



DOE – 2016 Technology Development Workshop

Presented by: Aaron Smith, Director of Technology

FINELITE
Better Lighting

DOE – 2016 Technology Development Workshop

- **Tunable White Case Studies**
 - **Lighting**
 - **Learning and the classroom**
 - **DOE research on lighting the Classroom of the future**

Start With:

Lighting

Lighting Supports Architecture



Project: DSST Conservatory Green Middle School Location:
Denver, CO
Architect: RB+B Architects

Lighting Needs Multiple Modes



Project: Alexander Graham Bell Elementary School
Location: Kirkland, WA
Architect: DLR Group

Lighting Can Be Tailored To The Space



Project: ChildServe Center
Location: Johnston, IA
Architect: SVPA Architects

Then, Re-Think:

Learning and the Classroom

Learning is Everywhere



Learning is Individual



Learning is Student Centric



Learning is Multiple Small Groups



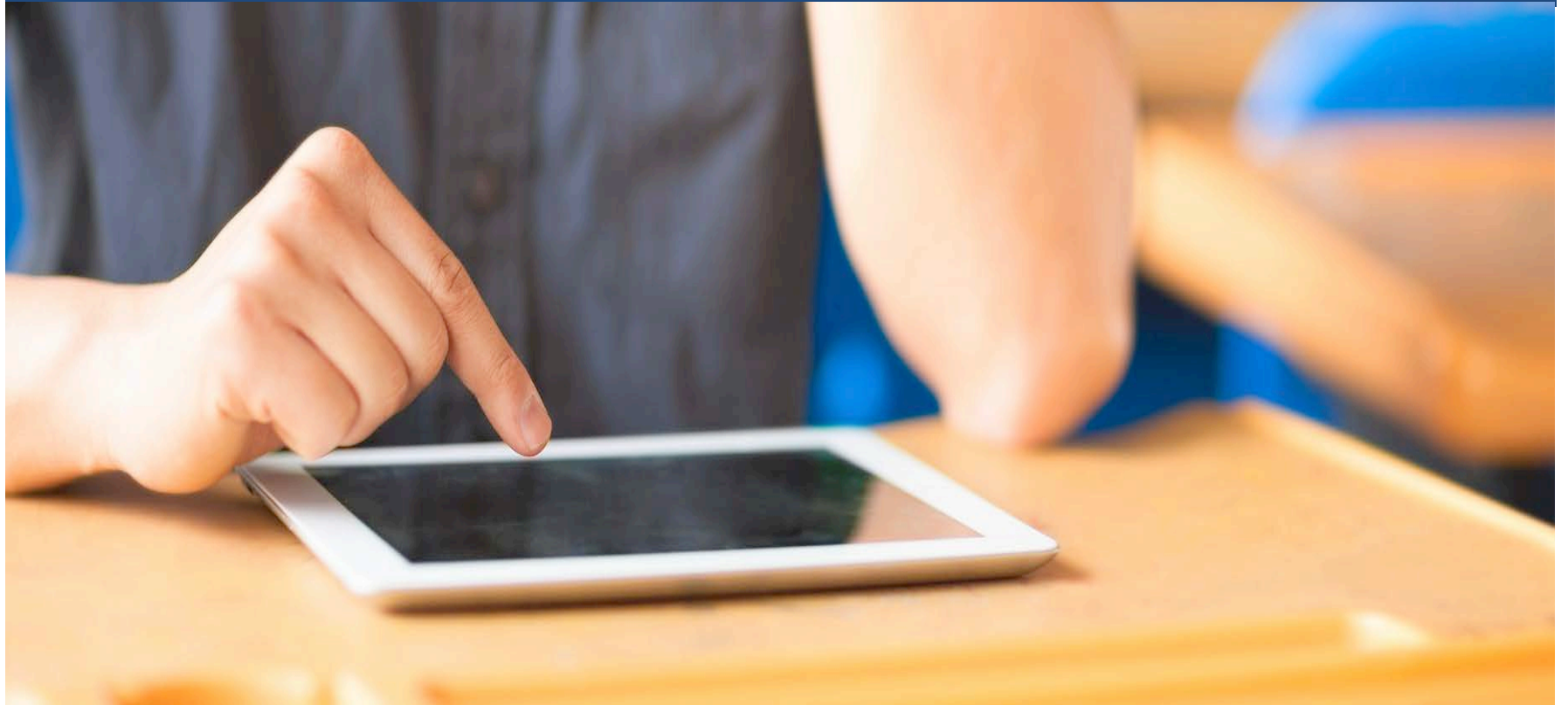
Classrooms Have Flat Panel Monitors



Classroom Have Single & Multiple Projectors



Classrooms Have Tablets



Classrooms Have Moveable Furniture



Classrooms Have Whiteboards and Writeable Walls



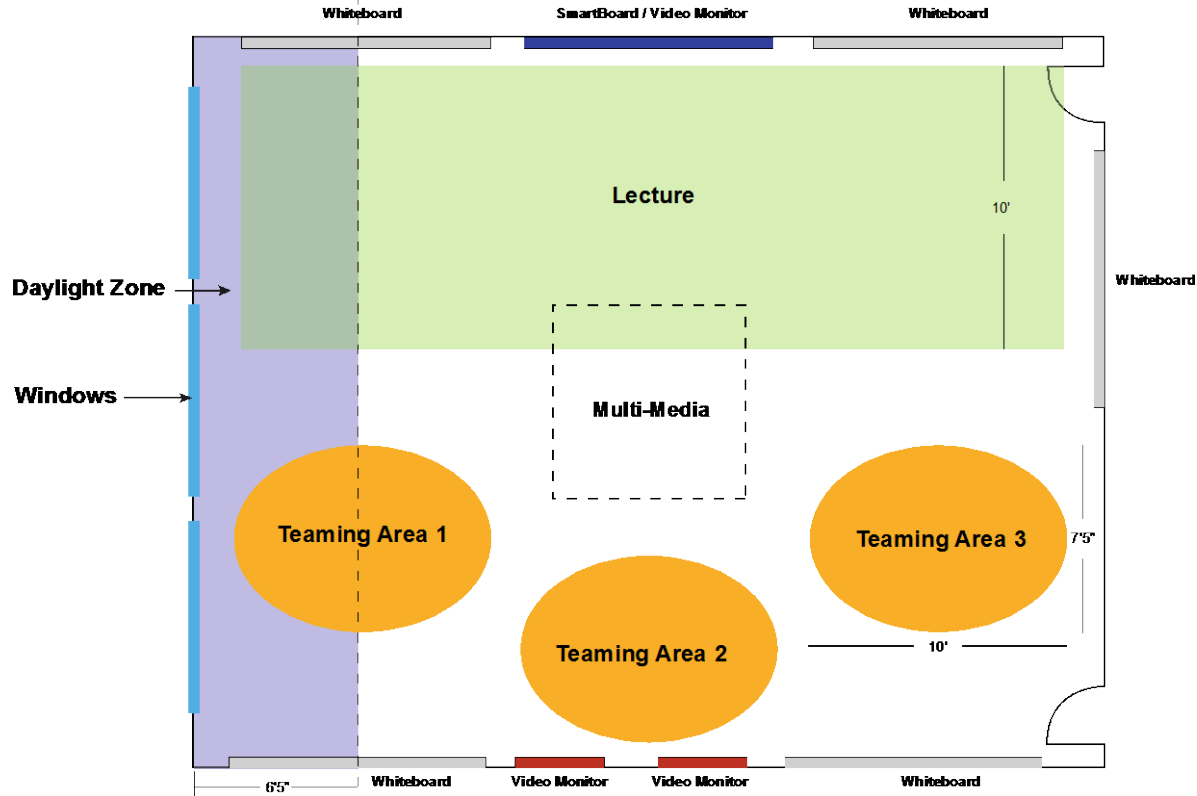
Student Presentations Replace Teacher Lectures



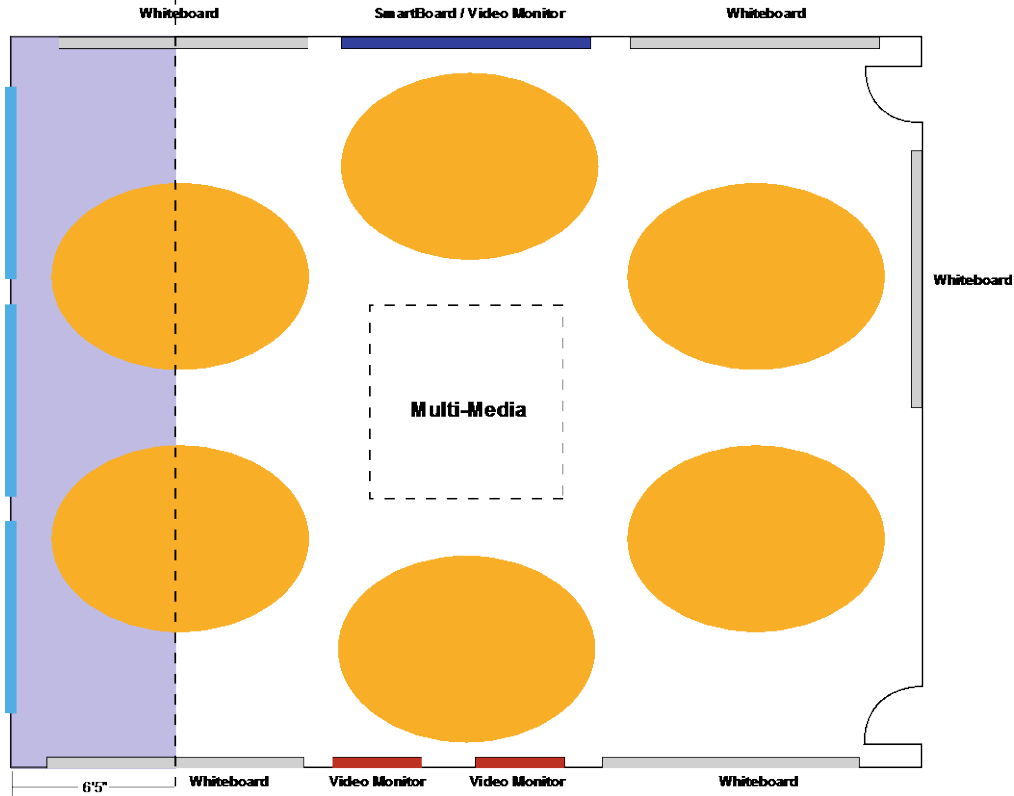
Lighting The Classroom of the Future

Introducing the DOE Research Project

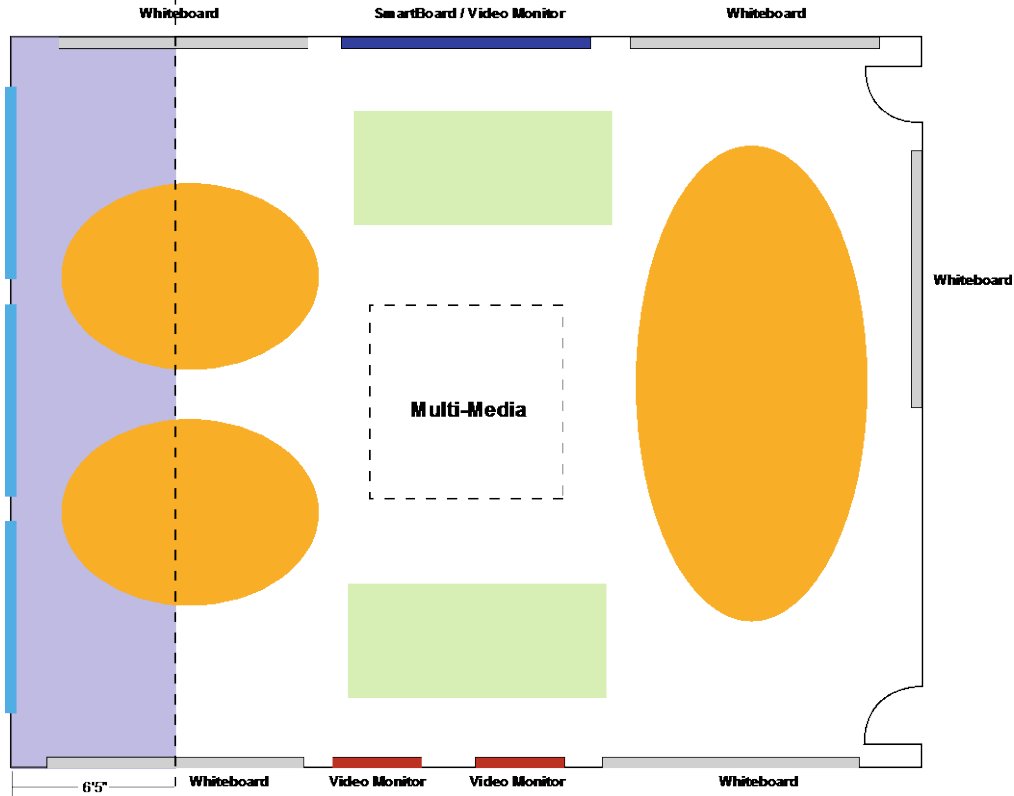
DOE Selected the Layout



Furniture Can Rearrange Daily:



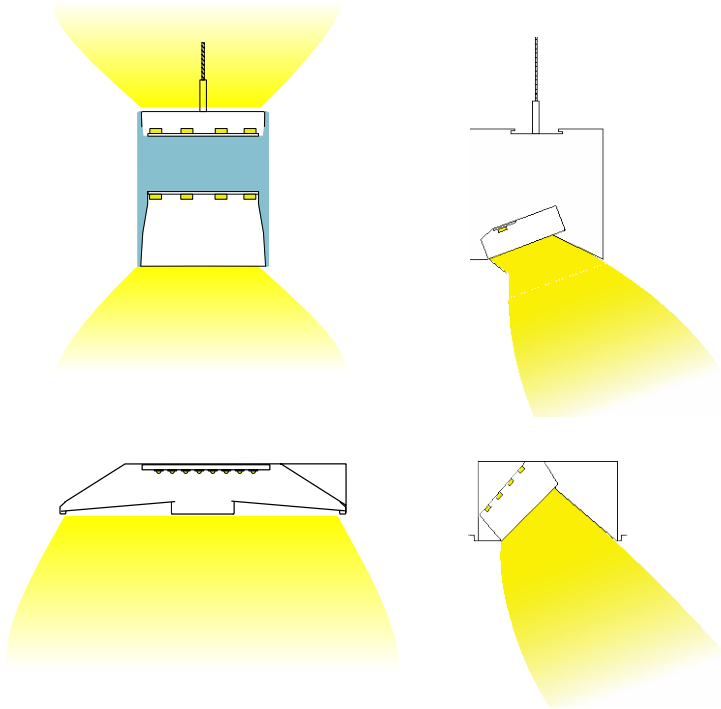
Furniture Can Rearrange Daily:



The DOE Research Findings

- **Layers of Light**
- **Future Proof Design**
- **Lighting Controls Built Specifically for Teachers**

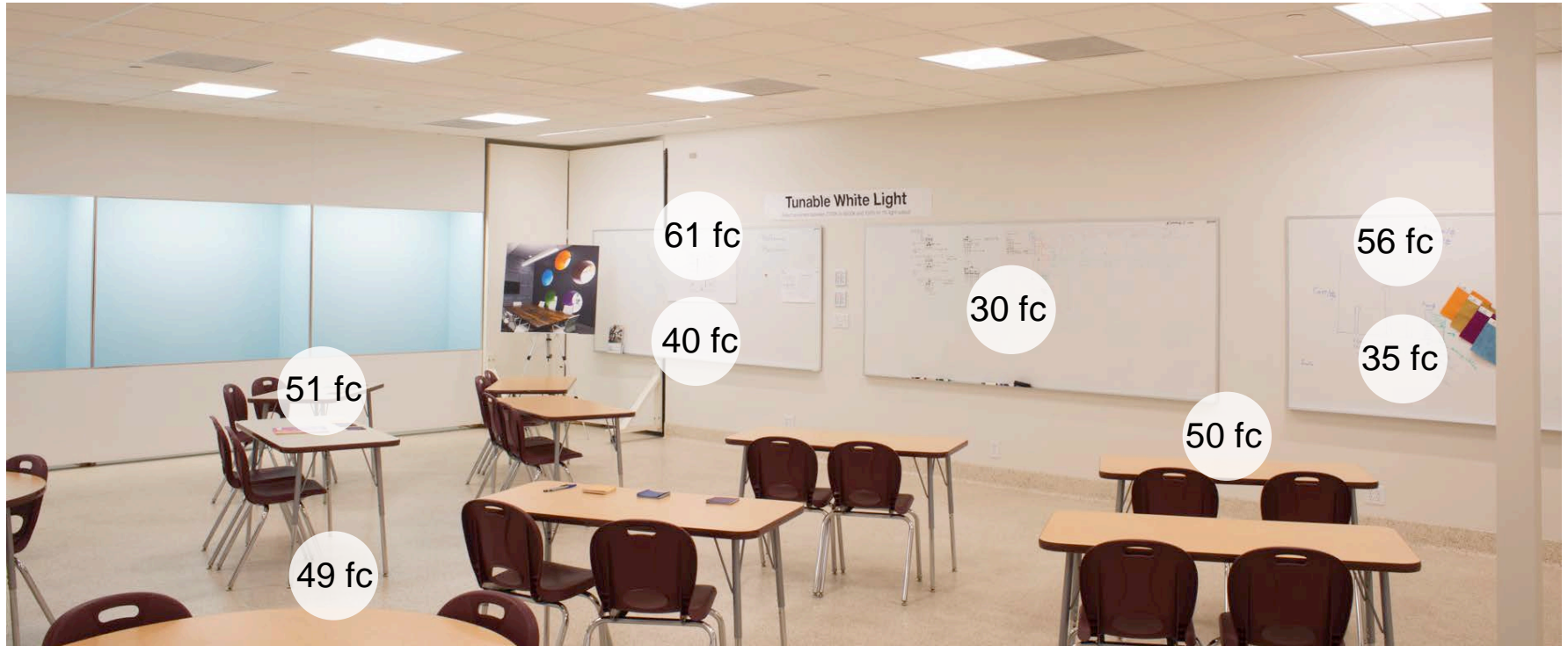
Layers of Light via High Performance Luminaires



- **Lumen maintenance – 90% at 100,000 hours**
- **Color maintenance – Same!**
- **Efficacy > 120 LPW**
- **Styles: recessed, pendant and whiteboard for both**

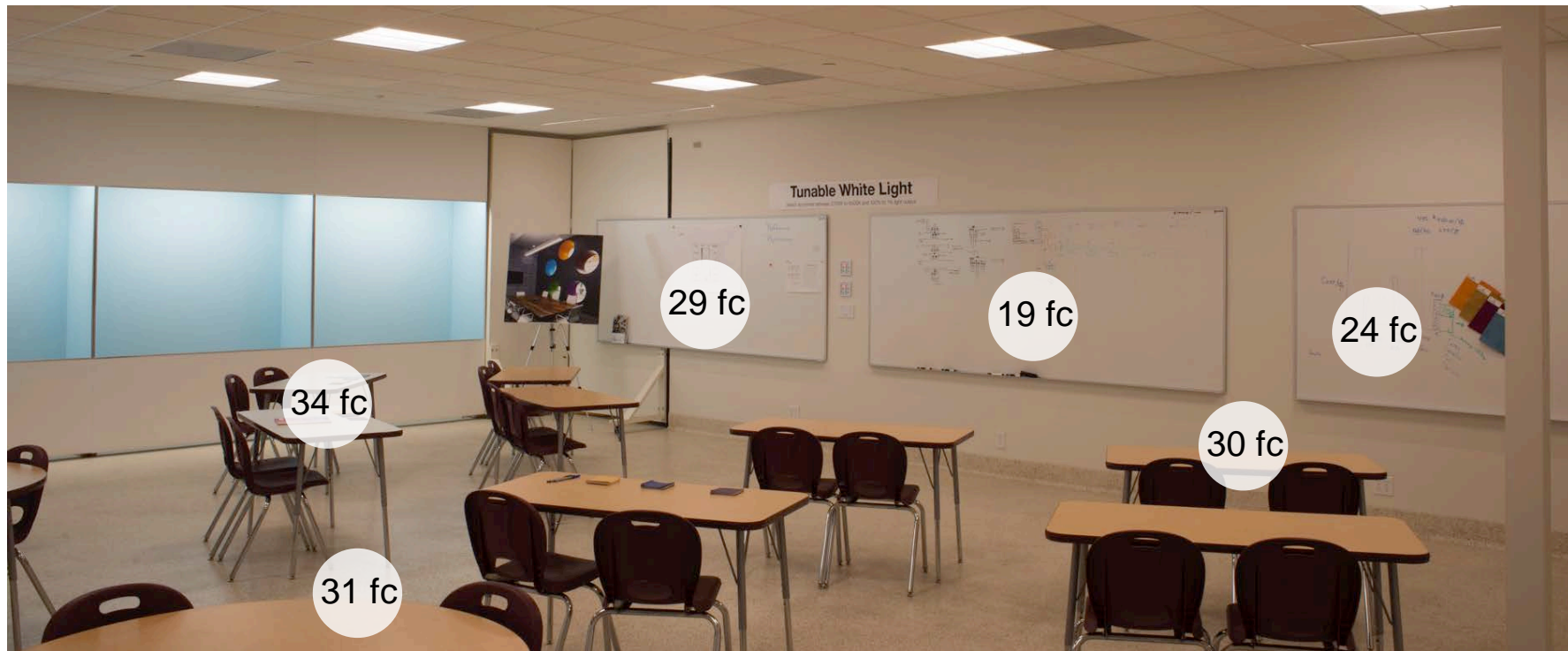
Lighting – Ceiling + Whiteboard + “Daylight”

CCT 4250K / Ceiling .27 W/sq ft at 75% / Whiteboard .19 W/sq ft at 100% / Total: .46 W/sq ft



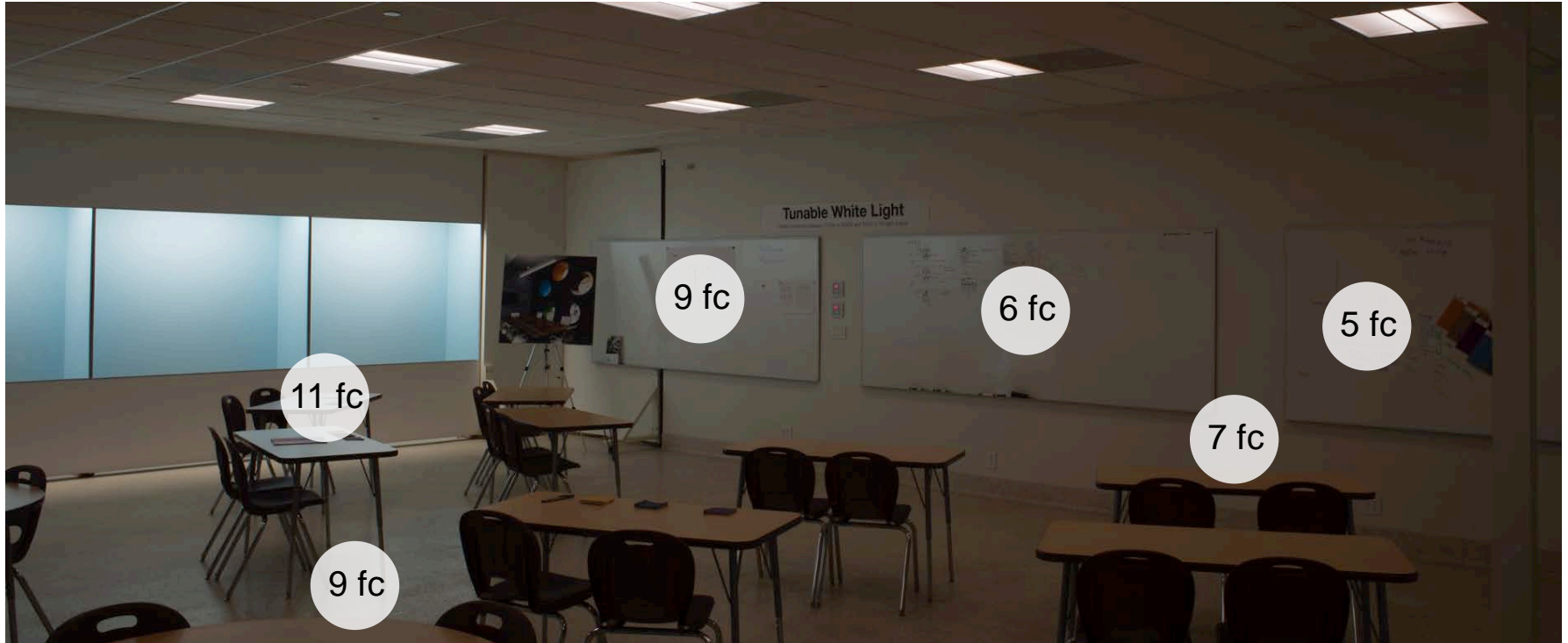
Lighting – Screens and Tablets

CCT 3750K / Ceiling .17 W/sq ft at 60% / Whiteboard .05 W/sq ft at 50% / Total .22 W/sq ft



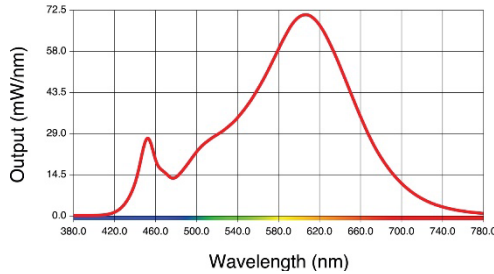
Lighting – AV Mode

CCT 3750K / Ceiling .04 W/sq ft at 30% / Whiteboard Off / Total .04 W/sq ft

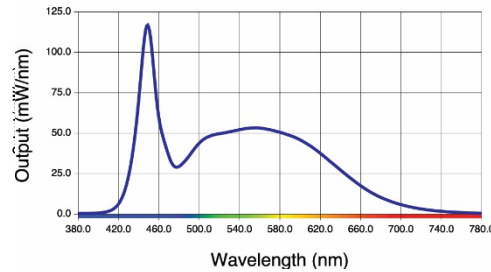


Future Proof with 2-source Tunable White Arrays

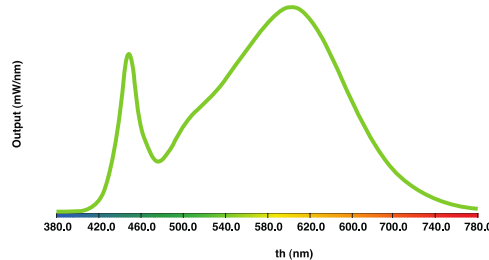
2700K: CRI 83, R9 10



6500K: CRI 85, R9 19



Two Source 3500K: CRI 87, R9 36



- **Excellent spectrum quality**
- **2700 – 6500K range**
- **Multiple form factors**
- **Plug-and-Play**
- **Serviceable**

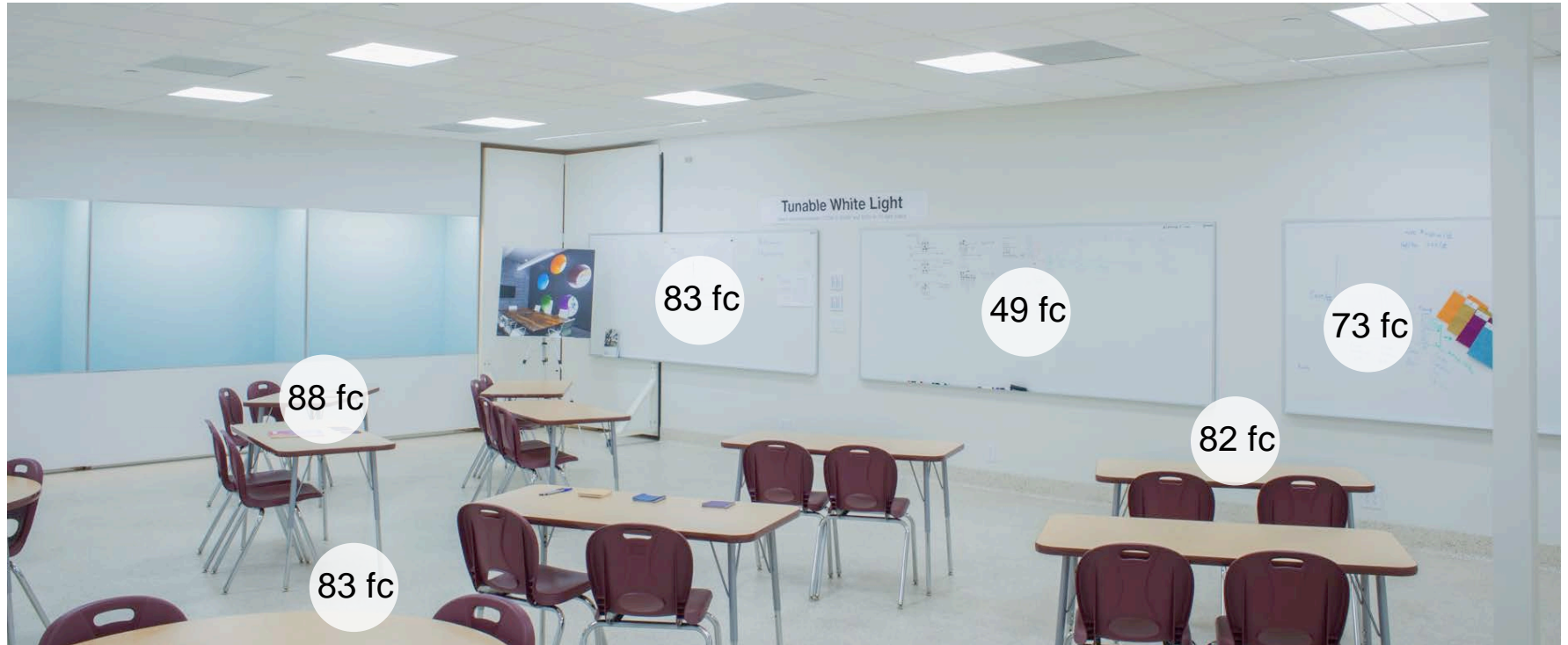
Lighting To Balance Daylight – (Focus Group Input)

CCT 5450K / Ceiling .31 W/sq ft at 80% / Whiteboard .19 W/sq ft at 100% / Total .50 W/sq ft



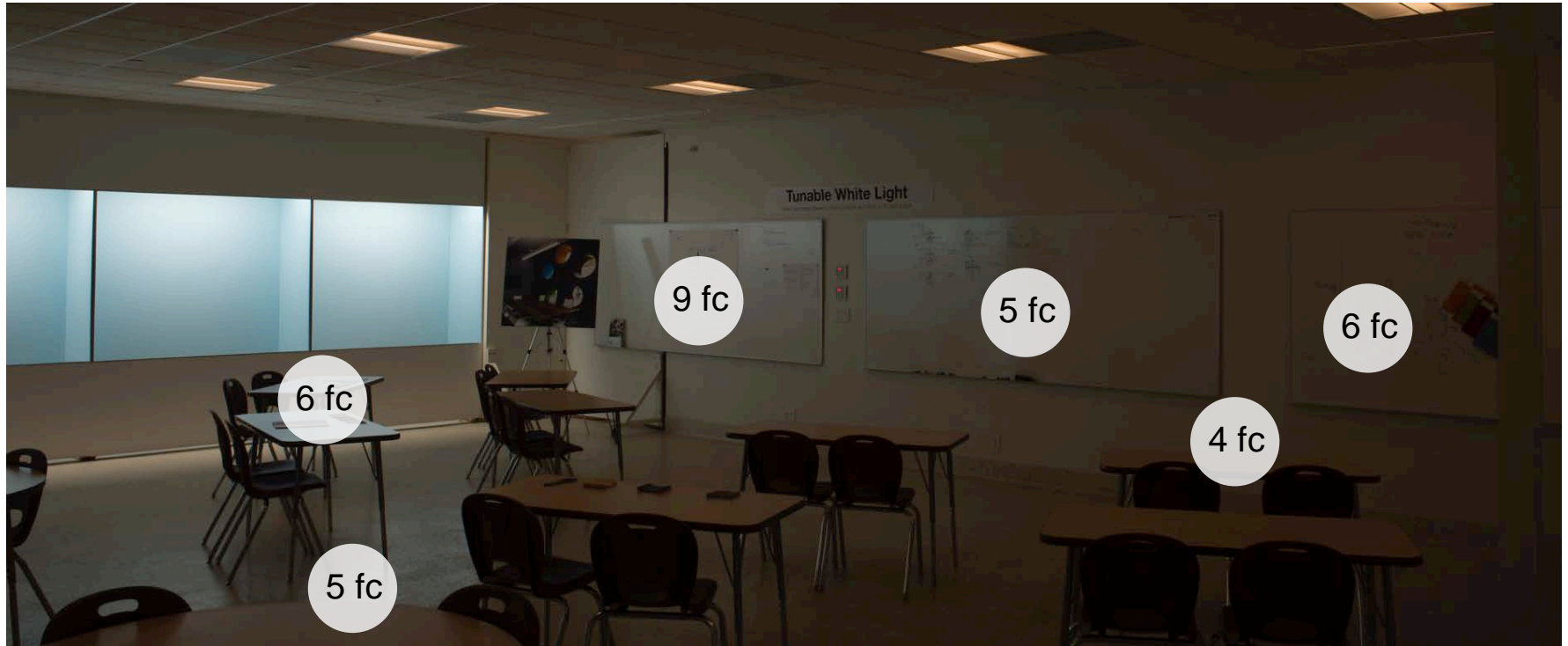
Lighting – Maximum Alertness

CCT 6500K / Ceiling .48 W/sq ft at 100% / Whiteboard .19 W/sq ft at 100% / Total .67 W/sq ft



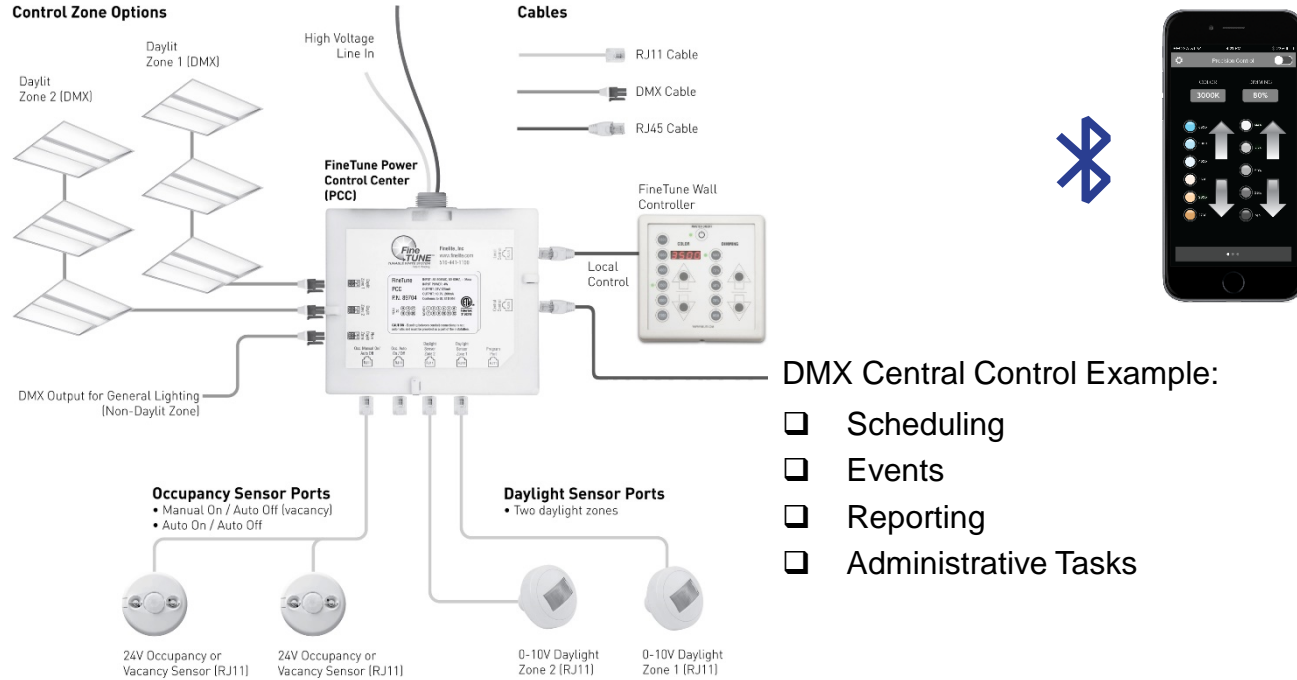
Lighting – Calming Mode

CCT 2700K / Ceiling .005 W/sq ft at 10% / Whiteboard .002 at 10% / Total: .007 W/sq ft



Lighting Controls Tailored for Teachers

System



One Key Finding is Absolutely Clear

**LEDs make quality lighting
affordable for all classrooms**

**Color tuning helps
future proof the design**

Schools Are Built To Last Decades



LED Luminaires Should Last 40 years



Long Life Changes the Value Equation

Proper LED luminaire and system design gives the school;

- Decades without maintenance
- Decades of lower energy costs
- “Future Proof” operation
 - Tunable White Available Today
 - Teacher can change pre-sets as teaching changes
 - Wall-mount and smart phone control
 - Local and Central Control
 - IoT enabled
 - Cost effective today and cost effective for tomorrow

This Means We Must Educate, Educate, Educate

- No other building element has undergone such rapid change
- Massively more value at lower cost!
- School districts need to know this
- Architects need to know this
- Lighting Designers and Specifiers need to know this
- Engineers need to know this
- Contractors need to know this
- Collaboration is needed to make this happen

Thank You

This concludes our presentation.
For more information, please contact:

Finelite, Inc.
30500 Whipple Road
Union City, CA 94587-1530

Ph (510) 441-1100
Fax (510) 441-1510

Aaron Smith
aaron.smith@finelite.com
www.finelite.com