

Rewriting the Rules

Abbreviated Version

on

Kitchen Lighting!

Presented by

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KBIS 2018 Orlando

January 10, 2018

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1. The Old & New Way to Layout Lighting Impairment
2. Dicing in the Dark
3. Case Study #1: Luxe but Dim
4. \$200 Lighting Test Kit: Just Do It!
5. Sorry, But Undercabinet Lights Won't Save You!
6. How Much Light Is Enough?
7. Lighting Metrics You Should Know
8. Not all bulbs (lamps) are Equal
9. Lighting & Vision Facts and Why Better Kitchen Lighting Matters
10. 4 Ways to Help with Vision
11. Challenges You Might Face on the Job
12. Case Study #2: Lamp Change
13. High End Kitchen Re-Lighting
14. The "Right Light" Defined: What's Yours?
15. Some Award-Winning Examples
16. Photobiologic Effects of Light (HSW)
17. Circadian (Tunable) Lighting: The Next Big Thing in Lighting
18. Final Tips, Resources, Questions

OUTLINE OF THE HOUR (130 Slides)



Why is good kitchen lighting important?

PERHAPS THE MOST CRITICAL ROOM IN THE HOUSE FOR
GOOD LIGHTING

THE OLD AND NEW WAY OF LAYING OUT KITCHEN LIGHTING

NKBA Professional Resource Library

KITCHEN & BATH LIGHTING

Concepts • Design • Light



Daniel Blitzer
Tammy MacKay, AKBD, NCIDQ, LEED Green Associate

NKBA National Kitchen
& Bath Association

50!

Recommends 50 fc on
countertops (minimum)

EVIDENCE-BASED LIGHTING DESIGN:

Conventional Wisdom/ “Book” Learning vs. Common Sense

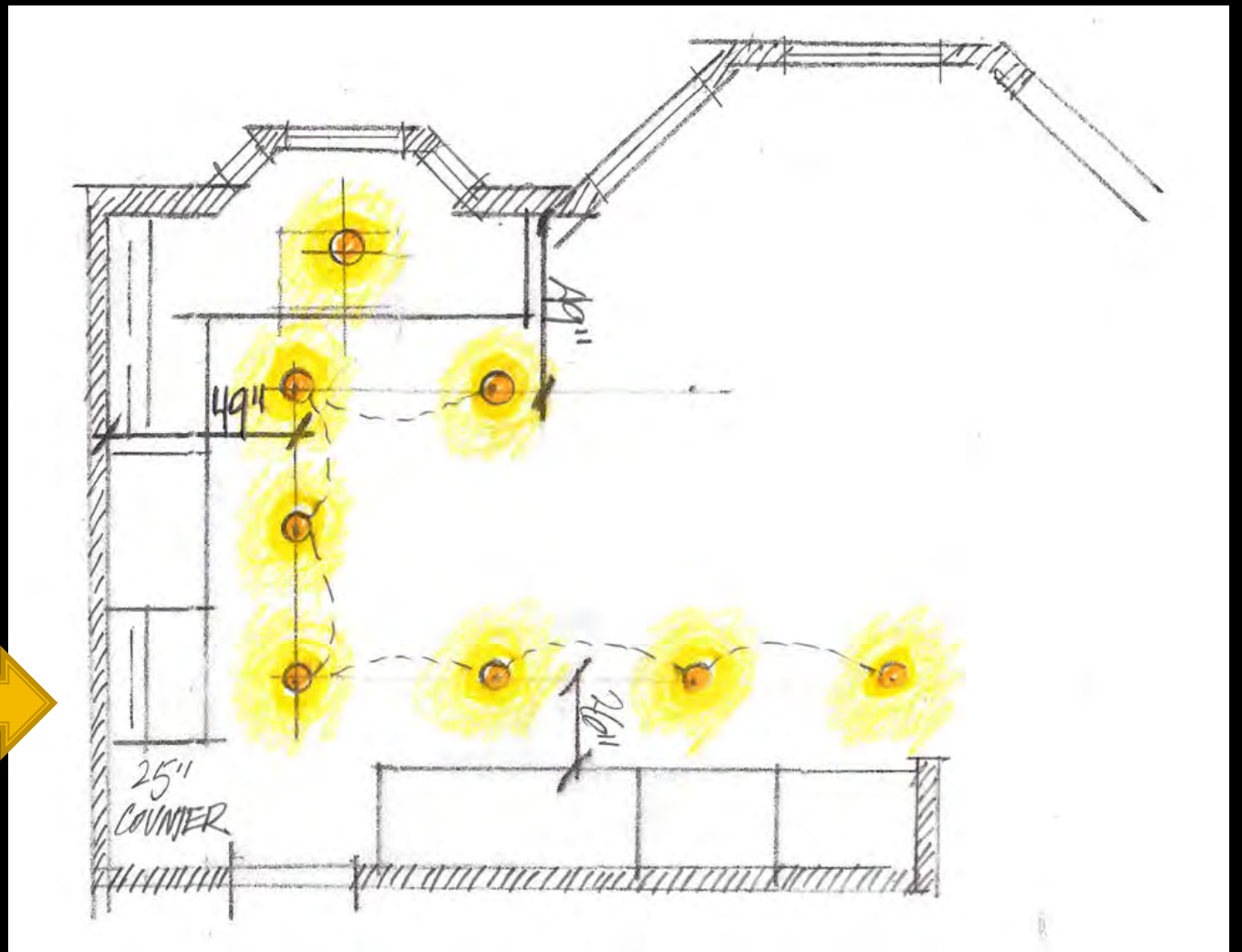
Learn to Trust Your Own Observations and Experience!

A 7 WORD SUMMARY OF THE WHOLE HOUR:

**THE RIGHT LIGHT
IN
THE RIGHT LOCATION**

THE OLD WAY OF LAYING OUT KITCHEN LIGHTING

Illustration from recent industry
text:



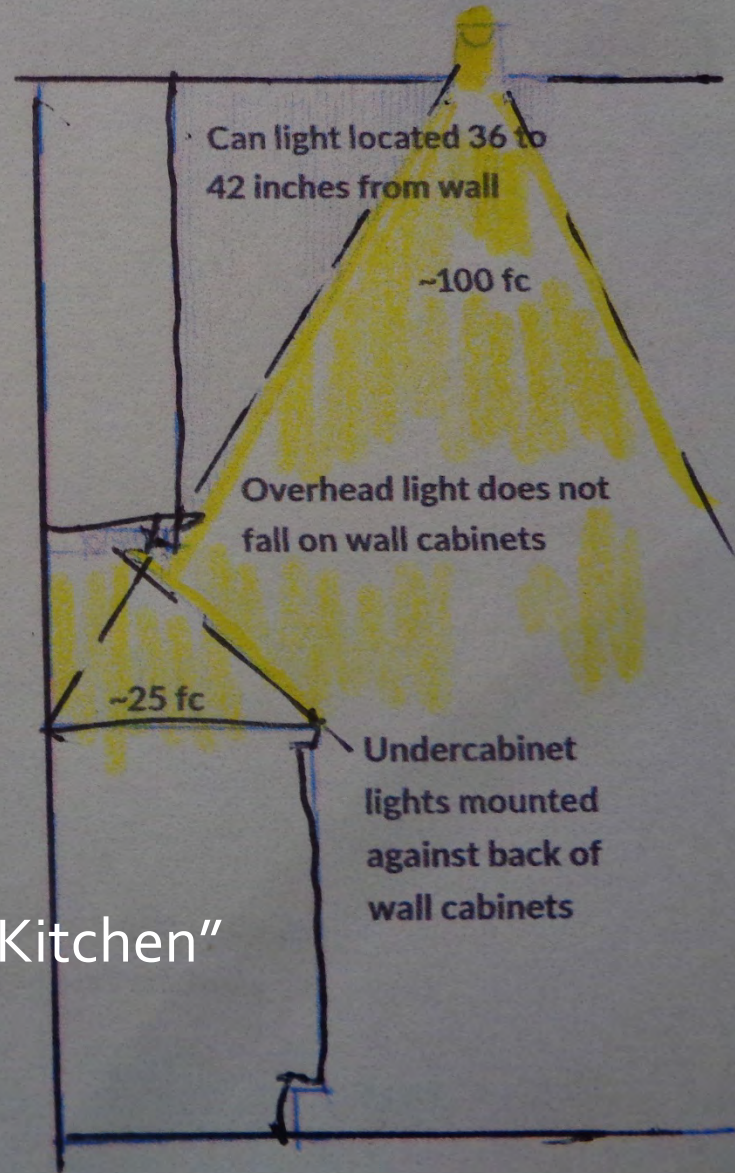
NO!!

Can you trust everything you read in a book?

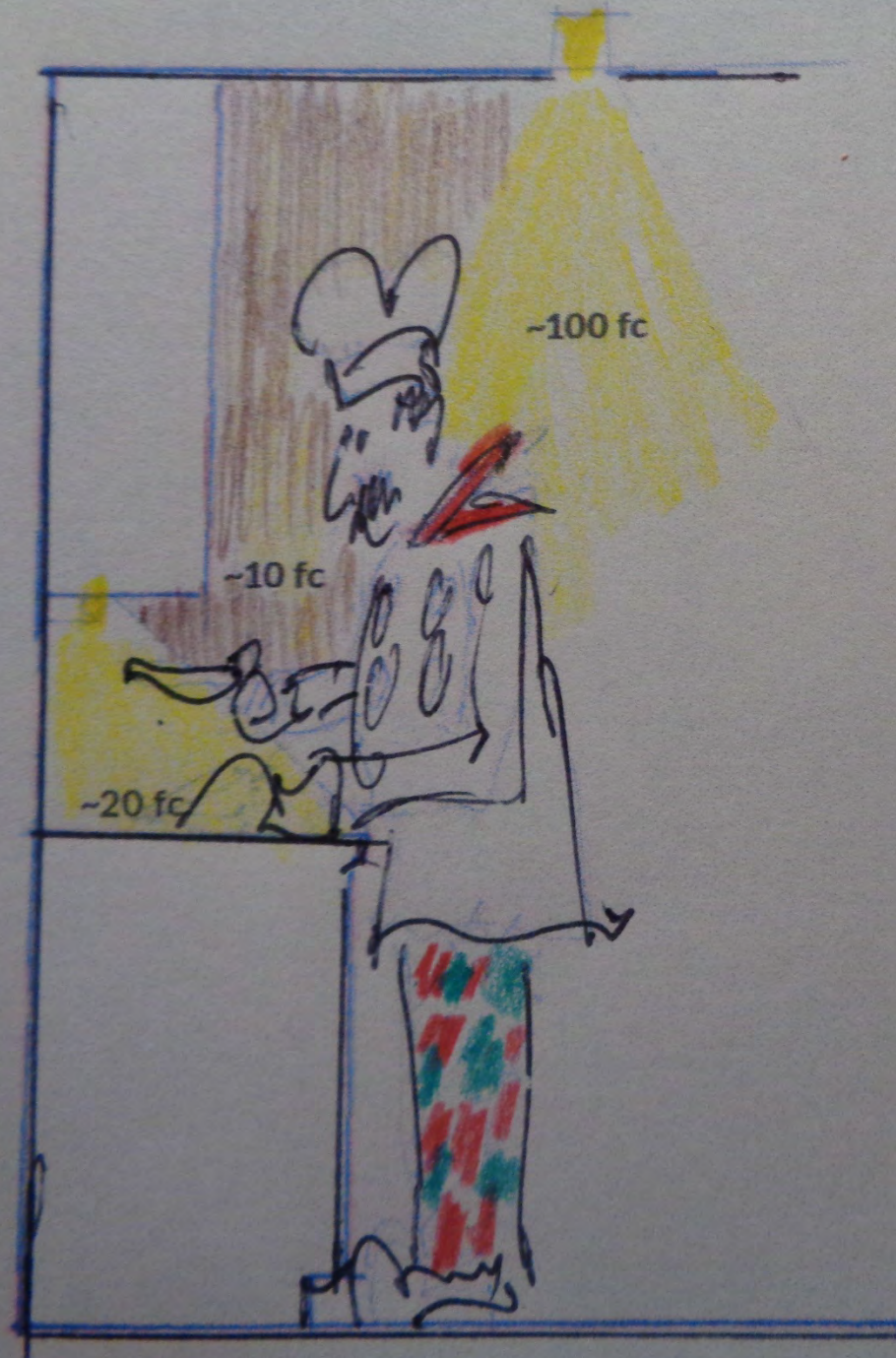
A

A GREAT IDEA ...

Just last year I attended an industry event at a lighting showroom where a representative from a major lighting manufacturer recommended lighting kitchens based on a sketch like the one at right. The reasoning here is that the overhead light should not hit the upper cabinets (horrors!), but should neatly fall just below them, where it joins with the undercabinet lighting to bathe the counter with a workable number of foot-candles (fc).



From "The Right Way to Light a Kitchen"
 Pro Remodeler February 2016



B

... UNTIL YOU ADD PEOPLE

It's a great idea ... until you add people.

Standing at the counter, the back of the cook's head gets 100 foot-candles while he or she works in his or her own shadow. This scheme also assumes that the kitchen is equipped with undercabinet lights and that you always use them—maybe even as primary task lighting.

But that's not how most of my clients use the undercabinet lights. Often the only lights they turn on are the ceiling can lights.

Dicing in the dark

At 36" from the wall, the
Delivered foot candles
Drops from 27 fc to 1.4 fc when
The user stands at the
Counter!! (using a PAR30 flood)



I know, I'll just Google it!



Can you trust everything on the internet?



**CASE STUDY #1: LUXURY REMODEL
WITH DIM PROSPECTS**

Open



1 / 1

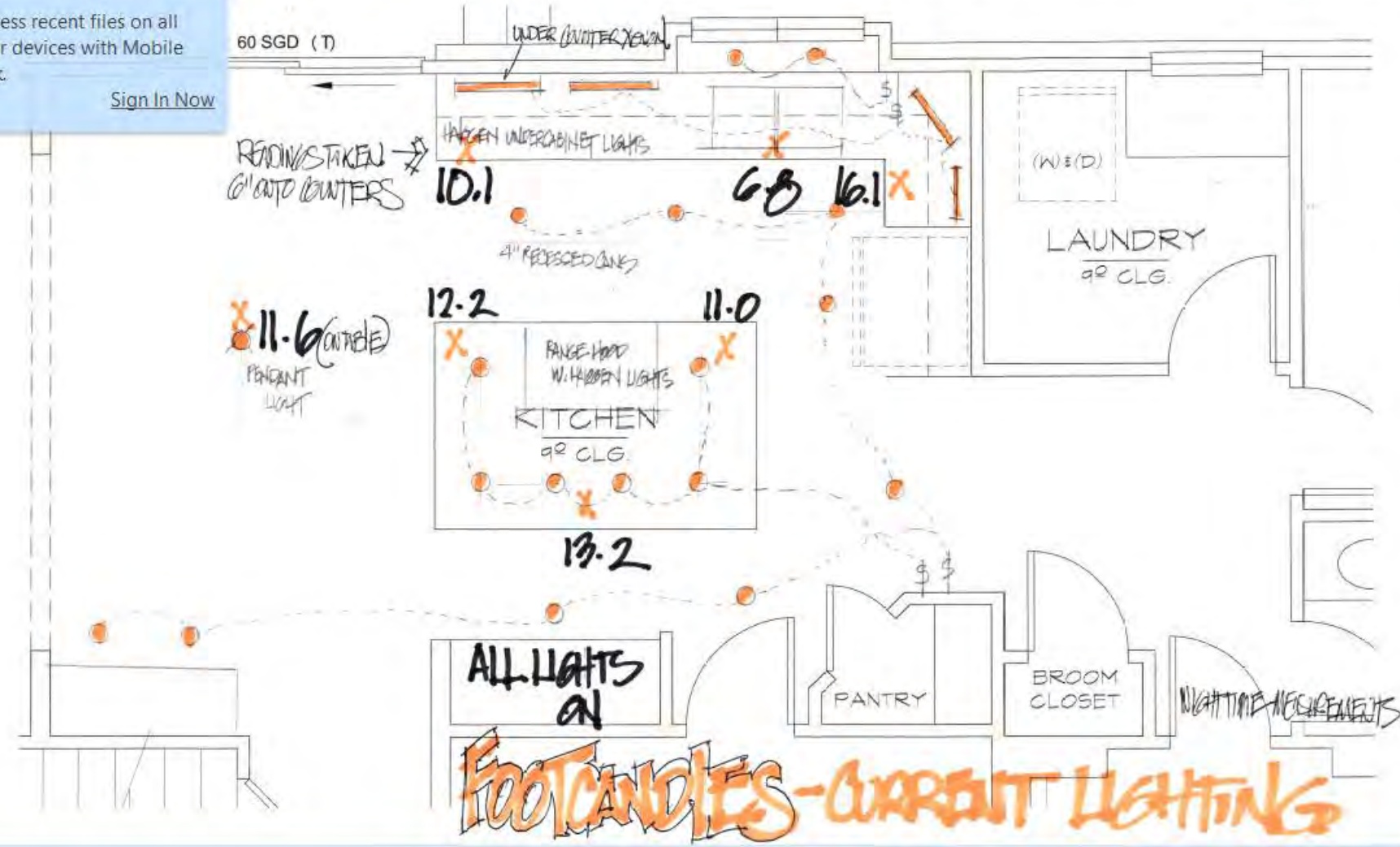
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Tools

Fill & Sign

Comments

Access recent files on all your devices with Mobile Link.
[Sign In Now](#)



Sign

- Export PDF
- Create PDF
- Edit PDF
- Send Files

Adobe Send

Send and track large files online.

Send File: [existing footcandles.PDF](#)

1 file / 2.71

Create Link

Store Files



Computer Simulation



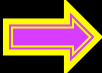
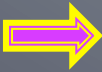


My \$200 Lighting Test Kit

Placement of Cans Matters...A Lot!!!

Jeni Finnigan, OTR/L, records foot candle readings while Architect Doug Walter moves downlight from overhead back in 6" increments at 860 S. Clarkson St. remodel



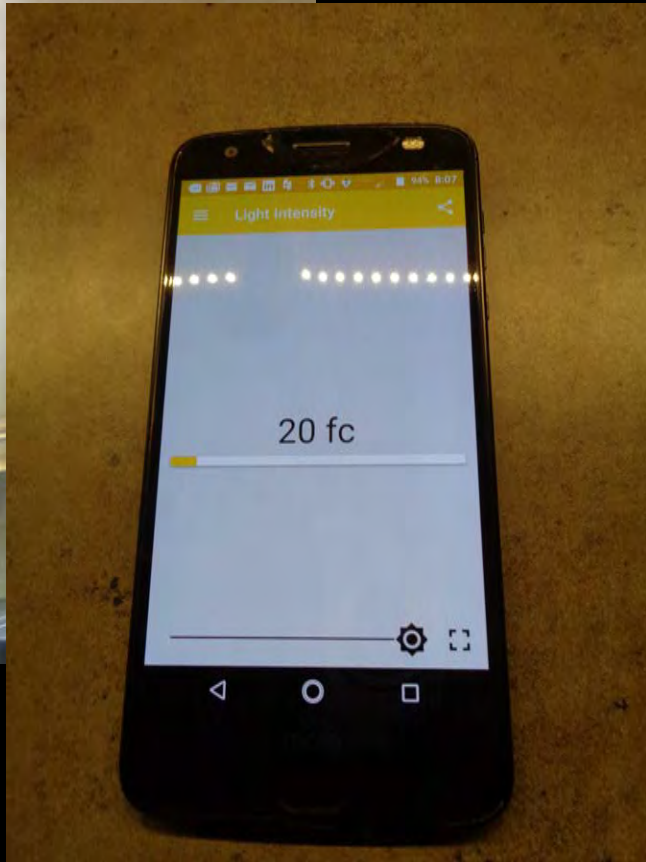
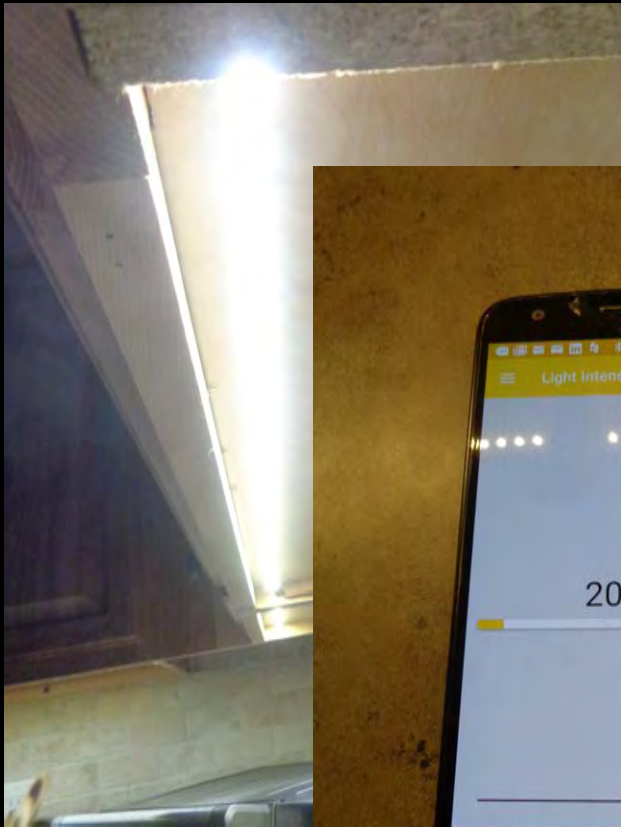
Distance from wall	BR 30 Flood	4" LED PAR 20 Narrow Flood	Halogen PAR 20 Narrow Spot	LED PAR 30 Flood
	Sylvania 800 Lumens	Lighting Science 500 Lumens	Satco 530 Lumens	Samsung 960 Lumens
24"	6.7	63	65	140
 24" w/cook	6.7	63.9	47	80
30"	6.2	43	30	105
30" w/cook	.66	31.5	2.5	2.6
36"	5.6	17.5	25	41
36" w/cook	.58	.65	1.7	.8
42"	4.9	4.6	20	45
42" w/cook	.51	.46	1.5	.46
48"	4.6	2.8	12.5	42
 48" w/cook	.48	.4	1.2	.5

All illuminance measured in Footcandles

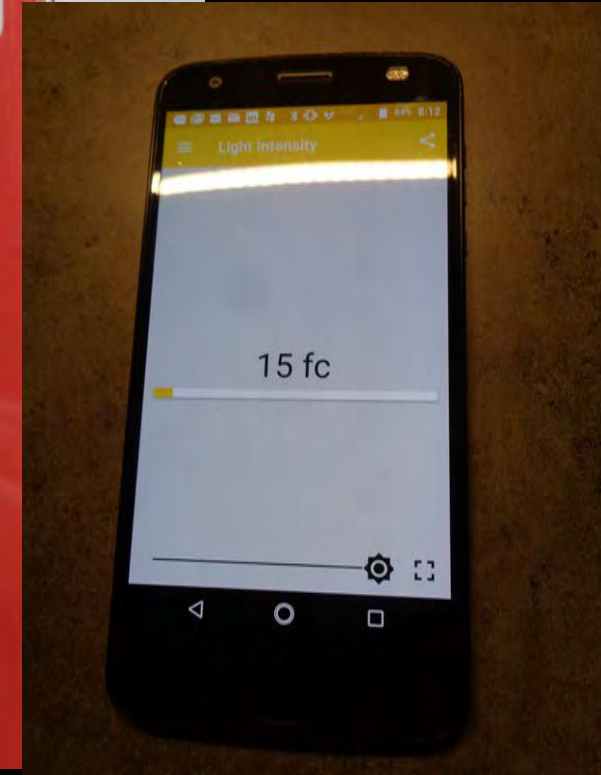
Measurements Taken at 860 S. Clarkson St. remodel

SORRY, BUT UNDERCABINETS WON'T SAVE YOU

What about on an island? At a window? When the user won't turn them on? In a loft style kitchen with no uppers?



169 lumens per foot



Typical Undercabinet Lights, Measured

Located at front of upper cabinets, measured 6 inches onto counter

SG9 Foot Candle.pdf - Word

File Home Insert Draw Design Layout References Mailings Review View Help Tell me what you want to do

Clipboard Font Paragraph Styles Editing

Foot Candle Readings for Sempria SG9 1/2 Watt LEDs

Location	Foot Candle Reading
Top Left	130FC
Top Right	96FC
Bottom Left	80FC
Bottom Right	65FC
Bottom Right Corner	42FC

Sempria by Task Lighting
(640 lumens per foot)

Page 1 of 1 0 words English (United States)

10:57 AM 12/24/2017

FC readings from one manufacturer of a high output undercabinet LED: note sharp drop off as distance +

A CRAM COURSE ON LIGHTING DESIGN & TERMINOLOGY

FORGET WATTS

THINK **LUMENS**

NO, CANCEL THAT: THINK
FOOTCANDLES!

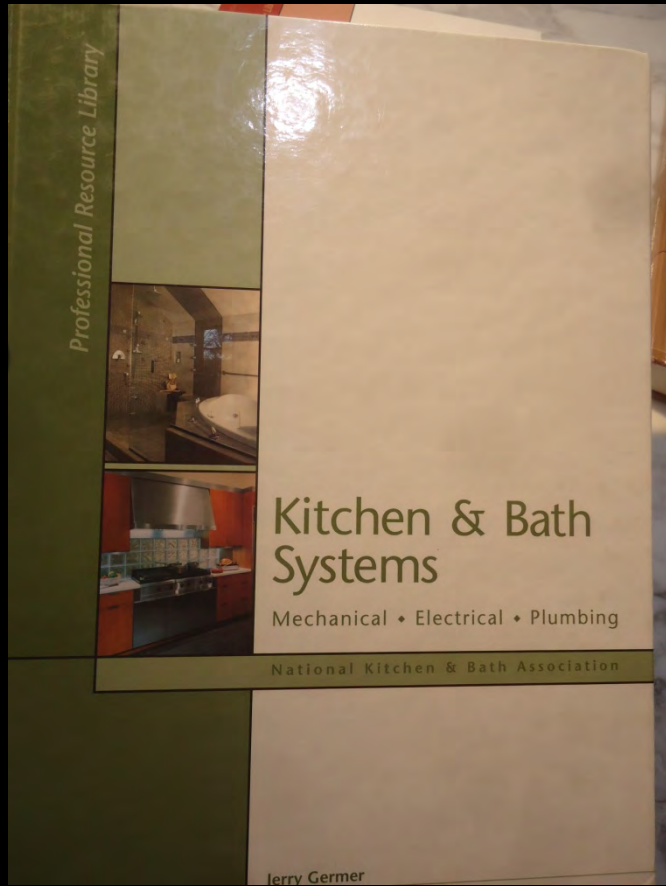


Area of home	Illuminance Level in Footcandles
Stairway	10-20
Hallway	5-10
Kitchen	50-100
Bathroom	10-20
Home Office	30-50
Laundry	50-100

All standards taken from Illuminating Engineering Society of North America Handbook 9th edition

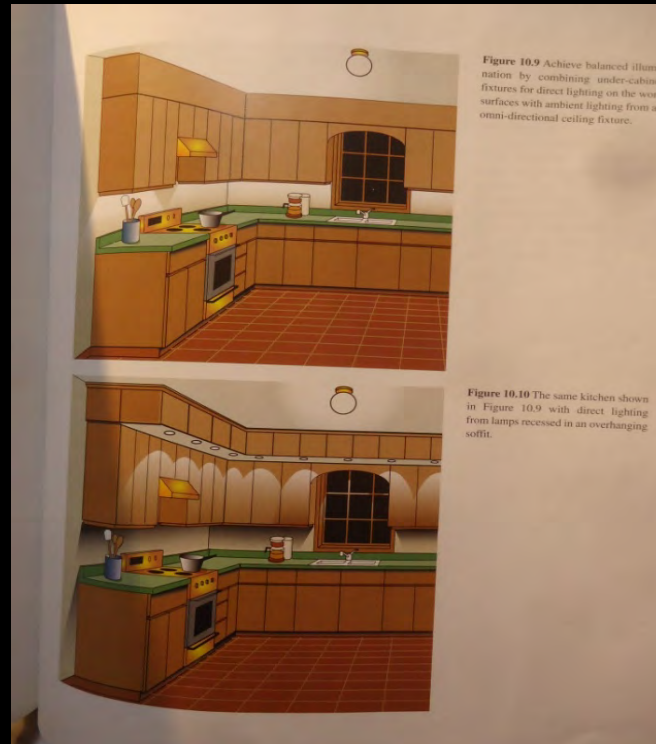
HOW MUCH LIGHT IS ENOUGH?

Minimum Standards



Recessed or surface mounts,
16-24" apart, centered on
counters, 75 w reflector lamps

Disconnect:
But what about this??



31: Lighting

Recommended:
In addition to general lighting required by code, every work surface should be well illuminated by appropriate task lighting.

Code Requirement:

At least one wall-switch controlled light must be provided. Switch must be placed at the entrance. (IRC E 3803.2)

Window/skylight area, equal to at least 8% of the total square footage of the kitchen, or a total living space which includes a kitchen, is required. (IRC R 303.1, IRC R 303.2)

Access Standard

Recommended:
Lighting should be from multiple sources and adjustable

(old) NKBA KITCHEN LIGHTING
RECOMMENDATIONS

You Can't Manage
What You Don't
Measure

You can do this!



IPHONE APPS

Light Meter-Elena Polyanskaya-Free
Lux Meter-Max Orlov-\$1.99
Light Meter-Vlad Polyanskiy \$1.99



ANDROID APPS

Light Companion by Medano
Light Meter Pro
Light Meter by Keuwlsoft
Light Meter by Trajkovski
White Paper

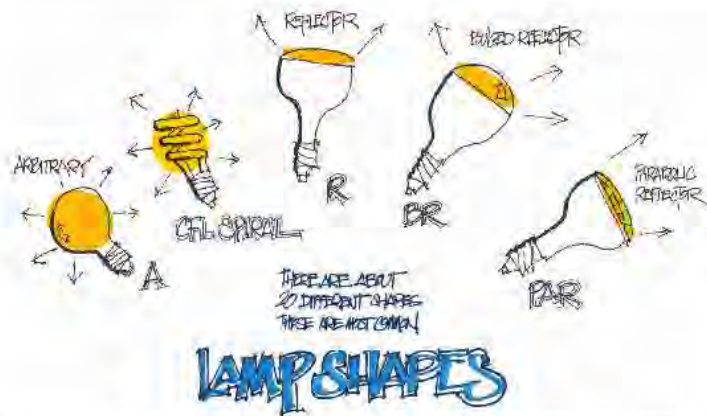
LIGHT METER APPS FOR YOUR PHONE



?



Not all bulbs are created equal!!!



was often home to me when I had to accompany my mother-in-law to the emergency room to get a cast on her leg stretched up after she slipped off the chair she was standing on while trying to replace a burned-out bulb.

Hard-to-reach fixtures aren't just a problem for seniors. Many newer homes have grand entrances with 18-foot-high ceilings or vaulted staircases or family rooms. In many cases, some genius decided to light those spaces with recessed cans. When it comes time to rewire them, you have two choices: hire an electrician with a really tall ladder or select lift, or invest in a wobbly aluminum extension pole with an attachment on the end that you will use to try to grab the burned-out lamp without breaking it off in the socket. If you fall at this rope-the game, you will need to hire an electrician with a really tall ladder. . .)

I talked with Dean Howell, owner of Advantage Electric, in Denver, who has seen plenty of smashed lamps and trim knocked loose by homeowners with poles. He has extensions up to 24 feet tall, but to safely erect them, it takes three men, so a service call like this would run about \$500. For more extensive rewiring, Howell brings out his own scaffolding, but he says homeowners should "plan on a \$700 or \$800 bill for that." Hmm. You could buy a lot of LEDs for that kind of money!

Howell also told me that he offers an LED alternative. "But on the service side, there's not much buy-in," he adds. "[Homeowners] will

There are literally dozens of bulb shapes, there are just the most common ones we deal with. Although you can buy recessed cans that are optimized for LED lamps, the light still blasts out in every direction instead of neatly down, which is where you want it. The solution: "reflector" lamps, which decrease in beam width, from 80 to 8 in LED to better direct the light. Only a CFL bulb will emit glare in a recessed fixture, which is why you should avoid recessed cans for ambient lighting. This is also the advantage of a dedicated LED fixture or screw-in retrofit LED kit: The homeowner can't mess it up by replacing a completely wrong but burned-out CFL lamp with a typical CFL that has none of the characteristics you demand.

year until the last one burns out to call me. I find that people who are building new are more open to the LED conversation."

Type & Color Temperature Matter

My go-to pig for this article was a colleague, interior architect Don Allison, who happened to mention to me that his kitchen lights were burning out too frequently. And so, on a recent lunch hour, off we went to the lighting aisle at The Home Depot to learn about new lamp technologies.

The vast array of offerings is a bit overwhelming, so I suggested that we start by finding the bulbs that he currently uses. He picked up a Philips halogen BR 30, which uses 60 watts to put out 620 lumens; it has a 2,700K color temperature, a lamp life of 2.5 years, and a price

Light Distribution:



Pay attention to lamp types & beam spread



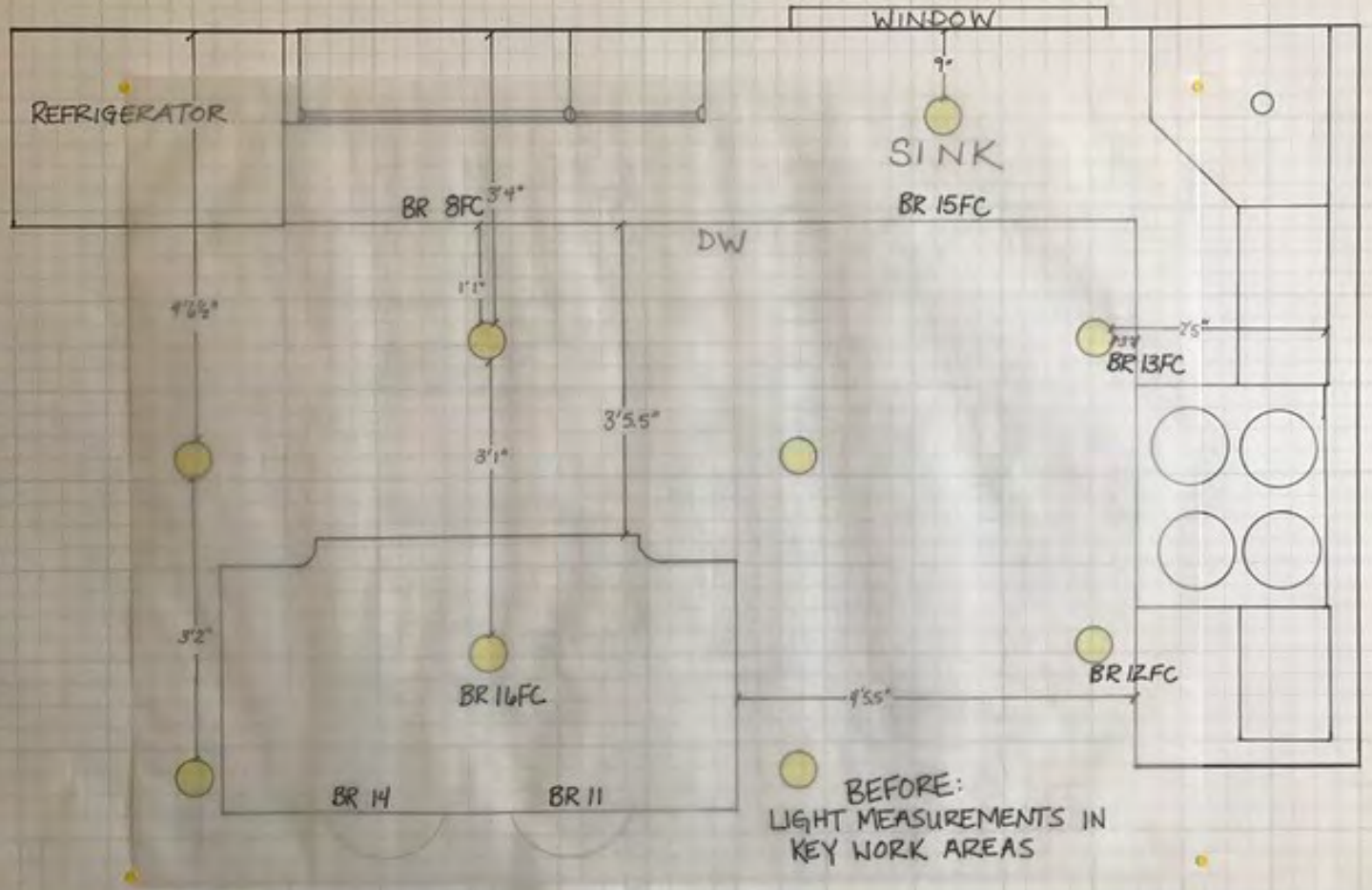
BR vs PAR
floods



25 degree PAR30 vs 40 degree PAR30
(thanks to Adam Calabrese)

BASIC LIGHTING UPGRADE, LITTLETON, CO

By Jeni Finnigan, OT/R



BEFORE 8-16 FC

without cook



15.4 footcandles
with BR30 bulbs.

BEFORE



158.6 footcandles
with PAR30 bulbs

Garfield Street Remodel BR vs PAR Floods

Original Lamps: 11 watt Utilitech
LED BR30 Floods= 15.4 fc

New Lamps: 11 watt Samsung
LED PAR30 Spots = 158.6 fc

**Same wattage, same lumens,
but 10 times the
illumination on task!!**





THE GOLD STANDARD IN LIGHTING:
Now, all we need to do is bring this inside!

- Light is critical to human functioning
- Light has an affect on us psychologically and physiologically.
- Benefits of light are well documented to positively impact us at any age with a variety of conditions
- Light plays a role in (not a complete list by any means):
 - reducing depression
 - facilitating independence with ADLs
 - decreasing fatigue
 - improving alertness
 - modulating circadian rhythms
 - decreasing agitation behaviors in those with dementia
 - treating conditions such as hyperbilirubinemia among infants

LIGHTING FACTS

- Vision depends on light
- 80-90% of new learning is through our eyes (many of us are visual learners)
- When our eyes are open, two-thirds of the electrical activity of the brain is devoted to vision (Fixot).
- Vision has an intricate relationship with our circadian rhythm and sleep cycle
- Vision plays a significant role in maintaining balance

VISION FACTS



46.1% of Americans

have some form of vision loss

Nat'l Center for Health Statistics 2010



Two very common side effects of aging on the eye: smaller pupils and thicker & yellowing lens

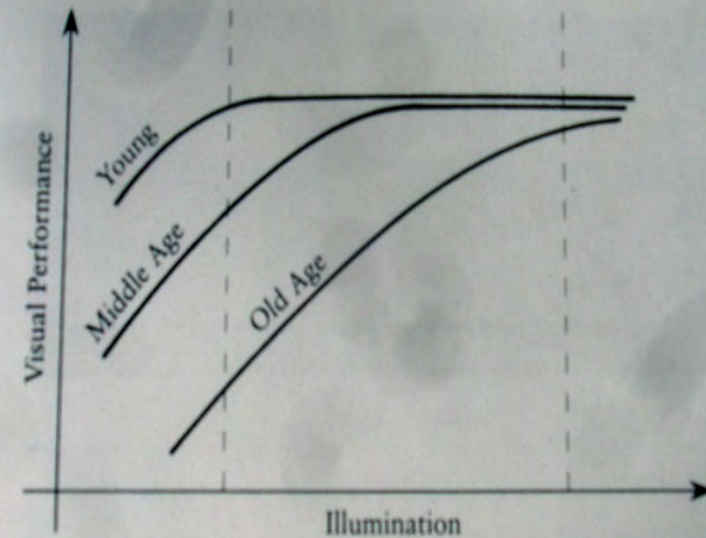


Figure 2-5. Aging versus visual performance. [From Boyce, P.R. 1973. Illuminance, visual performance and preference. *Lighting Research and Technology* 5(3):137]

and from C to D, the improvement in visibility decreases

the outer contour of the visual process. Designers look for contours. Psychology of object is viewed where only its perceived quality of its peripheral which the eye design information natural form and

Receptors process called that the physical receptors in of saying a surface. Whether that it as smooth surface. Figureous surface

Raise ambient light levels

Increase Contrast

Reduce glare & shadow

Give the viewer Control

**4 Best Ways Lighting To Help With
Vision Impairments**

- Plug-in Night lights
- Recessed Can Lights
- Surface Ceiling Fixtures
- Close to Ceiling Fixtures
- Pendant Lights
- Chandeliers
- Track Lighting
- Under Cabinet Lighting
- Wall Sconces
- Light Rope/Tape
- Table & Floor Lamps

TYPES OF FIXTURES IN YOUR TOOLBOX



Getting as close as you can to ideal alignment



WORKAROUNDS...

Understand and Master
THE LAYERS OF LIGHTING



Ambient
Decorative
Accent
Task

**THE FOUR LAYERS
OF LIGHTING**

BARE BONES KITCHEN REMODEL..



CASE STUDY#3



Bare Bones Kitchen
footcandle measurements



Change out Bulbs

Least Expensive

\$



Add supplemental Lights

Most Expensive

\$\$\$



Rearrange all lights

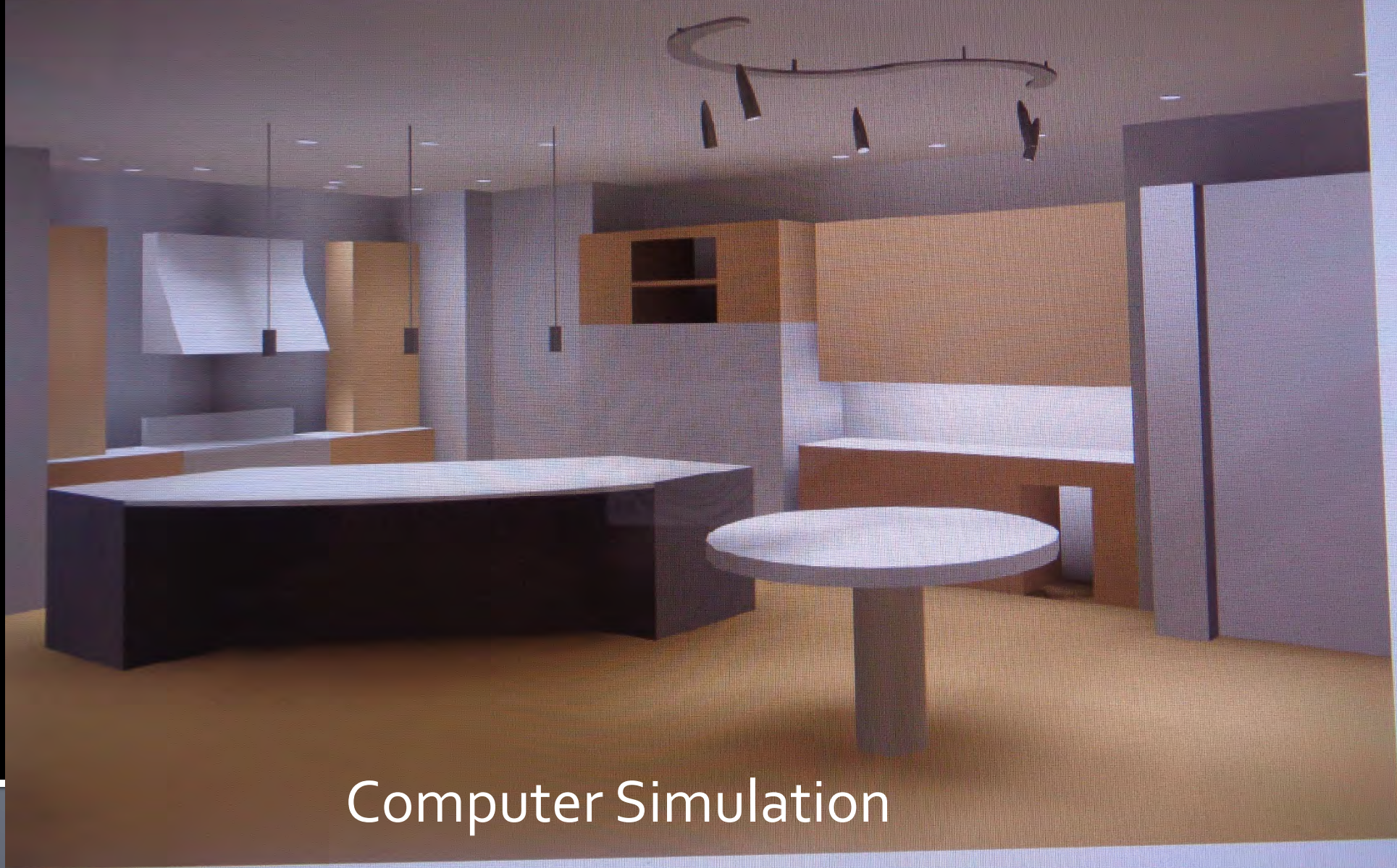
Final Case Study: HIGH END KITCHEN RELIGHTING



MAJOR LIGHTING REMODEL,
OBSERVATORY PARK, DENVER



Before & After



Computer Simulation



**DON'T BE AFRAID TO
EXPERIMENT & MOCK UP
POSSIBLE LAYOUTS**



THE RIGHT LIGHT DEFINED:

1. The right type (Recessed, surface, pendant ...)

2. The right size (6", 5", 4", 3"?)

3. The right bulb (lamp)

a. The right type (BR, PAR, other)

b. The right color temperature

4. IN THE RIGHT LOCATION



**Gold Winner, 2017 K&BDN Awards
by Sandra Diaz-Velasco, Eolo Design**

**Gold Winner, Kitchens
100-200k, KBBDN 2017**

**by Dave Stimmel, Stimmel
Consulting Group, Ambler, PA**



PHOTOBIOLOGIC EFFECTS OF LIGHT

ex: Daylight Improves Mood

And reduces the energy-sapping effects of Seasonal Affective Disorder (SAD).



- Shoppers buy more
- Patients recover faster
- Students get better grades
- Office workers are more productive
- Depression is reduced

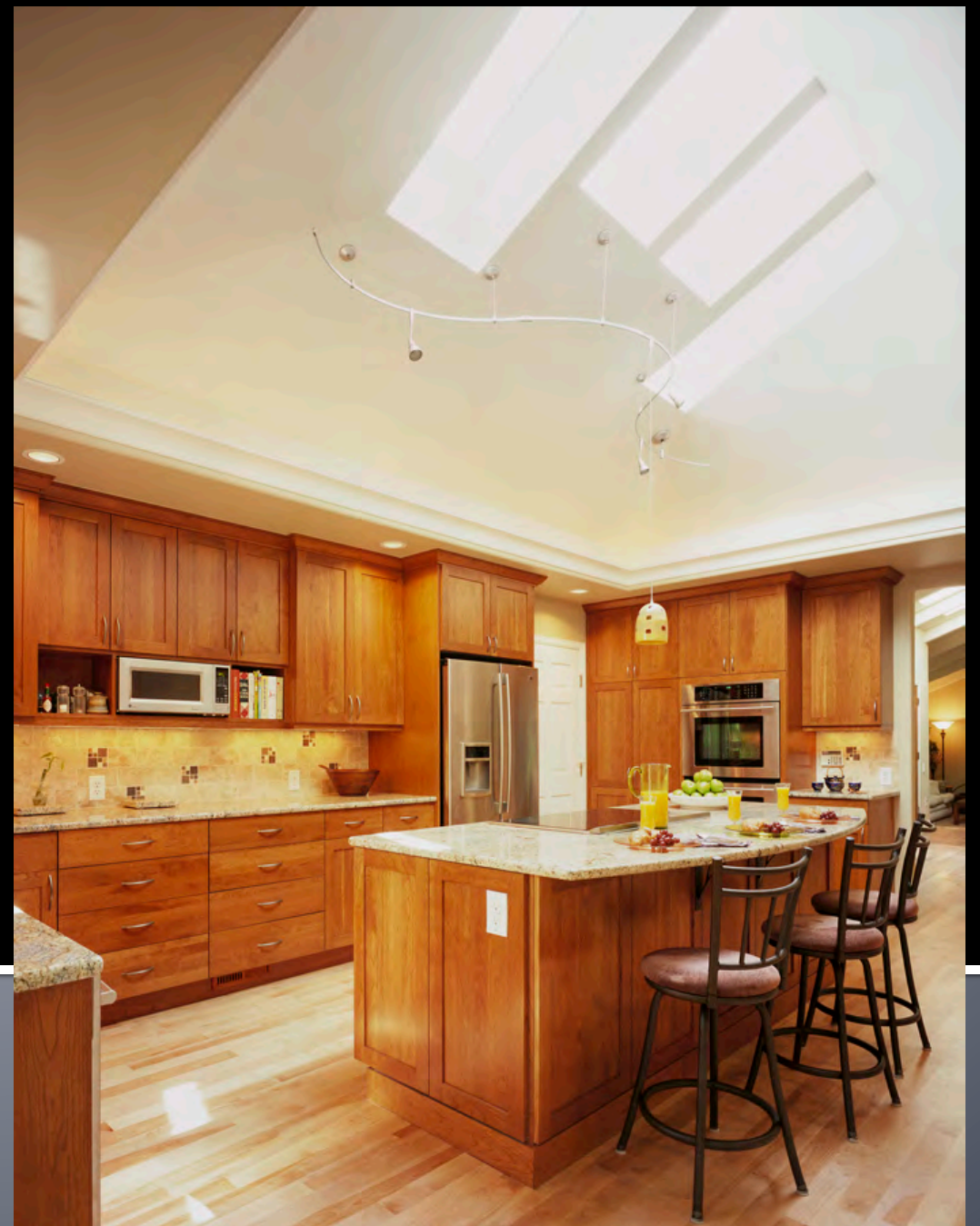


Evidence Shows That With Daylight:

In all this discussion of electric lighting...

**DON'T FORGET THE
BEST AND CHEAPEST
SOURCE OF LIGHT:
THE SUN!**

Doug Walter Architects



CIRCADIAN RHYTHMS AND LIGHT



Nobel Prize in Medicine



USA TODAY · TUESDAY, JUNE 19, 2007 · 80

Your body's on the clock with circadian rhythms

Illustration by Keith Simmons, USA TODAY

By Dan Vergano, USA TODAY

Tired, hungry, busy or sad? Maybe your circadian rhythms are having their way with you. Again.

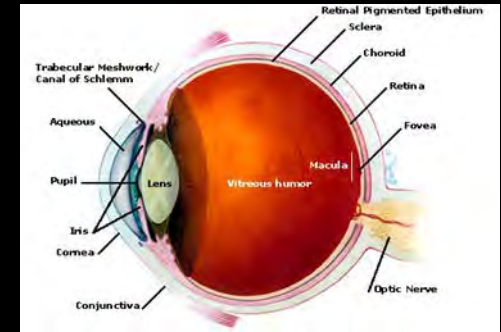
"What are these rhythms good for? That is the basic question everyone is asking," says neuroscientist Goleen McClung of the University of Texas Southwestern Medical Center at Dallas.

isn't the SCN, which adapts to sunlight cues to a new time zone, but rather "peripheral" body clocks located in virtually every organ: "heart, blood vessels, lungs, ovaries, muscles, liver," he says.

The SCN cues these organ clocks to start ticking. But their activity seems more tied to food intake, and they respond more slowly to changes in meal times.

But what makes

1. via the primary optic tract, governing visual response and perception



2. via the retinohypothalamic tract, governing circadian, endocrine, and neurobehavioral function *

*It was only in 1998 that retinal ganglion cells were discovered that are photoreceptors in the eye that are neither rods nor cones, and provide stimulus to the SCN (suprachiasmatic nucleus)

LIGHT ACTS ON THE BODY
IN TWO WAYS

Morning to Noon: a high intensity of blue light in the 400-500 nm range

Late afternoon light: sun is orange to red light in the 600-700 nm range

Nighttime darkness is just as important as daylight for proper human health

New Category: Circadian Lighting and "Tuneable" Lighting



**THE NEXT REVOLUTION
IN LIGHTING!!**



2016

LIGHT AND
TECHNOLOGY IN A
NEW LANGUAGE.

Senior Care Lighting - An Iterative Pilot Study

April 28, 2016

8:30 am – 9:30 am

Bob Davis, PhD, FIES, PNNL
Connie Samla, PE, LC, SMUD

SAN DIEGO, CA USA
San Diego Convention Center

LIGHTFAIR.COM

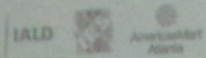


PHOTO CREDITS
ZHENHAI CULTURE & ART CENTER, SHANGHAI
ZHU JIANG, CHINA | LIGHTING DESIGN: NING SU
VENANG LIGHTING CO LTD | PHOTOGRAPHY
© 2016 IALD



2400 K: nighttime setting



6000K : morning setting



PATIENT ROOMS & CORRIDOR

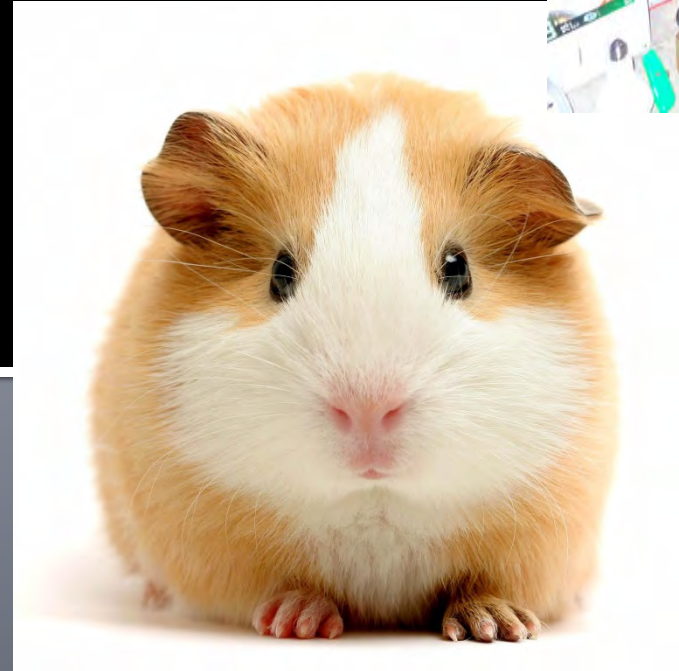
TIPS AND TAKEAWAYS:



**YOU CAN'T MANAGE WHAT YOU
DON'T MEASURE!!!!**



BE YOUR OWN GUINEA PIG!!



TRY IT OUT IN YOUR OWN KITCHEN FIRST !!!

RESOURCES:

- A/L MAGAZINE (online only, FREE)
- ENLIGHTENMENT MAGAZINE (FREE)
- LIGHTING & DÉCOR MAGAZINE (FREE)
- LD&A MAGAZINE (COME W. MEMBERSHIP TO...)
- IESNA: ILLUMINATING ENGINEERING SOCIETY
- IALD: INTERNATIONAL ASSOCIATION OF LIGHTING DESIGNERS
- IBS/KBIS 2018 in ORLANDO
- LIGHTFAIR: ANNUAL TRADE SHOW (CHICAGO)

GLOSSARY & RESOURCE LIST

Available on website:

www.dougwalterarchitects.com

Click on News/Articles tabs



**Who is the Lighting Expert on your
jobs? YOU ARE!!!**

Thank you!

This concludes the Continuing Education Program

Any Questions??



Doug Walter, AIA, CAPS, LEED AP
Doug Walter Architects
www.dougwalterarchitects.com

The logo for KBIS, featuring the letters 'KBIS' in a bold, sans-serif font. The 'K' and 'B' are dark blue, and the 'I' and 'S' are light grey.

