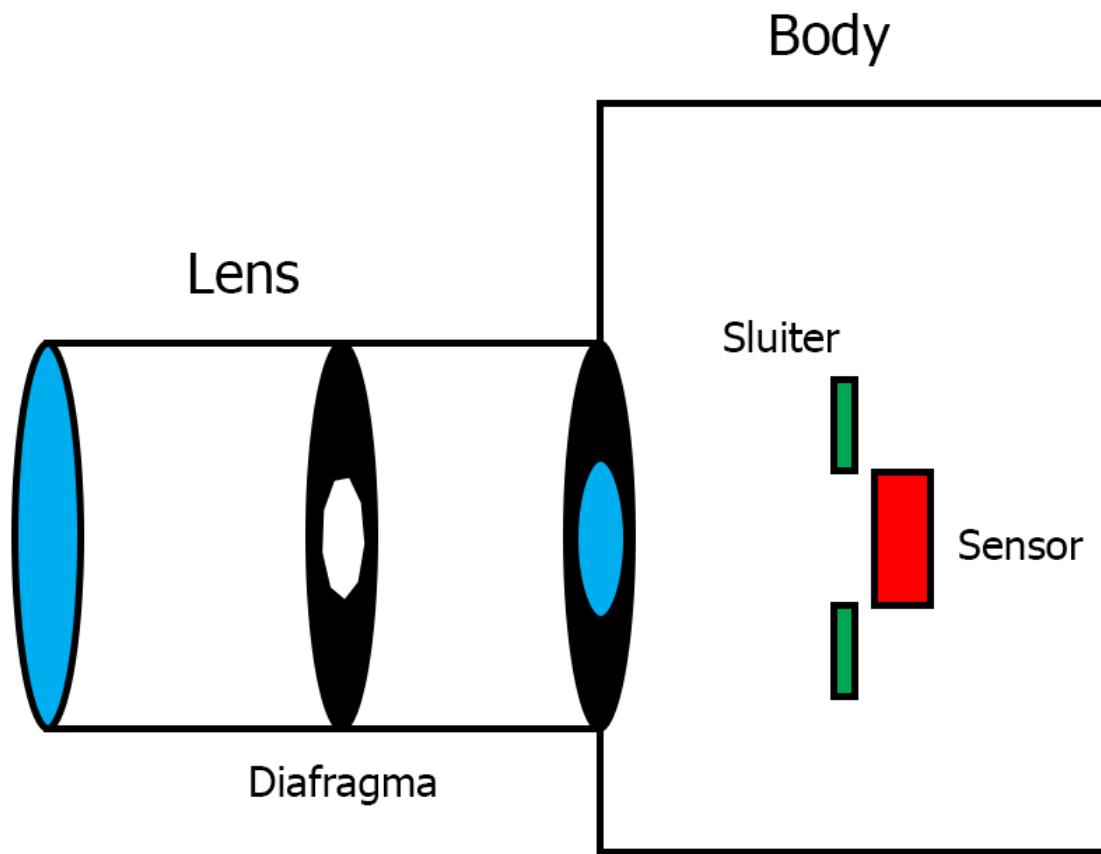
# Excercise

Set the ISO to 1600.

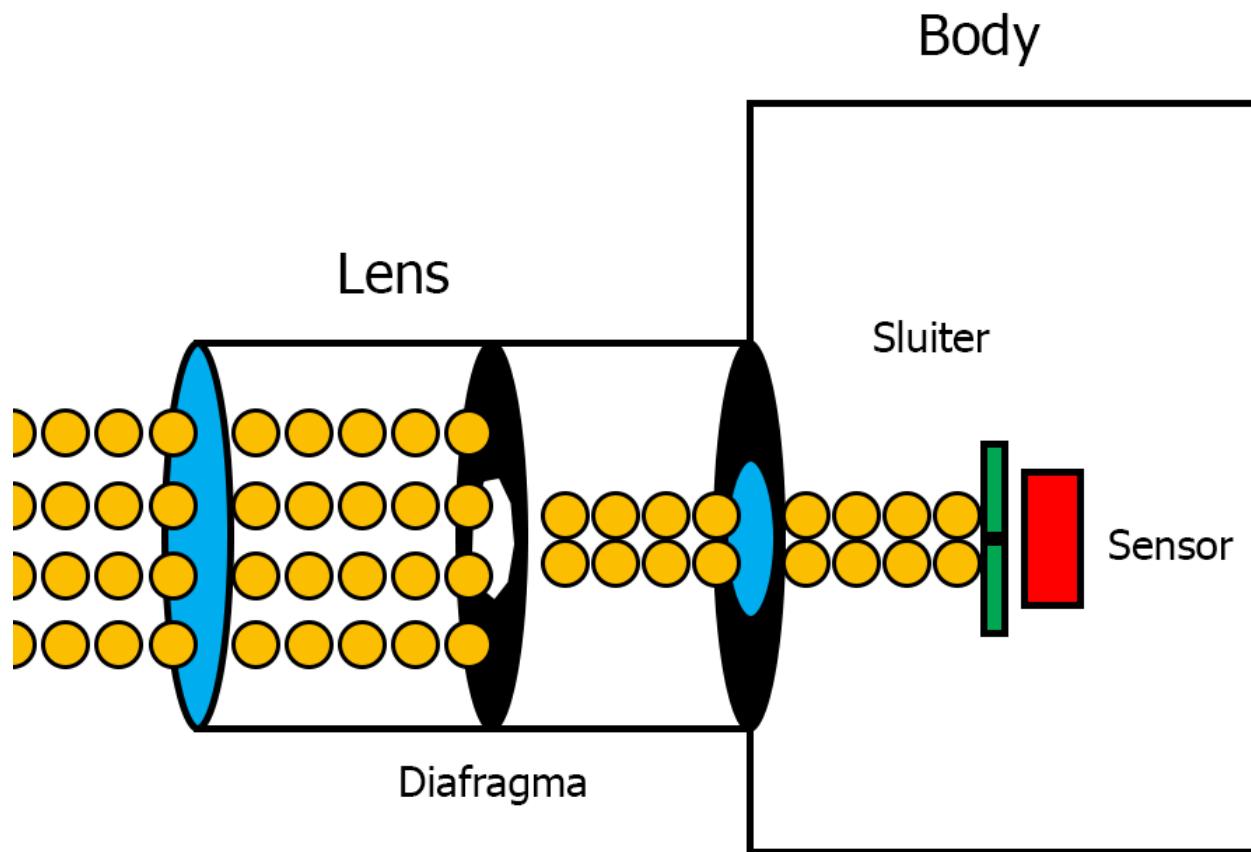
Take two pictures (in Av/A mode) of the same subject: 1 with a large aperture (low f number) and 1 with a small aperture (high f number).

Is there a difference in shutter speed? If so what is the difference?

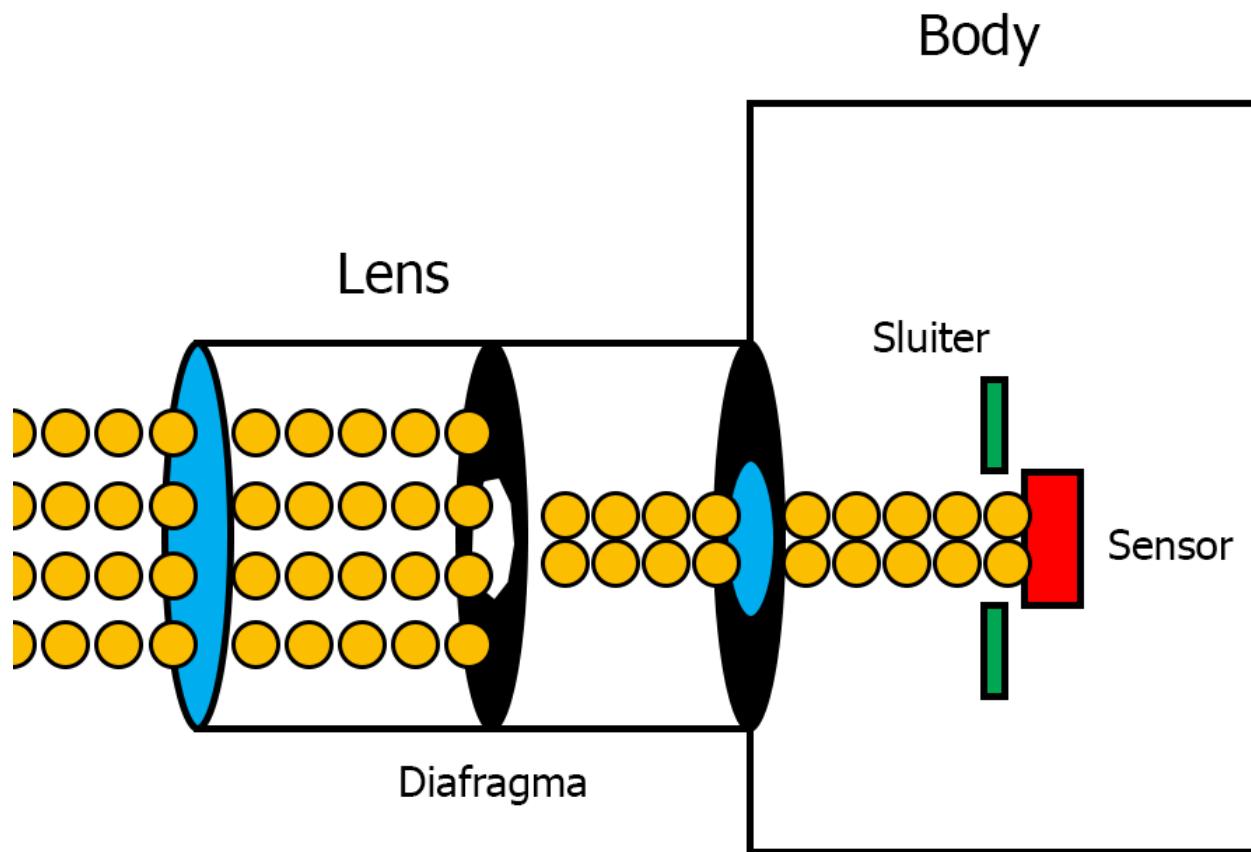
*Shutter speed*



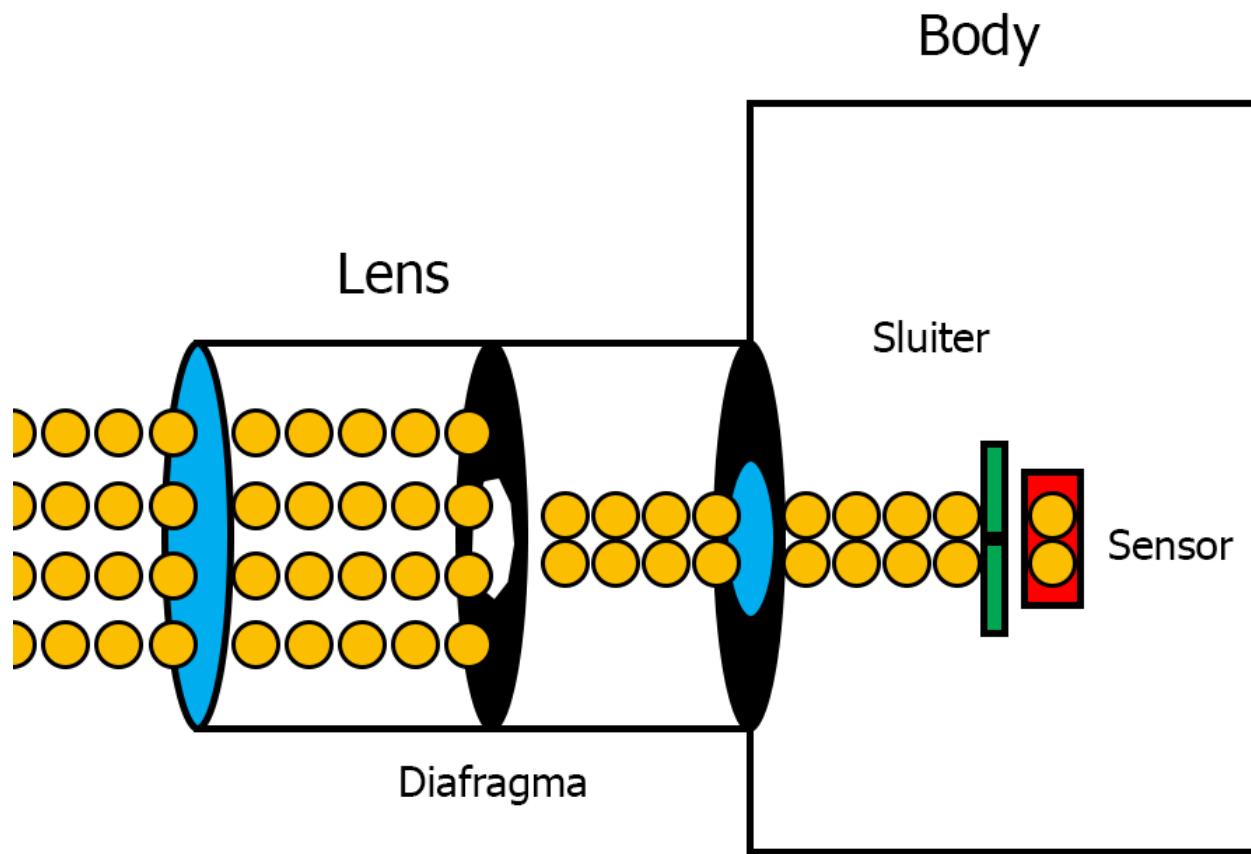
'Curtain' in front of the sensor



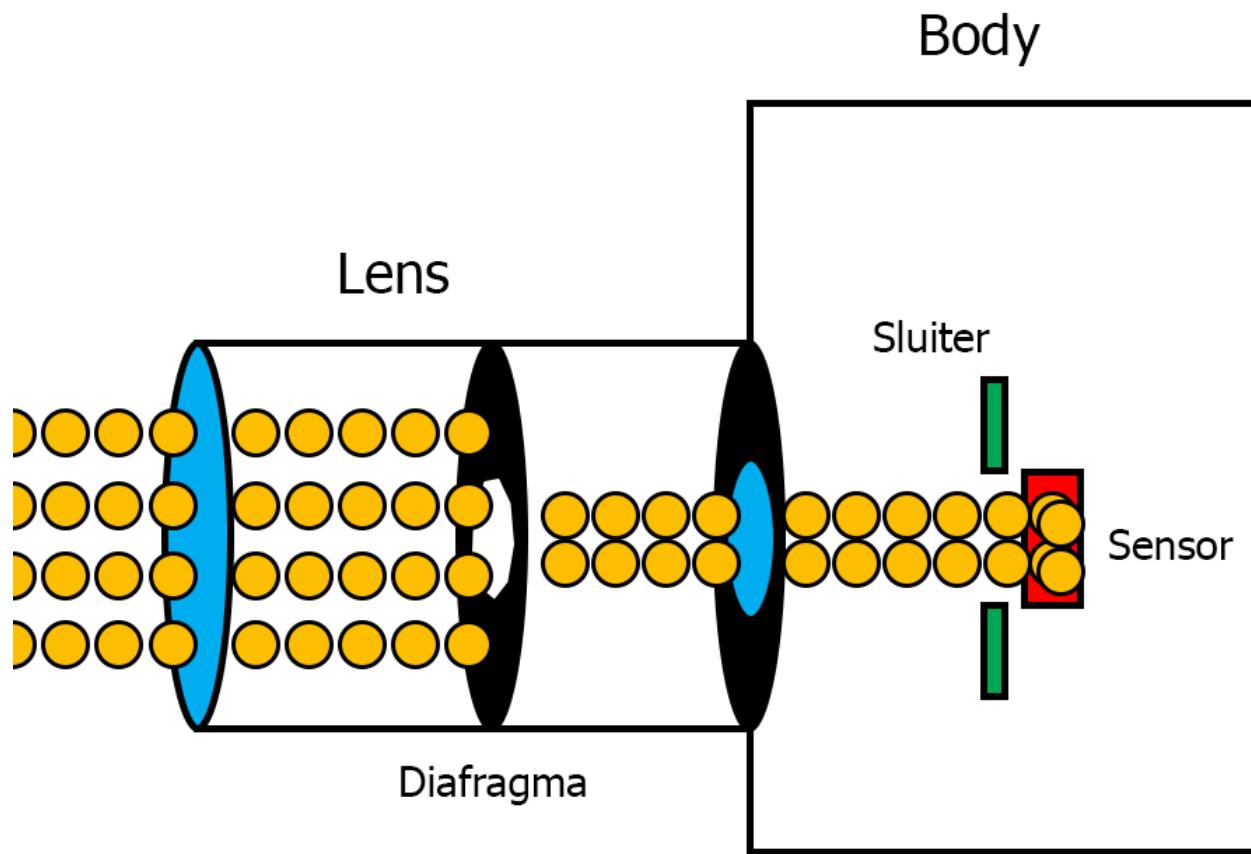
Closed shutter



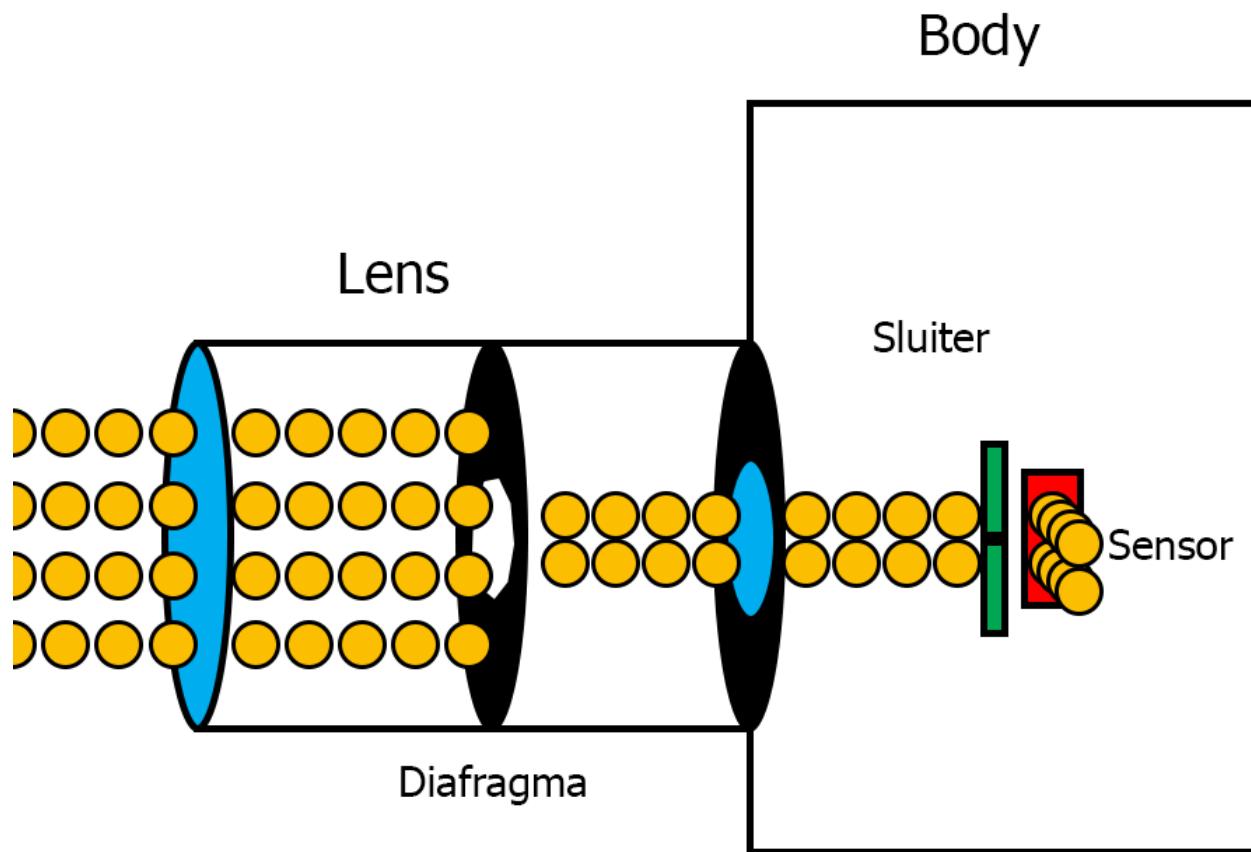
Shutter opens briefly



Little light on the sensor = short exposure



Shutter opens longer

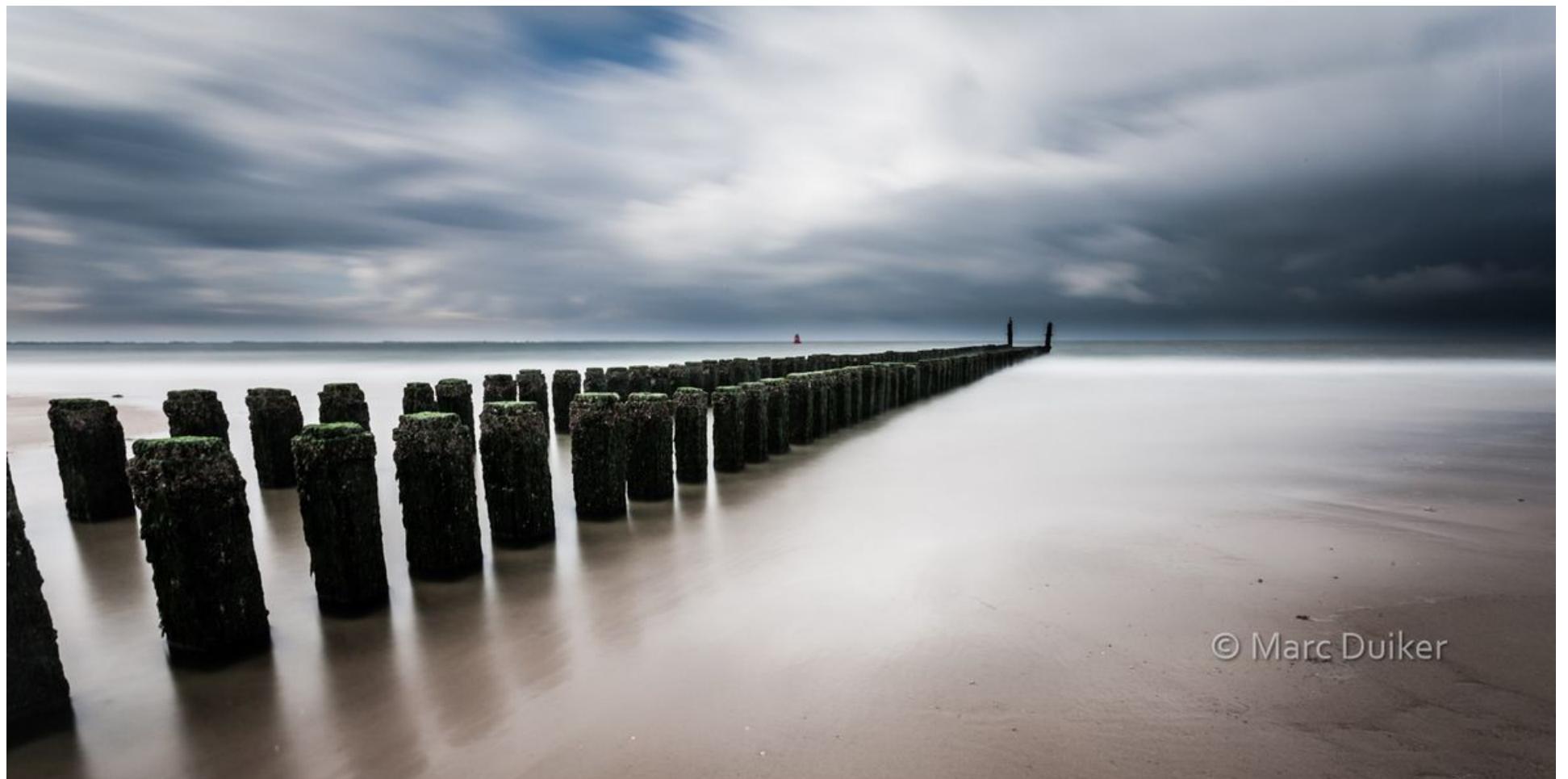


A lot of light on the sensor = long exposure

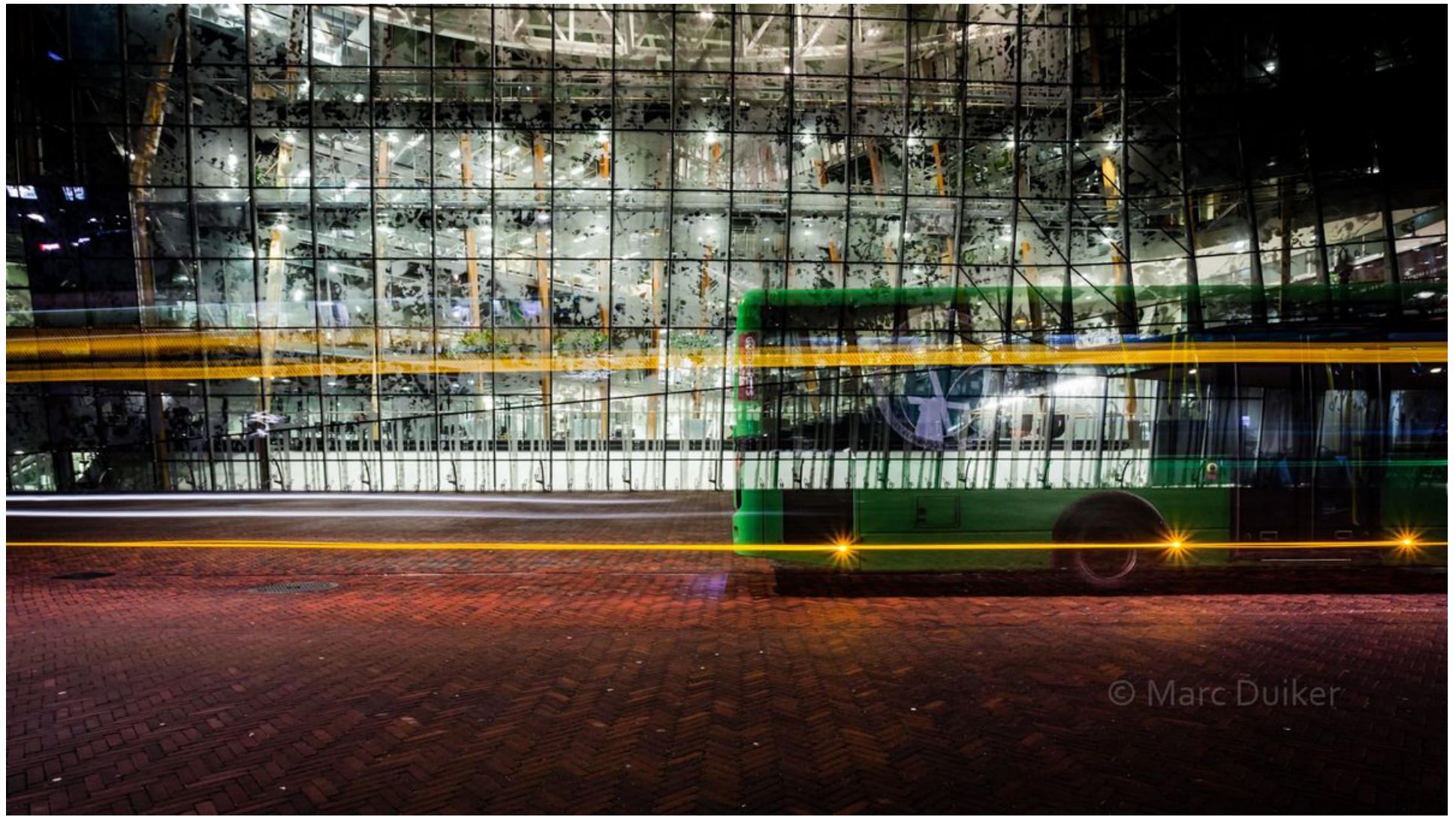
why do we want to control the  
shutter speed?

Control how movement is captured  
(Use Tv / S (or M) mode)

Some examples



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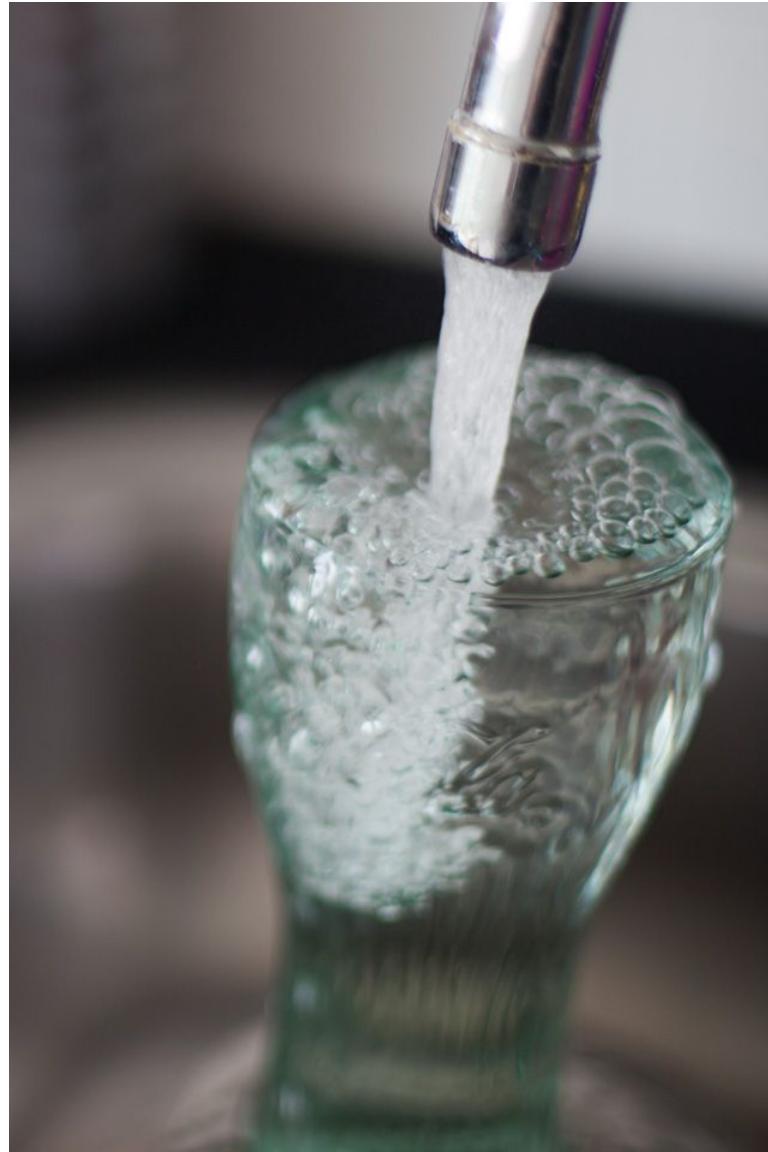
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# Shutter speed values

... 1/250, 1/125, 1/60, 1/30, 1/15, 1/8, 1/4, 1/2, 1" ...

- With each step the exposure time is doubled = (f-)stop
- Range of most cameras: 1/4000 - 30 sec
- 1/ is often omitted in the display, so 250 = 1/250 sec.
- 1" = 1 sec

Effect of shutter speed



1/250 sec



1/3 sec

**1/250 sec**



**1/3 sec**



# Excercise

Set the ISO to 1600.

Take two pictures (in Tv/S mode): 1 with a short shutter speed (e.g. 1/100) and 1 with a longer shutter speed (1/15).

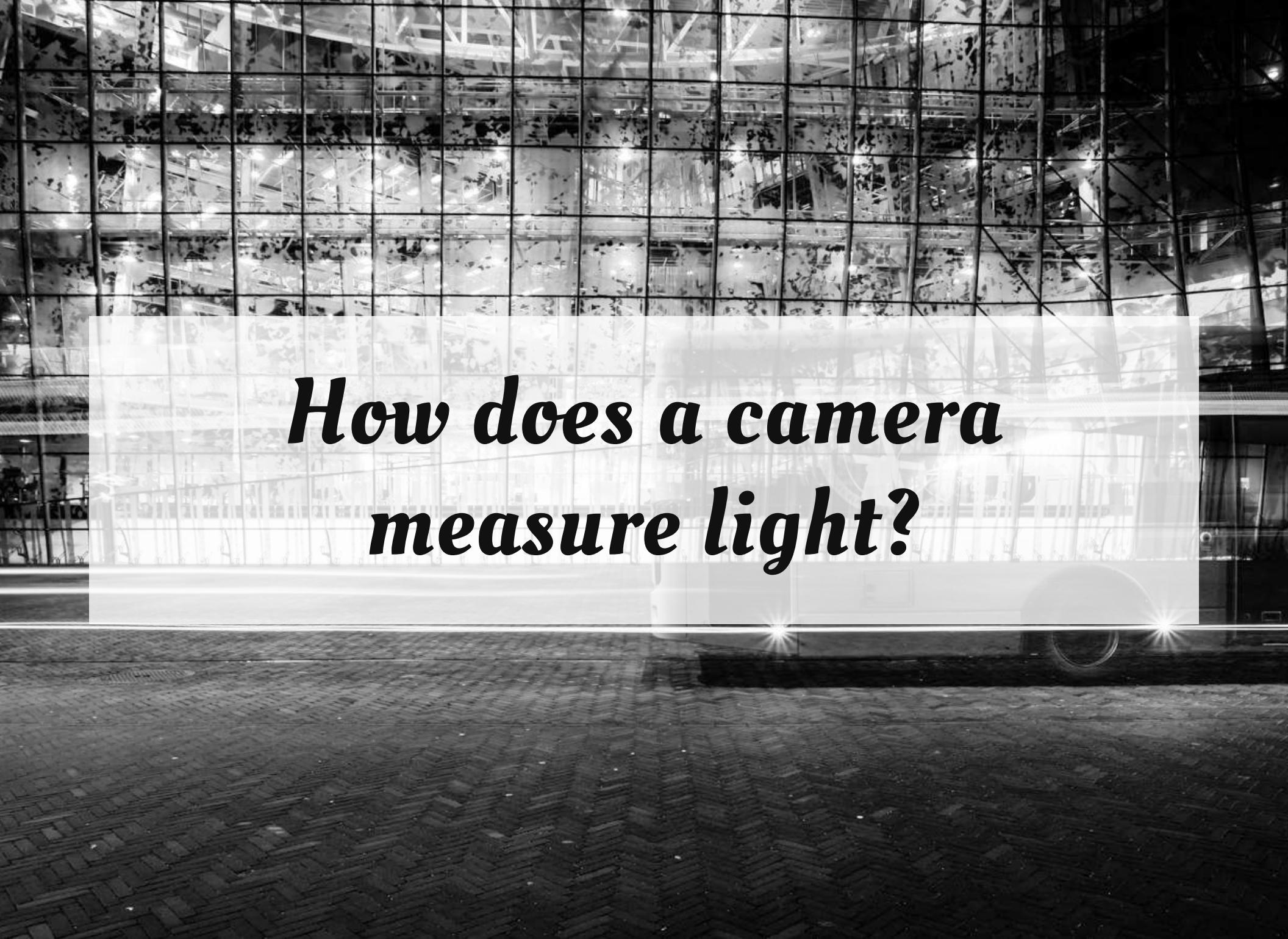
Is there a difference in aperture? If so what is the difference?

we can control the exposure  
via

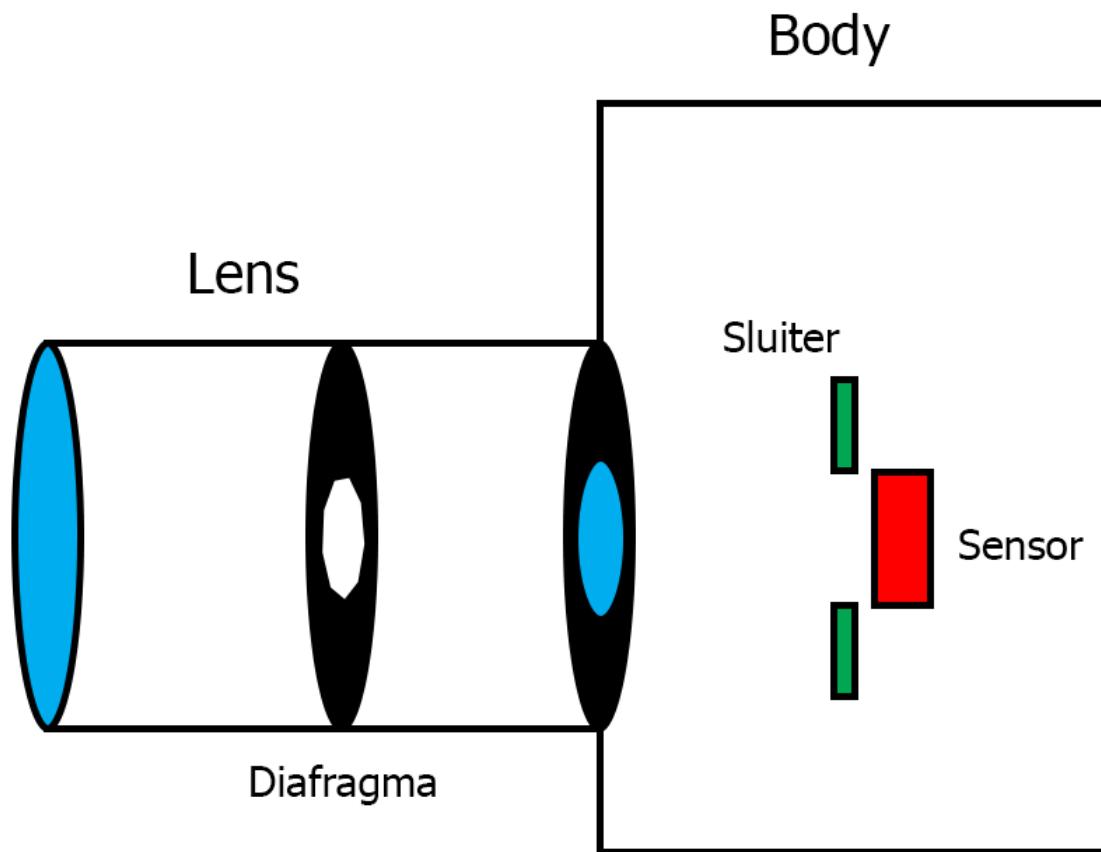
- Aperture
- Shutter speed
- ISO

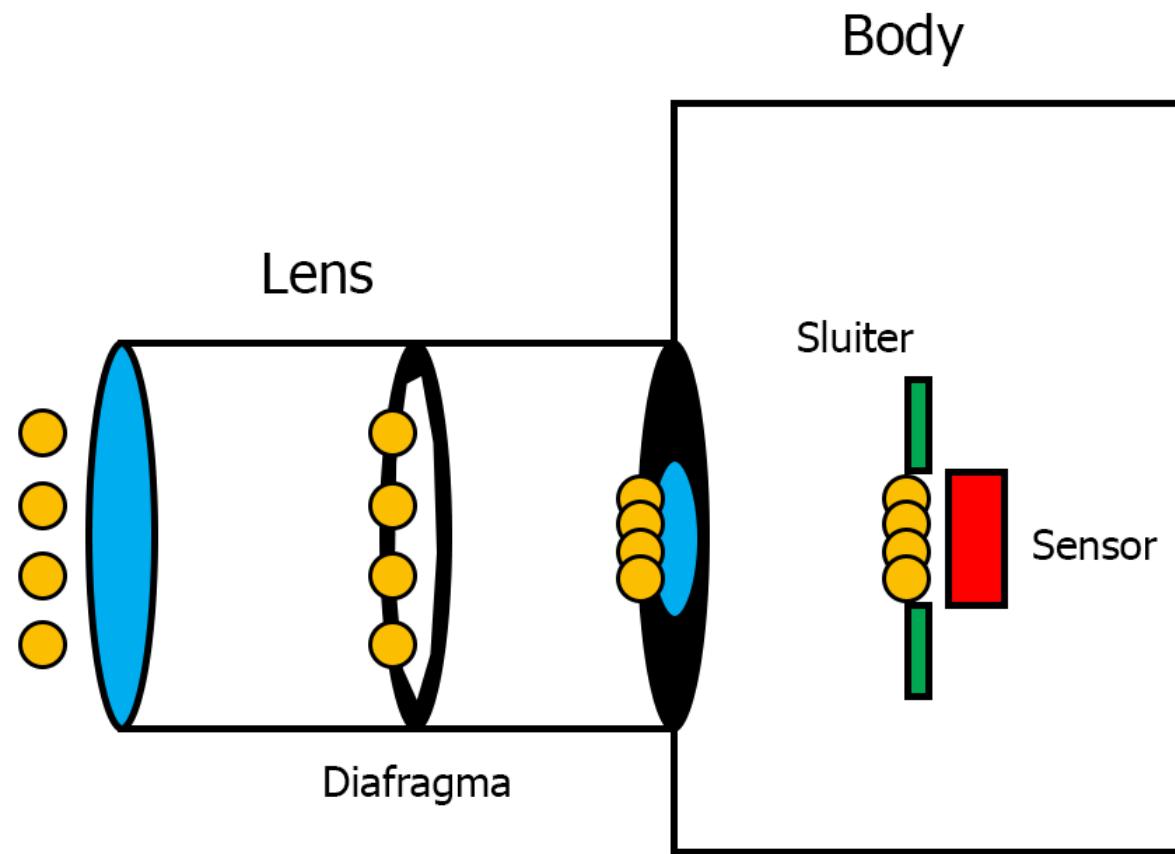
# Equal exposure

Aperture	Shutter speed	ISO
<b>f/4</b>	<i>1/125</i>	100
<b>f/5.6</b>	<i>1/60</i>	100
<b>f/5.6</b>	<i>1/125</i>	<b>200</b>
<b>f/5.6</b>	<i>1/250</i>	<b>400</b>



*How does a camera  
measure light?*





Sensor measures light before a picture is taken.

# 18% (neutral) gray



18% reflecterend licht



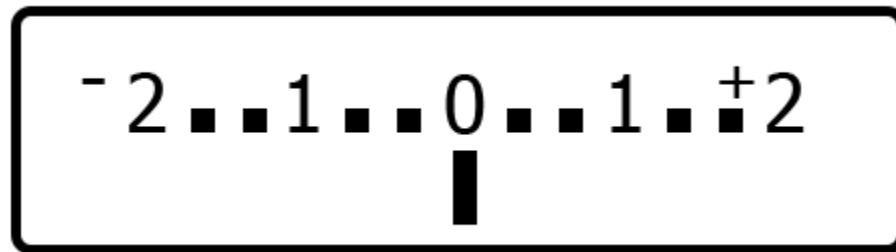
-	2	•	1	•	0	•	1	•	‡	2

what is the subject is not 18%  
gray?

Snowy landscape

Night scene

# Exposure compensation



- Unit: stops of EV (Exposure value)
- On camera: button with +/- sign

# Over expose

-2...1...0...1...+2  
|

Light environments: in the snow, on the beach

# Under expose

-2...1...0...1...+2  
|

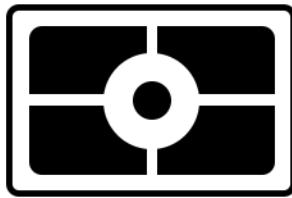
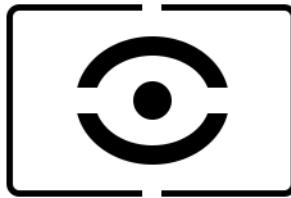
Dark environments: in a church, dark alley, at night

# Excercise

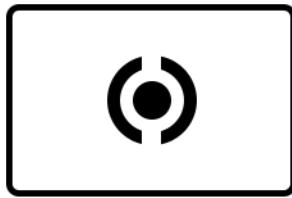
Take two pictures of the same subject (in Av/A mode).  
Once without exposure compensation and once with  
exposure compensation (+ or - 2EV).

What is the difference in shutter speed?

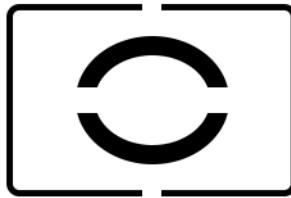
# Types of light measurements



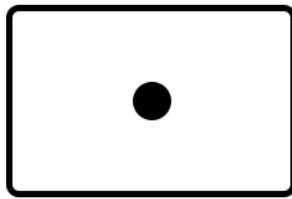
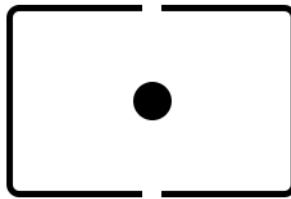
Meervlaks / evaluative /  
matrix / zone



Centrum gericht



Gedeeltelijk



Spot

# Excercise

Take two pictures (in Av/A mode) of a subject which both has light and dark features. Use the spot mode to measure the light. Take one picture while pointing at a light area and take another picture while pointing at a dark area.

Are the pictures very different in exposure?

# Home work

1. Take two pictures of the same subject (in Av/A mode): 1 with a very small depth of field and 1 with a very large depth of field.
2. Optional: Take one picture (in Tv/S mode) to capture movement.



Questions / remarks /  
homework

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