A Brief Tour of HDR

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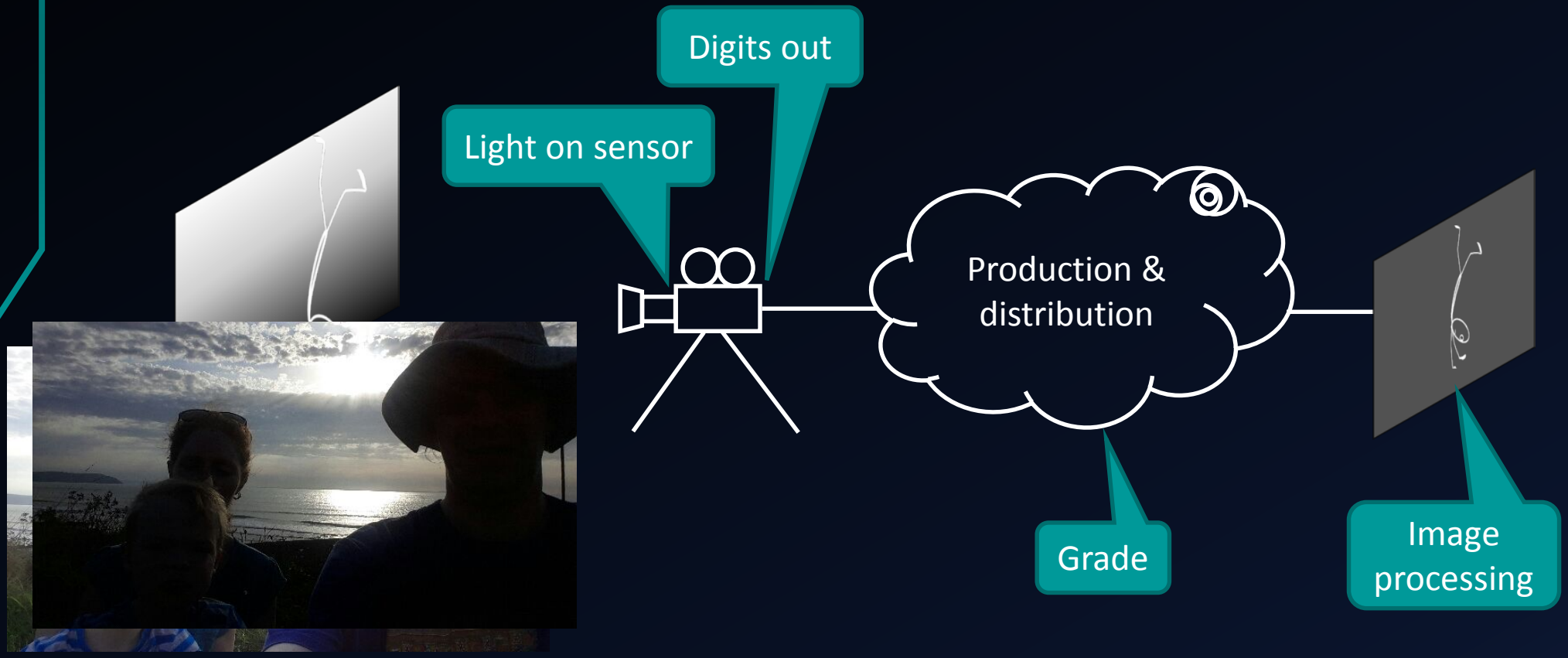
Dynamic range through the workflow

- Dynamic range is controlled (varied) at various stages…

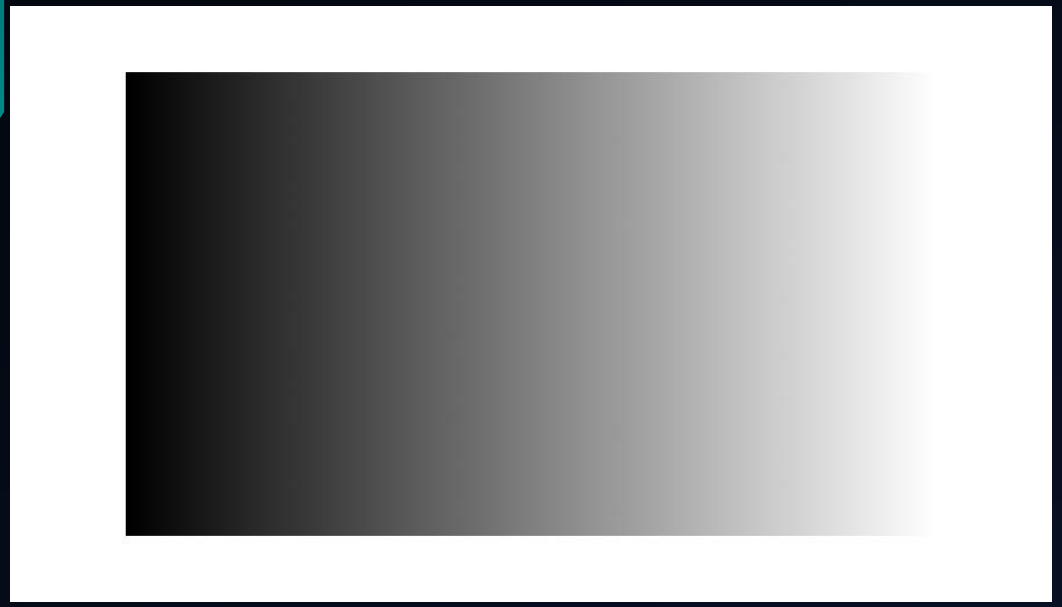


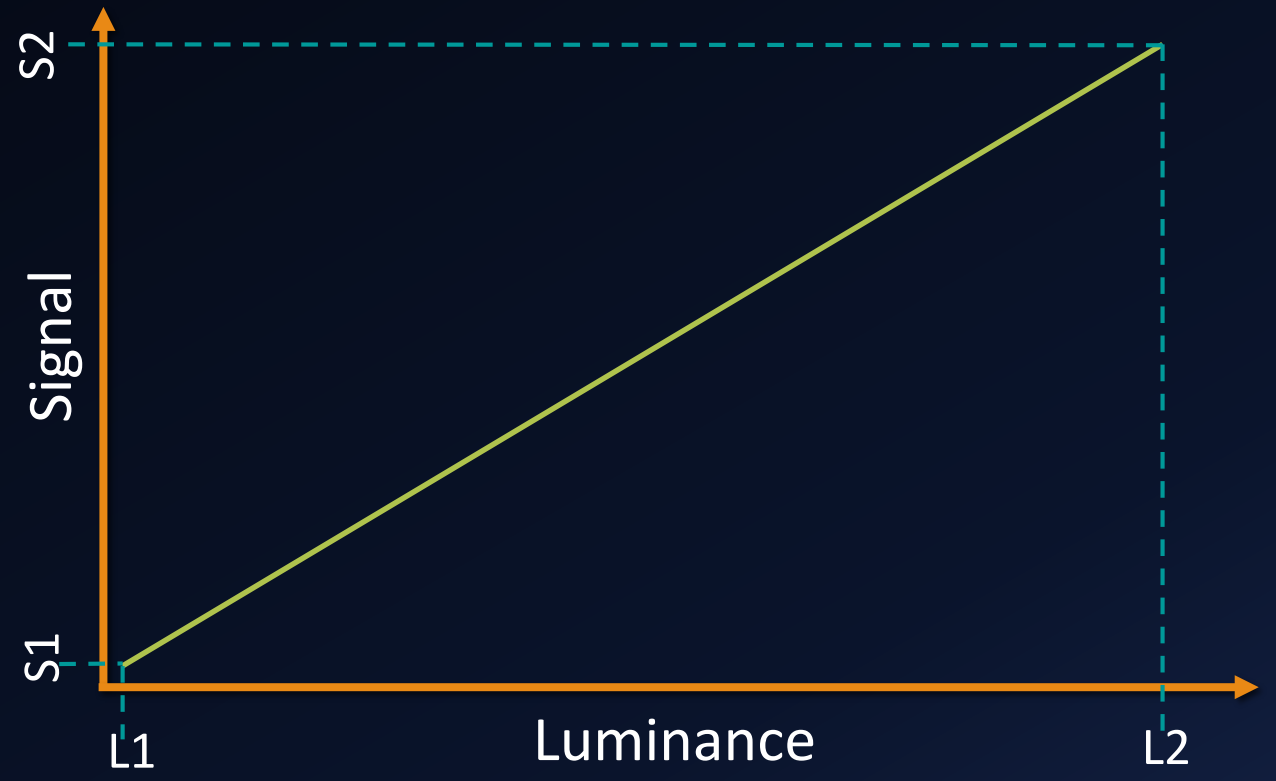
What is dynamic range (of an image)?

- Dynamic range is related to the contrast ratio…

L2/L1

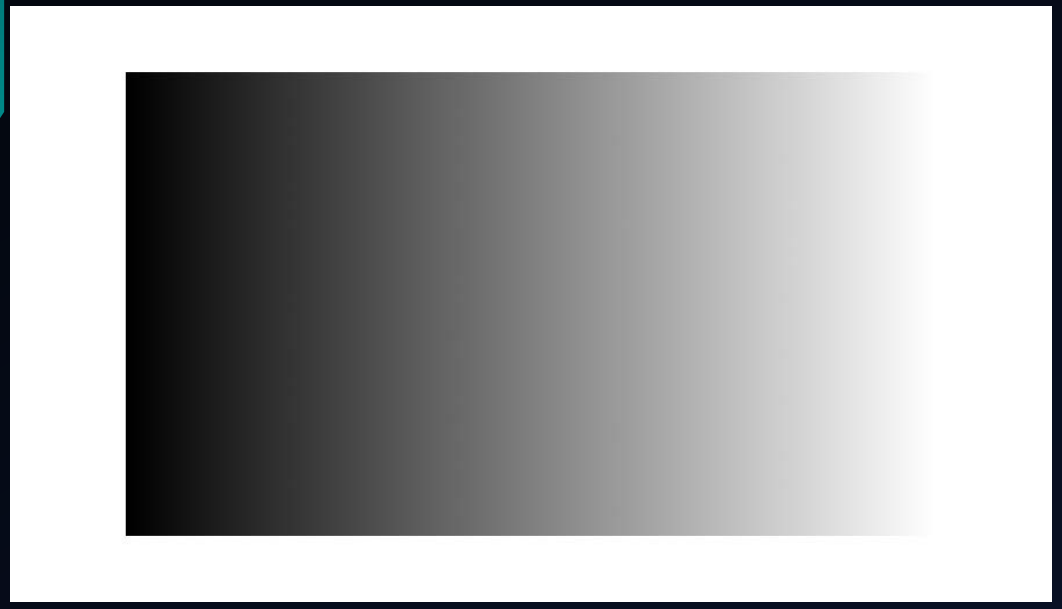
S2/S1

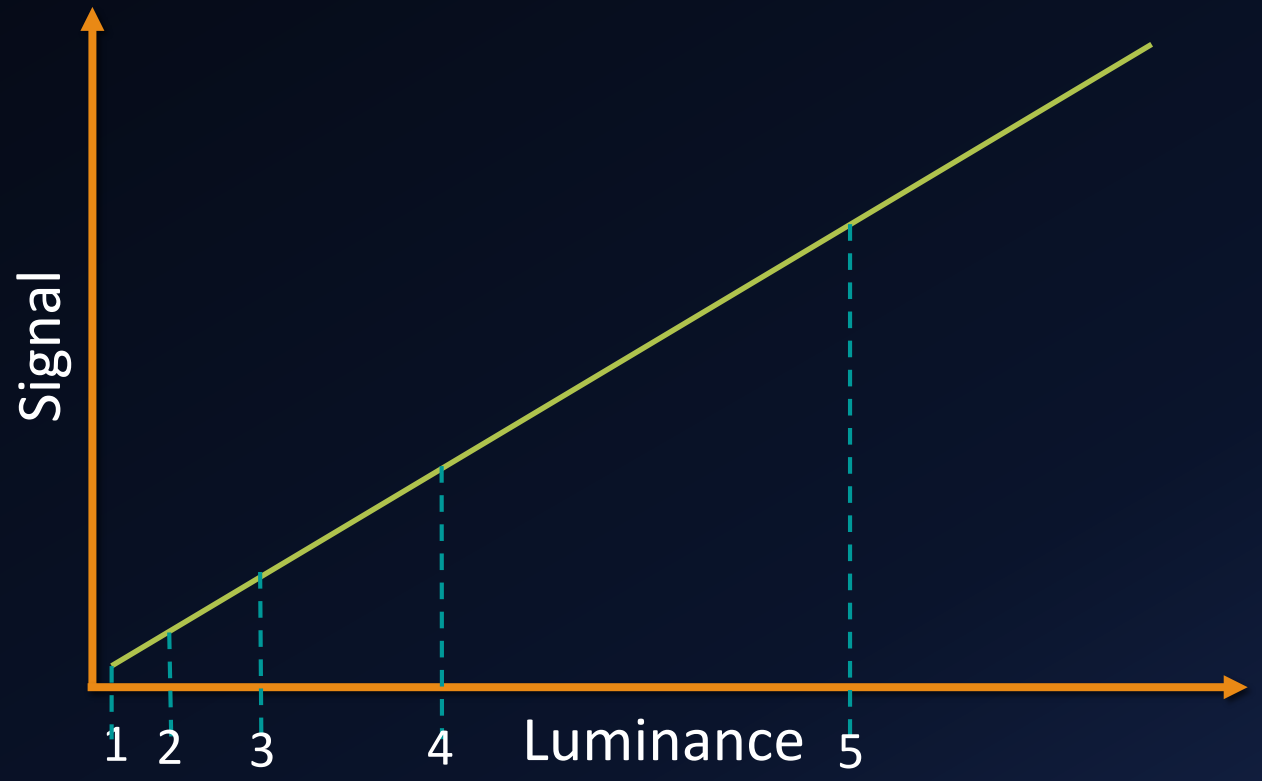




Dynamic range is usually measured in ‘stops’

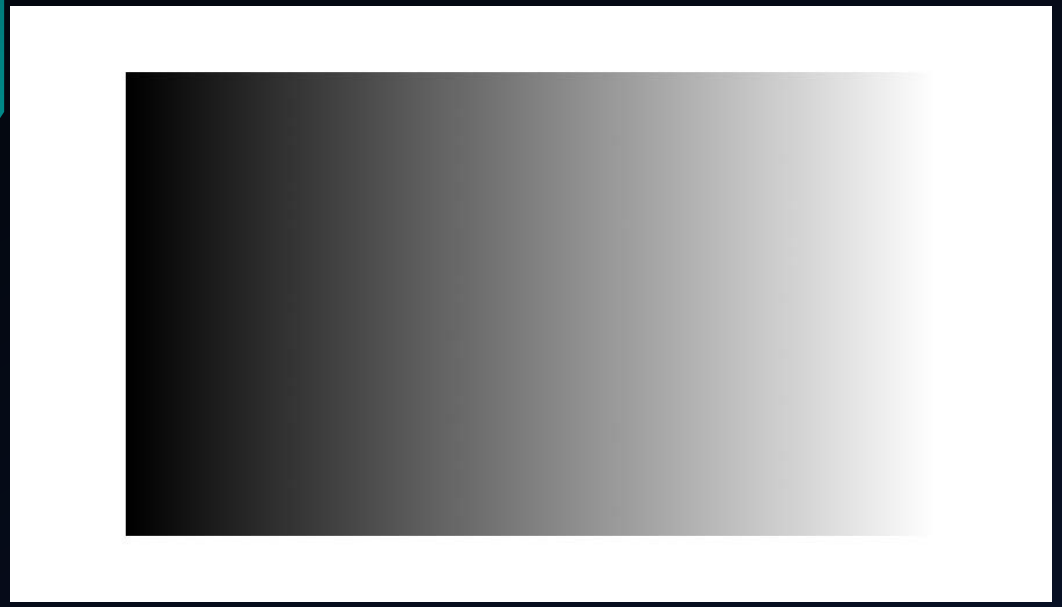
- An F-stop (in these terms) represents a 2X increase in light…

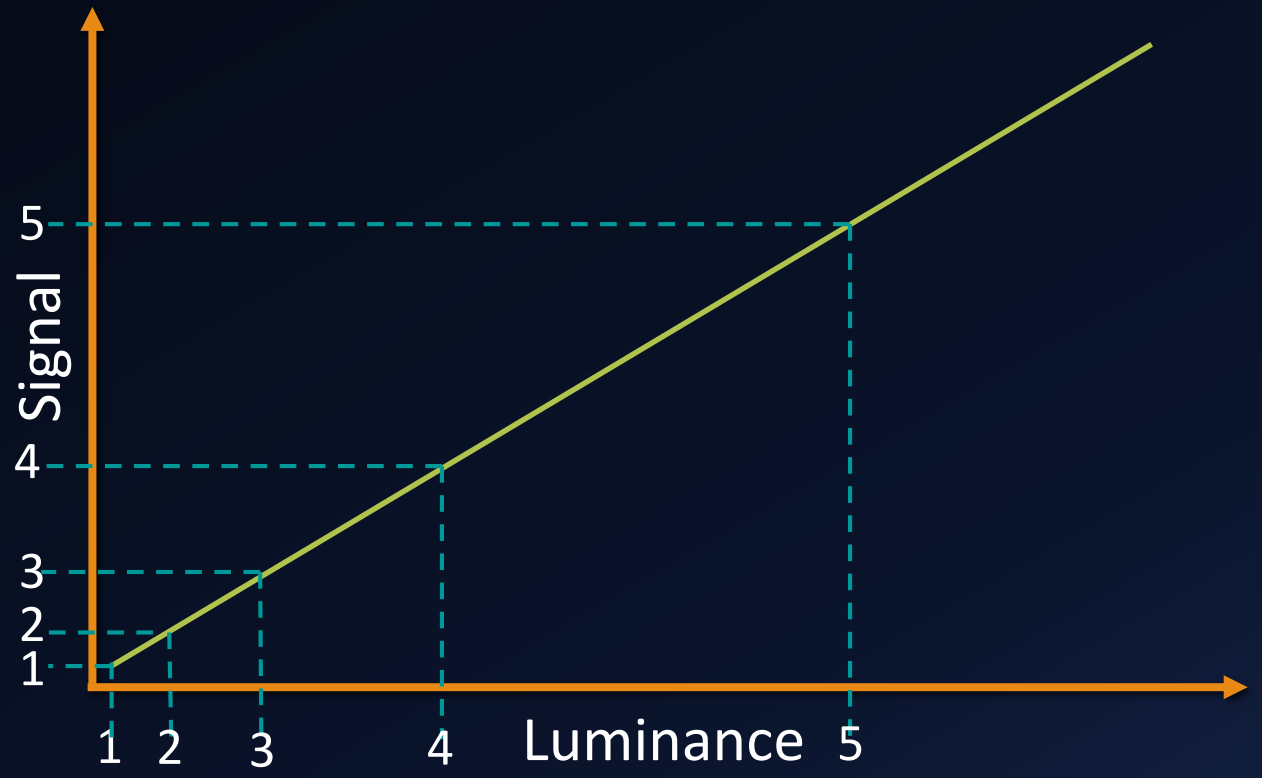




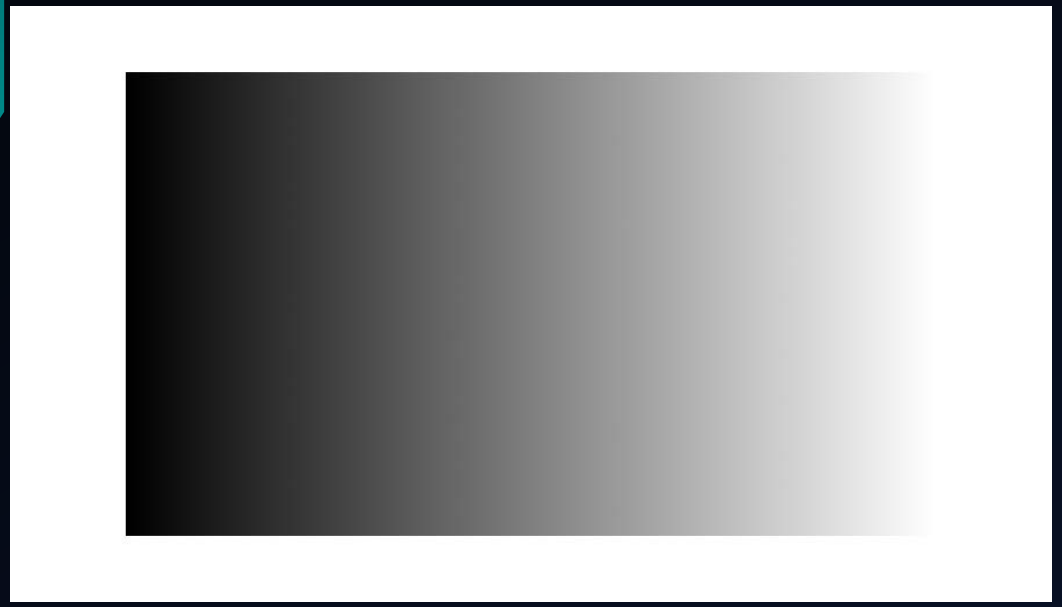
Dynamic range is also considered in ‘bits’

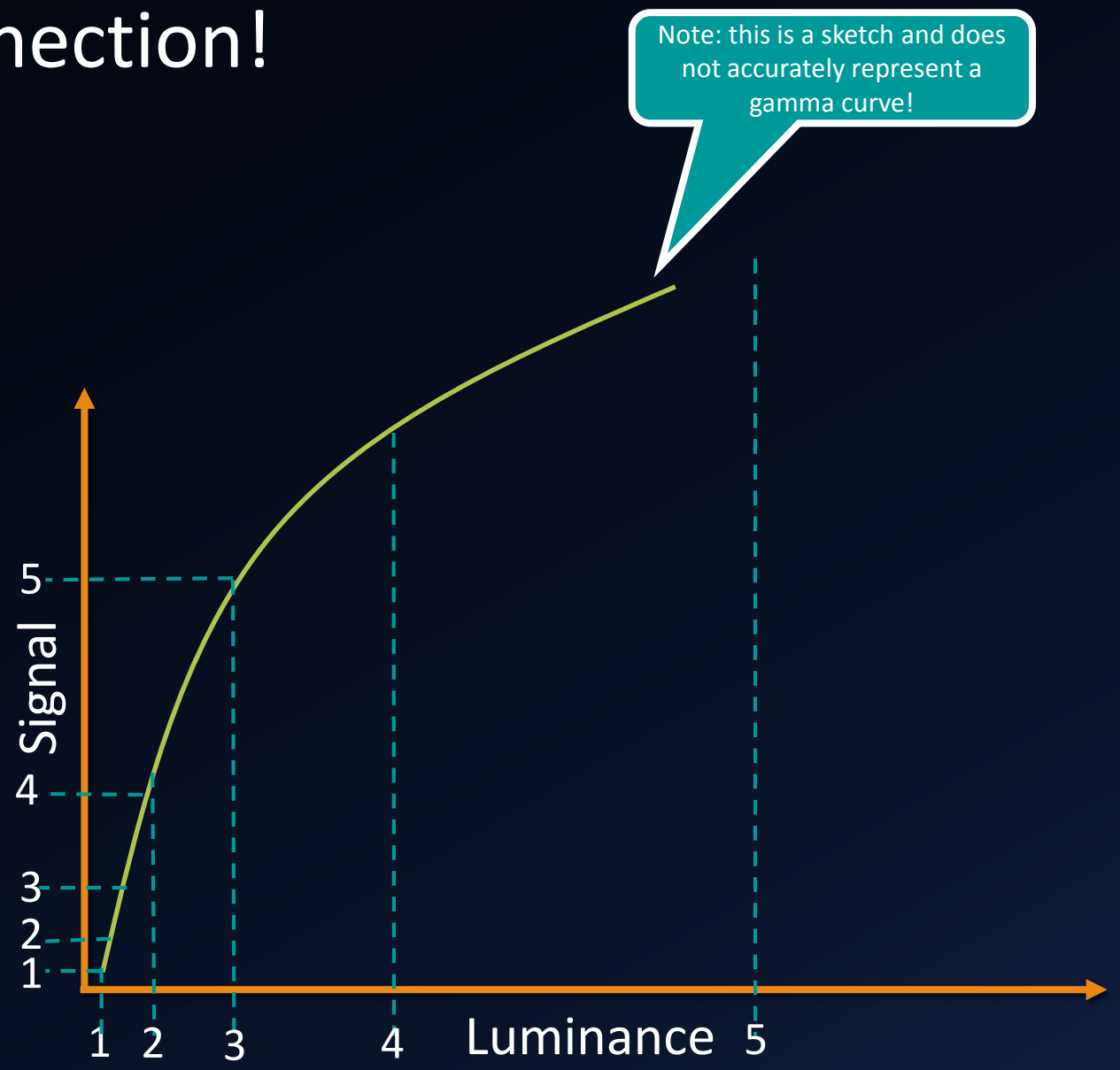
- A bit (binary digit) represents a 2X increase in signal…





Gamma ‘breaks’ this connection!





Display & its environment

- Grade 1 Rec 709 monitor conveys ~7 stops
  - (should display peak whites at >150 nits)
- Dynamic range => contrast ratio = ratio of ‘blacks’ v ‘whites’
- Example: Assuming ‘black’ = 0.25 nits…
  - 7 stops => 0.25 nits to 32 nits
  - 9 stops => 0.25 nits to 128 nits
  - 12 stops => 0.25nits to 1024 nits
  - 16 stops => 0.25nits to 16380 nits
  - 21 stops => 0.25nits to 524290 nits!

Influenced by illumination due to display

Influenced by ambient room illumination

About half the luminance of the sun at noon

- Grade 1 Rec 709 monitor conveys ~7 stops
  - (should display peak whites at >150 nits)
- So if 7 stops is ‘SDR’, what is ‘HDR’?
  - Or at least, how many stops **should** it be?