

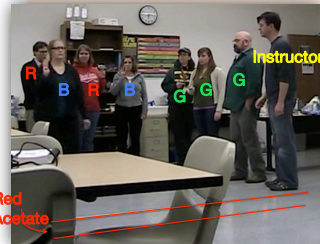
Models for Seeing Colored Objects: A Case Study Progression

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How do we learn new things?

Light Energy Theater

(Energy Theater pertaining mainly to light energy)

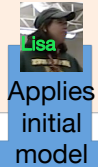


Scenario:
Sunlight shines through a red acetate

Decision:
Walk through acetate (transmission) or stop within acetate (absorption)



Hand signs signify color of light



Applies initial model



Action:
R was transmitted
B was absorbed

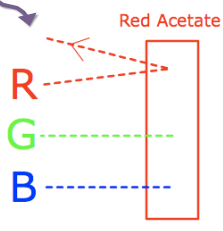


Walks through acetate
"Shouldn't they [reds] be reflected off? And shouldn't... the rest of us [blue and green] go in?"

Disagrees with other participants

Opaque Model

Lisa initially thinks acetates act like opaque objects



Energy Theater Rules

- You are a chunk of energy.
- Objects in the scenario correspond to locations on the floor.
- You indicate your form in some way.
- As energy is transferred among objects, you move to different locations on the floor.

Raw Resources

Pre-established ideas and concepts

Lisa comes to class with prior knowledge of light and color

(Hammer, AJP, 2000)



Challenging Established Mental Models

Difficult to significantly alter what students think

Lisa creates multiple models before developing one with no conflicts

(Redish, AJP, 1994)

Compromise Model still conflicts with other participants' models

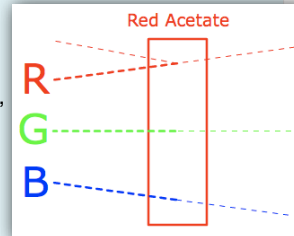
Compromise Model

Model:

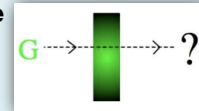
R: some reflected, some transmitted
G and B: some absorbed, some transmitted



Reasons through a new model:
"Wouldn't some [green and blue] be absorbed and some go through just like the red?"



What happens when light is transmitted?

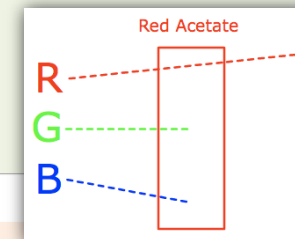


Transparent vs. Opaque

Light travels through transparent objects

Creates another model

Transmission Model



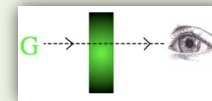
Model:

R: transmitted
G and B: absorbed



Realizes acetate color is not determined by reflection

"You're basically saying that you're just seeing light coming through, it's not reflecting"



No more contradictions



Realizes she learned something new
"This kind of stuff I never really learned"

