

Motion Control

John M. Gonsalves

703-941-3635

john@gpclasses.net

Class #3

Review

- Composition
- Depth of field as affected by:
 - aperture
 - distance
 - focal length
- Perspective as affected by focal length *and* distance

The Other Pictorial Control

- Aperture (DOF)
- Focal length (Perspective)
- Shutter Speed (exposure time) adds the feeling of movement to the still image.

Shutter Speed (Exposure Time)

- The shutter controls the duration of exposure.
- Most shutter speeds are expressed as whole numbers but are really fractions.
- Each full speed is twice as fast or one half as fast as the “full” speed above or below it.
- One full shutter speed is equivalent to one full f/stop of exposure change

Common Full Shutter Speeds

- 1 second
- 1/2 second
- 1/4 second
- 1/8 second
- 1/15 second
- 1/30 second
- 1/60 second
- 1/125 second
- 1/250 second
- 1/500 second
- 1/1000 second
- 1/2000 second

Many modern SLR's include shutter speed values of $\frac{1}{2}$ or one third stop values like 1/80, 1/100

How Fast is Longer?

- Terms for exposure are confusing.
- A fast shutter speed and a short exposure time are the same - i.e. $1/500$ sec.
- A slow shutter or long exposure mean the same - i.e. $1/4$ sec.
- Most exposure times are in fractions of a second - 1000 means $1/1000$ of a second.

Auto or Manual

- Manual Exposure is great for bracketing, but Shutter Priority Auto is easier for controlling motion in the real world.
- Nikon = S Canon = Tv

Shutter Priority Automatic

- Nikon = S or Canon = Tv
- You select the camera shutter speed
 - The camera automatically sets the “proper” aperture for a correct exposure
 - Useful when you are trying to control motion in the resulting image by dictating the exposure time (i.e. panning, subject blur, or freeze action)

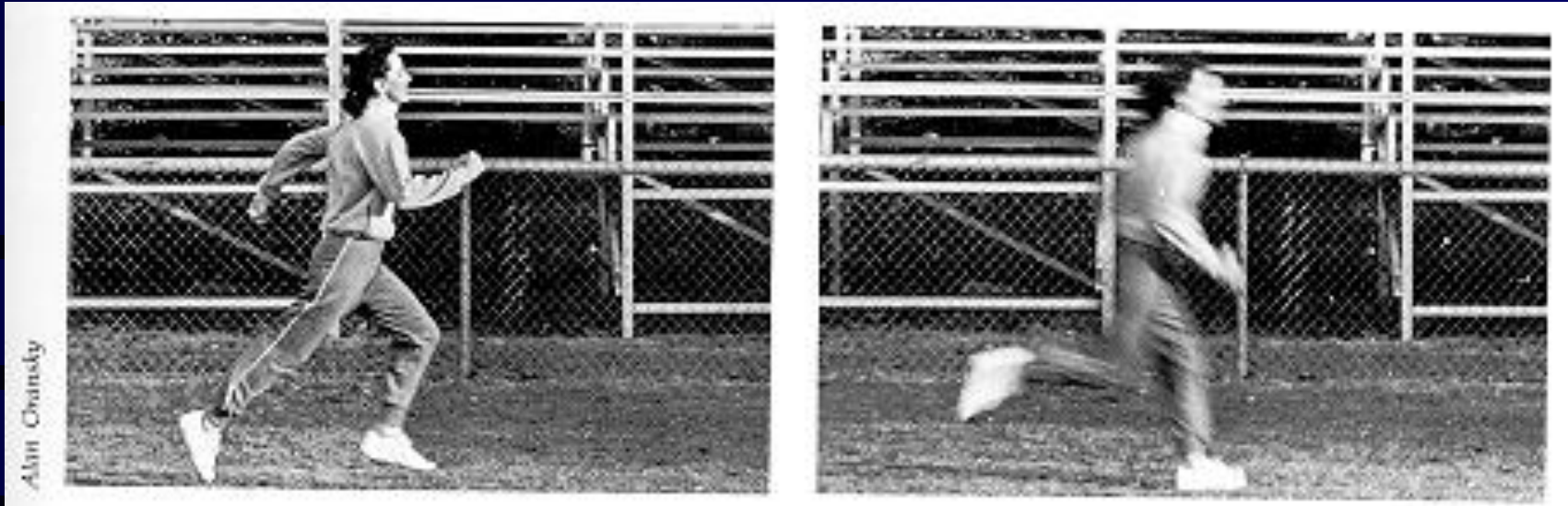
Effects of Shutter Speed

- Freeze subject motion (Stop Action)
 - high shutter speed, camera still or moving
- Blurring subject motion
 - slower shutter speed, camera motionless
- Panning
 - slower shutter speed, camera moving **with** subject direction and speed

Subject Blur

- Using an exposure time that allows the subject to blur some while the background is not blurred implies that the subject was in fact moving.
- The correct exposure time to create the intended blur is dependant on the speed of action, distance, angle of motion, focal length of lens.

Subject Blur



Slower shutter speeds will show blur of moving subjects and camera movement will blur image.

*To avoid unintentional camera blur keep exposure times at least as fast or faster than the focal length.



$1/250 \text{ sec}$



$1/15 \text{ sec}$



500 @ f/2.8

8 @ f/22
w/tripod





500 @ f3.5

15 @ f/22

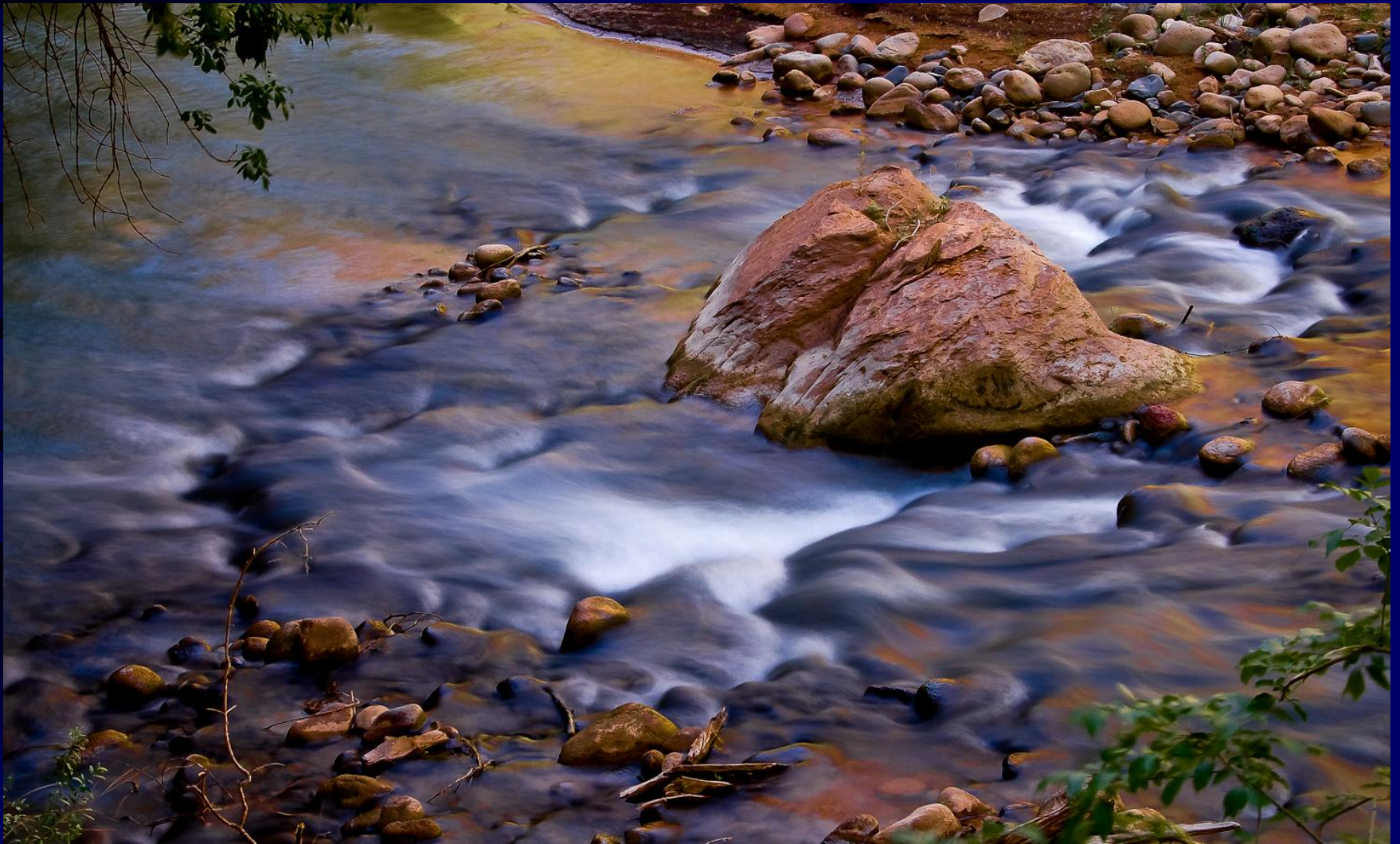


Subject Blur



1/10 @ f/22 24mm

Subject Blur



2 seconds @ f/22 46mm

Subject Blur



1.6 sec @ f/22 24mm

Subject Blur



$\frac{1}{4}$ sec @ f/10 24mm

Intentional Image Blur



- Use a tripod and a relatively long exposure like 1/15 sec to create an images like this (assuming the train was moving slowly)

Stop Action

- Freezing all movement in an image is effective only when it is readily apparent to the viewer that motion had to be happening within the image otherwise the viewer might assume that this is the natural state of the scene.

Stop Action



Stop Action



1/2500 @ f/2.8 135mm

Stop Action



1/4000 @ f/5.3 465mm (35mm equiv) ISO 800

Stop Action



Use fast shutter speeds like 1/500 or higher to freeze action.

Stop Action



1/1250 @ f/5.6 600mm (35mm equiv) ISO 400

Stop Action



1/1000 sec at 65+ mph

Stop Action



1/250 @ f/5 170mm

Stop Action



1/400 @ f/5 80mm

Stop Action



1/2500 @ f/5.6 48mm

Stop Action



1/640 @ f/2.8 110mm ISO 400

Stop Action



1/1250 @ f/2.8 200mm

Stop Action



1/80 @ f/11 58mm ISO 200



Stop Action

1/1000 @ f/4.5 32mm

Stop Action



1/3200 @ f/2.8 120mm



1/125 @ f/11 86mm

Stop Action



1/60 @ f/2.8 (w/flash)

Stop Action (w/flash fill)



1/250 @ f/2.8 70mm w/flash ISO 1600

Panning

- Moving the camera in the same direction **and** at the same speed as the moving subject will create an image where the subject appears relatively motionless, but the background will be blurred in the opposite direction thereby implying movement.

Panning with Action



- Use slower speeds, like 1/30 sec, and follow action during the exposure to imply movement in image by blurring the background

Panning

- Degree of background blur is affected by:
 - Shutter speed
 - Distance from camera
 - Focal length of lens
- Amount of subject blur during pan is affected by movement of camera, shutter speed and direction of subject motion relative to the lens axis
- There is no generic setting – TEST, record your settings and correct

Panning



1/40 @ f/29 86mm

Panning



1/40 @ f/10 112 mm

Panning with Action



Panning with Action



Panning with Action



1/100 @ f/13 34mm

Panning with Action



©AVEX Photographic – Scott Saylor

1/60 @ f/2.8 28mm

Panning



Handheld - 1/8 sec @ f-3.5

Panning w/flash



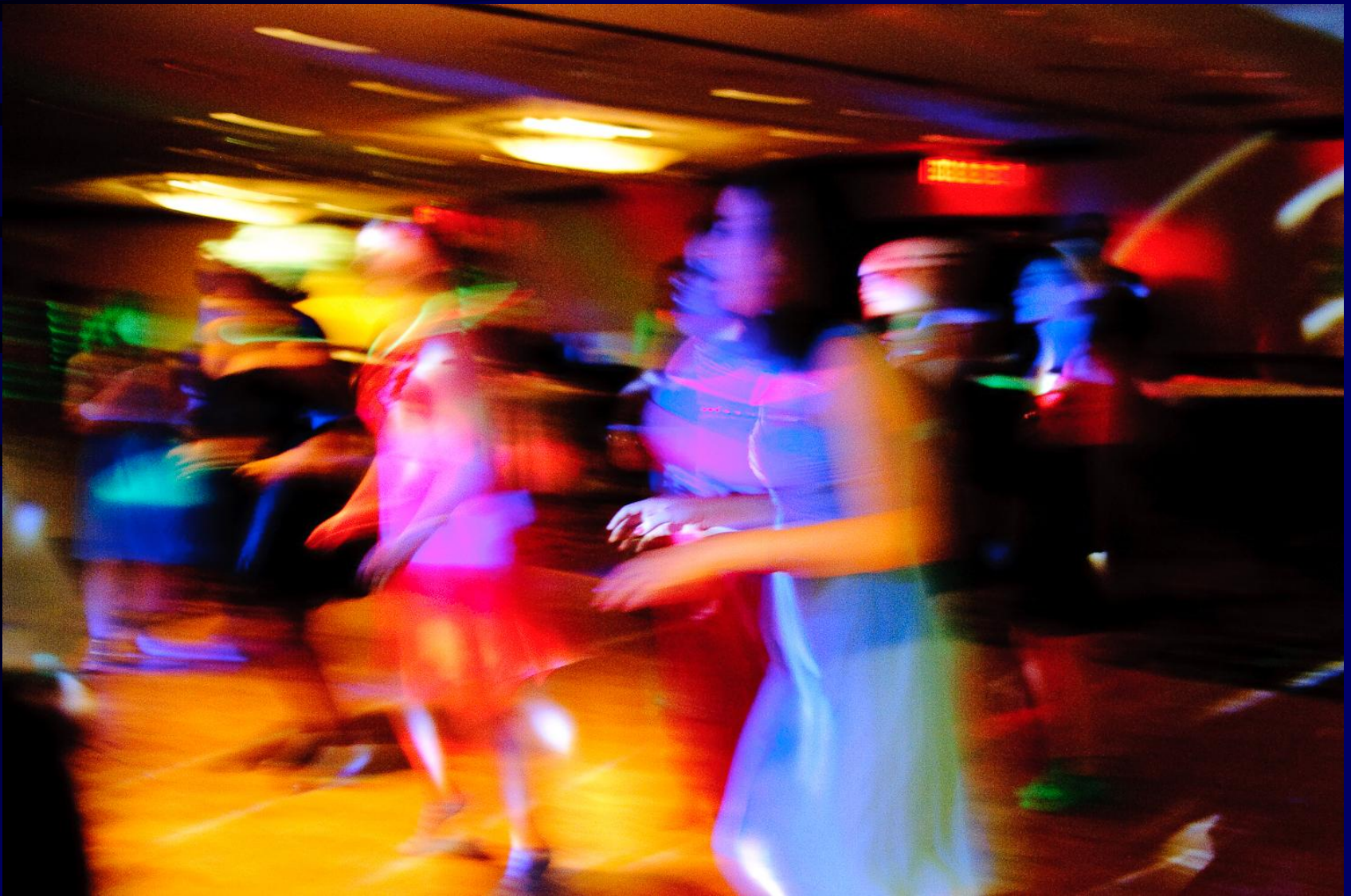
1/60 @ f/2.8 (w/flash)

Subject Blur w/Flash



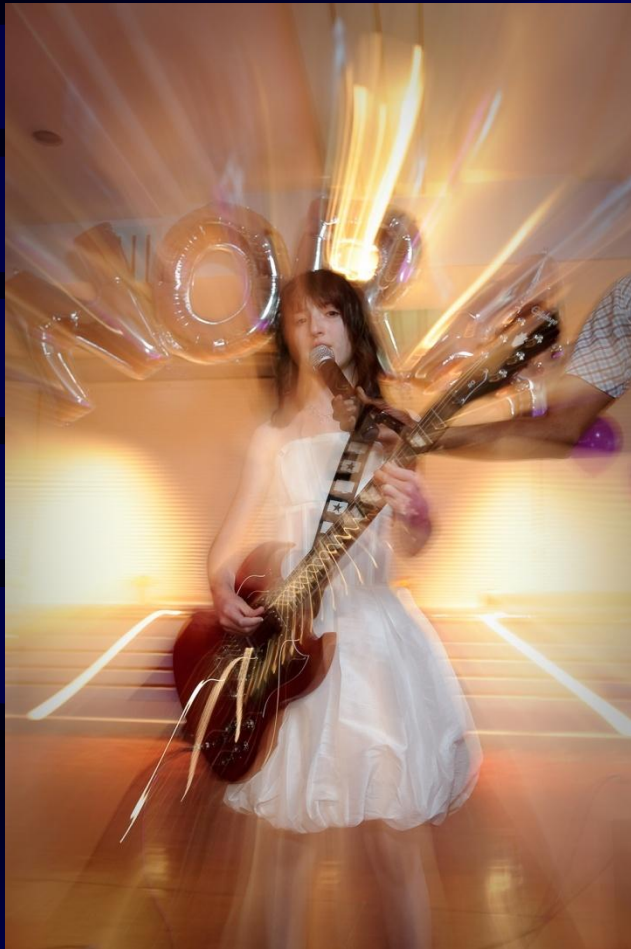
1sec @ f/5.6 (w/flash)

Camera Blur



1/15 @ f/2.8 (camera moving)

Zooming Lens F/L During Exposure



1/3 @ f/4 (lens zoom w/flash)

Nikon Video – Capturing Movement

10:30 minutes



Capturing Movement

“B” or Time Exposures



1.5sec @ f/22 ISO 100 (open shade with neutral density + polarizer filter)

“B” (Bulb) Shutter Speed



Aperture determined by ISO and subject brightness

4-10 seconds at f/11 ISO 200

“B” or Time Exposures



64 sec @ f/2.8

“B” or Time Exposures



58 sec @ f/2.8



LOWELL OBSERVATORY, FLAGSTAFF, ARIZONA

©2010 Gonsalves Photography

“B” or Time Exposures at Twilight



1 and 1/3 sec @ f/22

Painting w/Light



46 sec @ f/16 35mm ISO 200

Painting w/Light



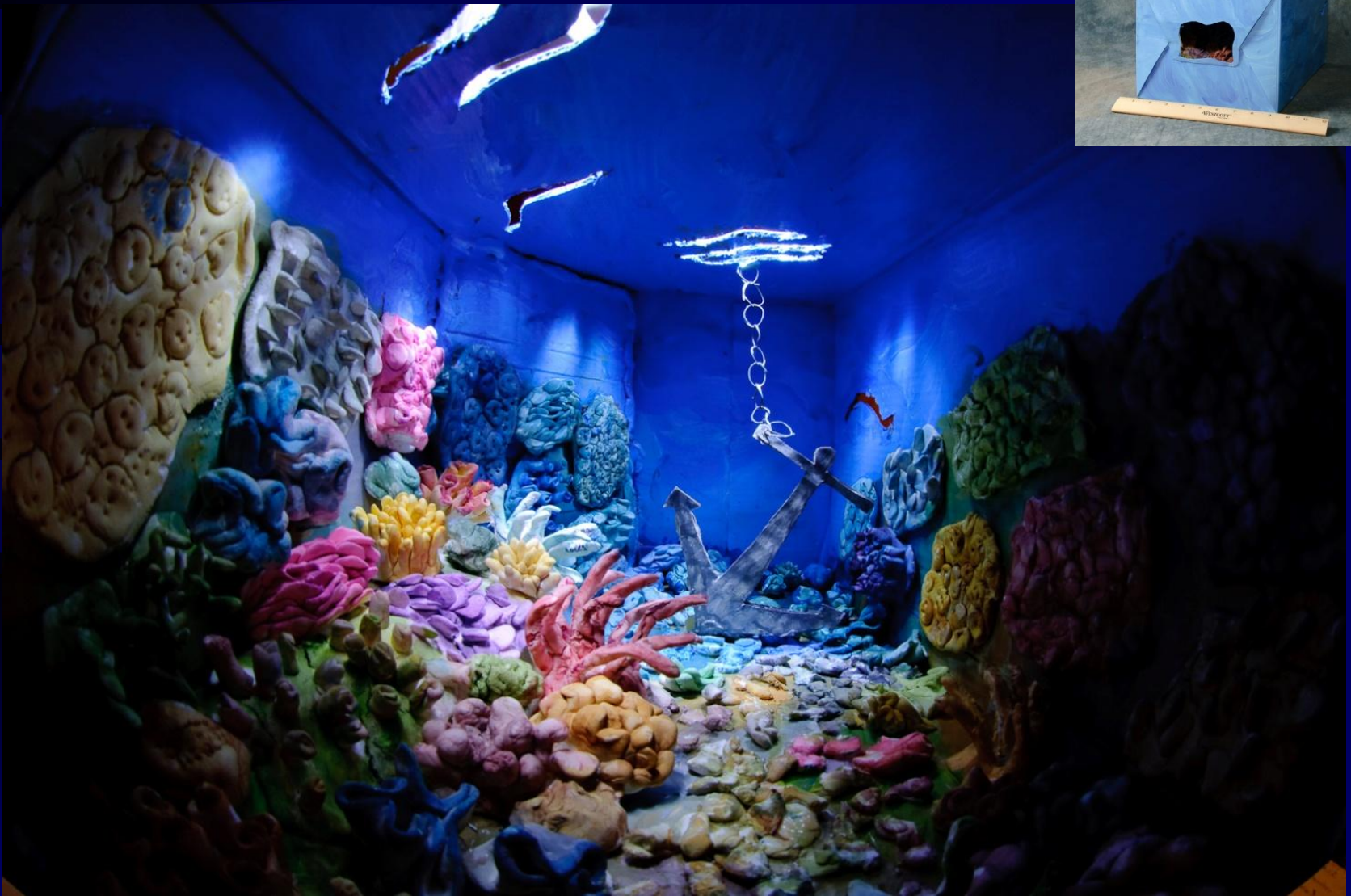
45 sec @ f/16 40mm ISO 200

Painting w/Light



45 sec @ f/4.5 35mm ISO 200

Painting w/Light



20 sec @ f/16 10.5mm ISO 200

Questions

- This presentation is available on-line in the PowerPoint section at:
www.gpclasses.net
 - Password = stallions