Behavior Changes That Count

Designing k-12 Energy Efficiency Behavior Programs
That Yield Predictable, Measurable Results

Energy Management Starts With…

- Over 1,000 k-12 CA schools since 1996
- STEM-based energy efficiency education
- Student-driven savings: 5-15% reduction in energy consumption

PowerSave Schools Program Results

- 563 schools enrolled since 2008

- 8.5% average energy reduction

- 40,044 mWhs saved

- $5.7 million in avoided costs

"Soft" Impacts of Student-Led Approach

- Fostering student leadership
- Students from disadvantaged backgrounds develop sense of agency
- Creates bonds between students/teachers and facilities staff
- On-ramp to green careers
- Engaging homes and communities
- Generate culture change

Three Elements of Behavior Program Design

- Evaluation, Measurement, & Verification (EM&V)

- Social Science

- Ease of Implementation

Evaluation, Measurement, & Verification

- Answers the question: how will/do/did you do that?

- Perception that behavior is difficult to predict/measure

- Important before, during, and after implementation

- Avoids cannibalizing savings
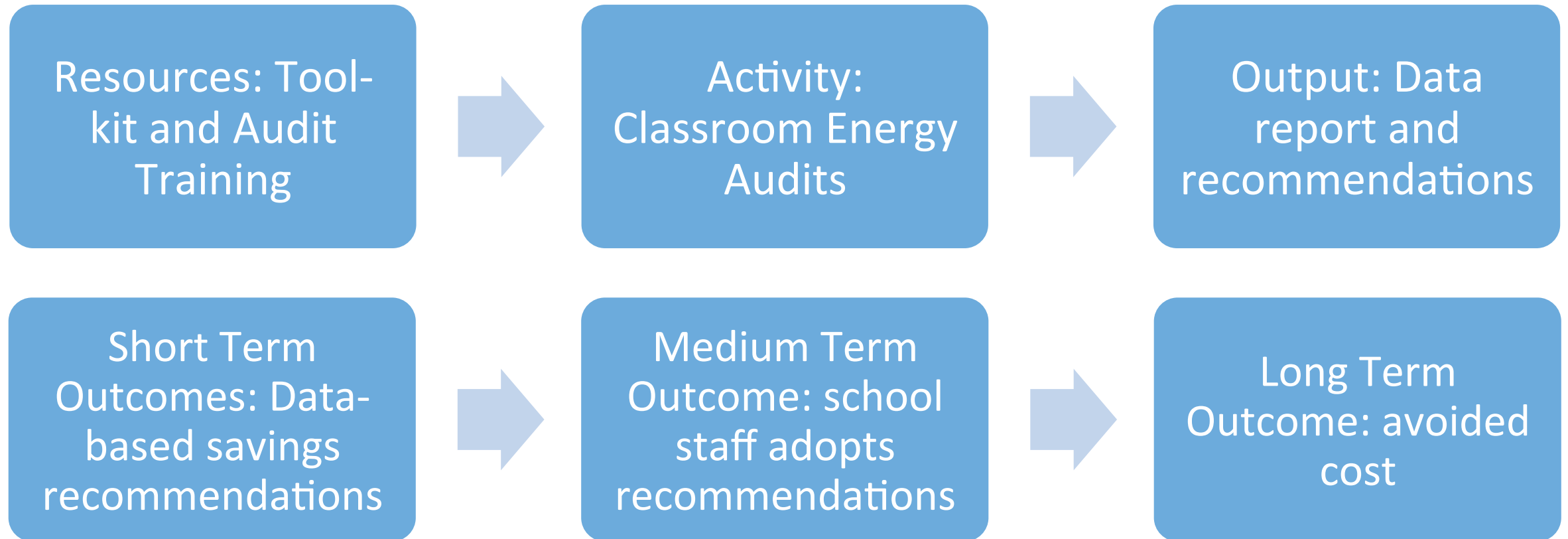
Theory & Logic Model (T&L)
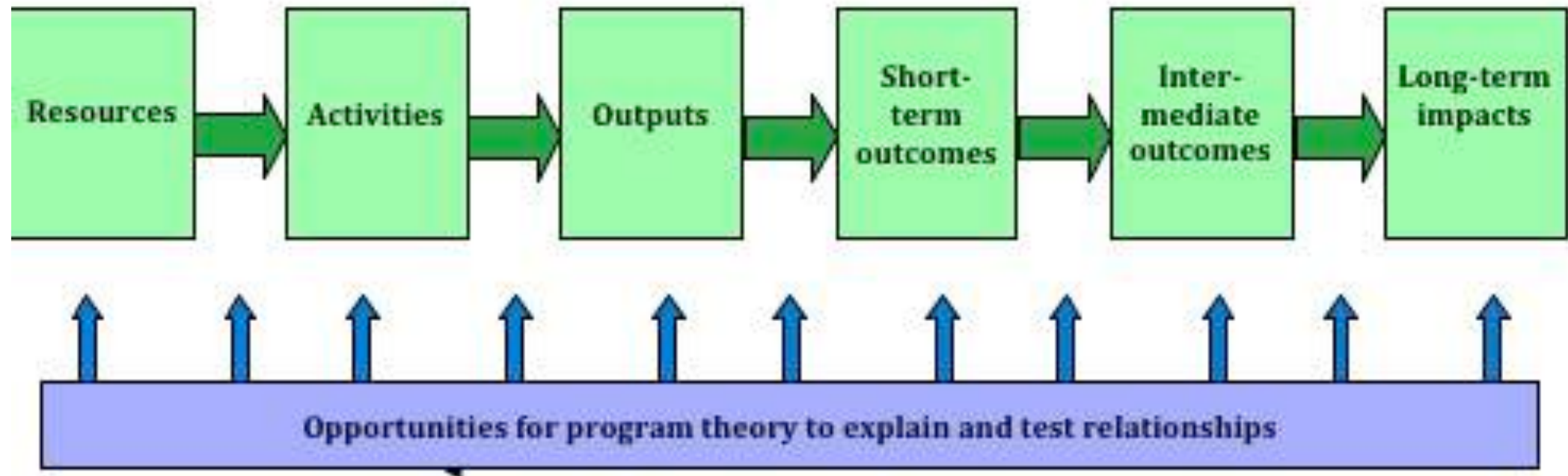
"Working without a program logic model is akin to driving in an unknown country without an adequate roadmap; even if you are lucky enough to get to your destination, you won't be able to trace how you got there." *--Paving the Way...*
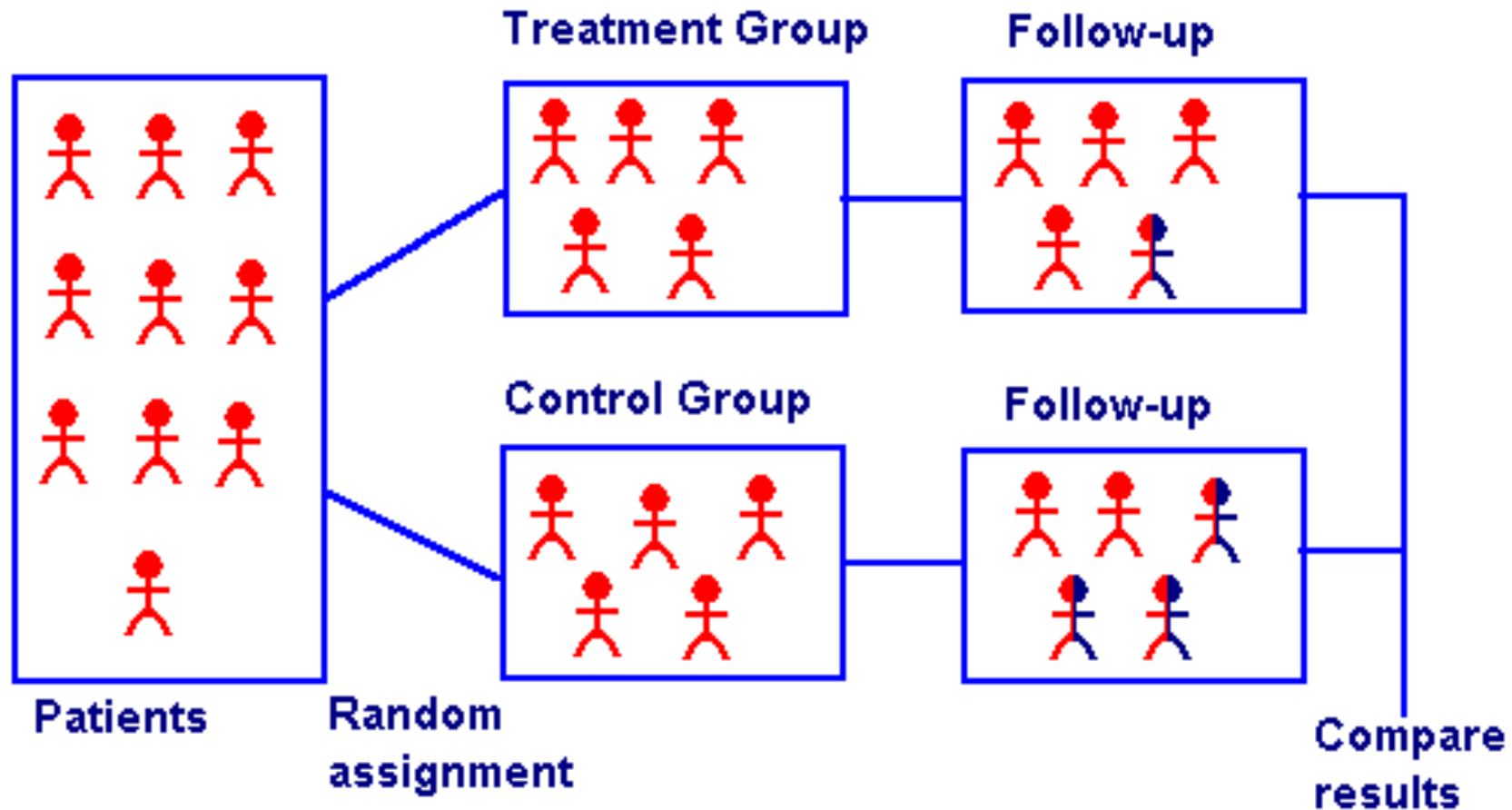
Example: Student Energy Audits

Resources: Tool-kit and Audit Training	→	Activity: Classroom Energy Audits	→	Output: Data report and recommendations
Short Term Outcomes: Data-based savings recommendations	→	**Medium Term Outcome: school staff adopts recommendations**	→	**Long Term Outcome: avoided cost**

Separating Treatment and Control Groups

Control Group

Treatment Group

Randomized Control Trial (RCT)

Randomized Encouragement Design (RED)

- Potential participants offered encouragement to participate (encouragement is applied at random)

- Participants may opt in or out

- May be a better fit for school districts

Measuring and Tracking Savings

International Performance, Management, and Verification Protocol (IPMVP)

- Standardized statistical approach to quantifying the effects of energy efficiency measures
- <u>Option C</u> addresses whole building analysis

  o Multi-variant regression analysis

  o Delineates plan for data collection

  o Track site changes unrelated to conservation measures

Smart Metering and Interval Data
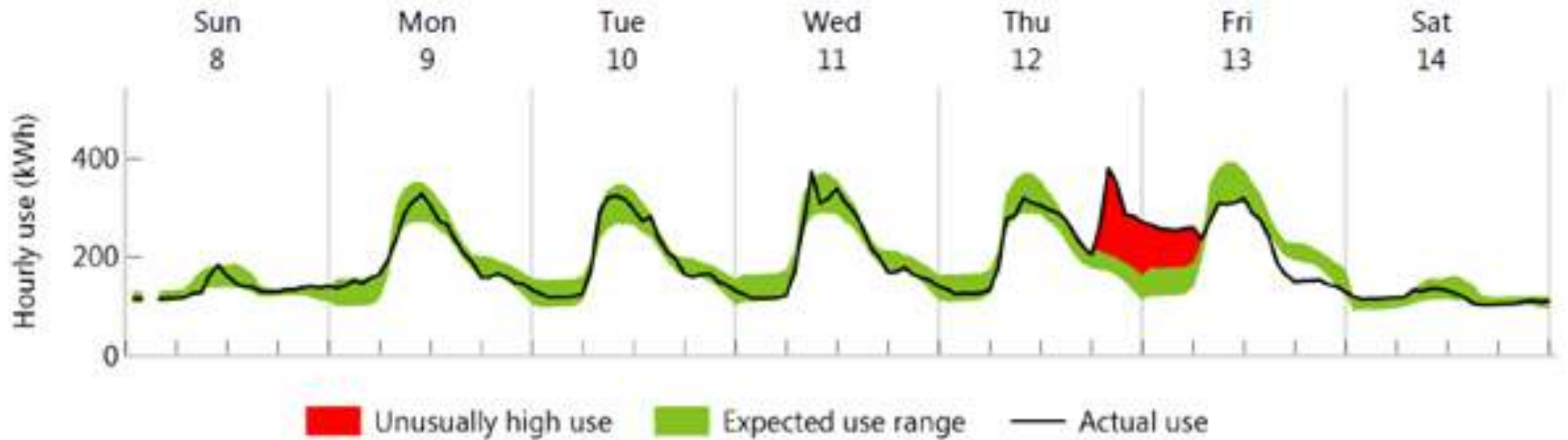
Social Science Research
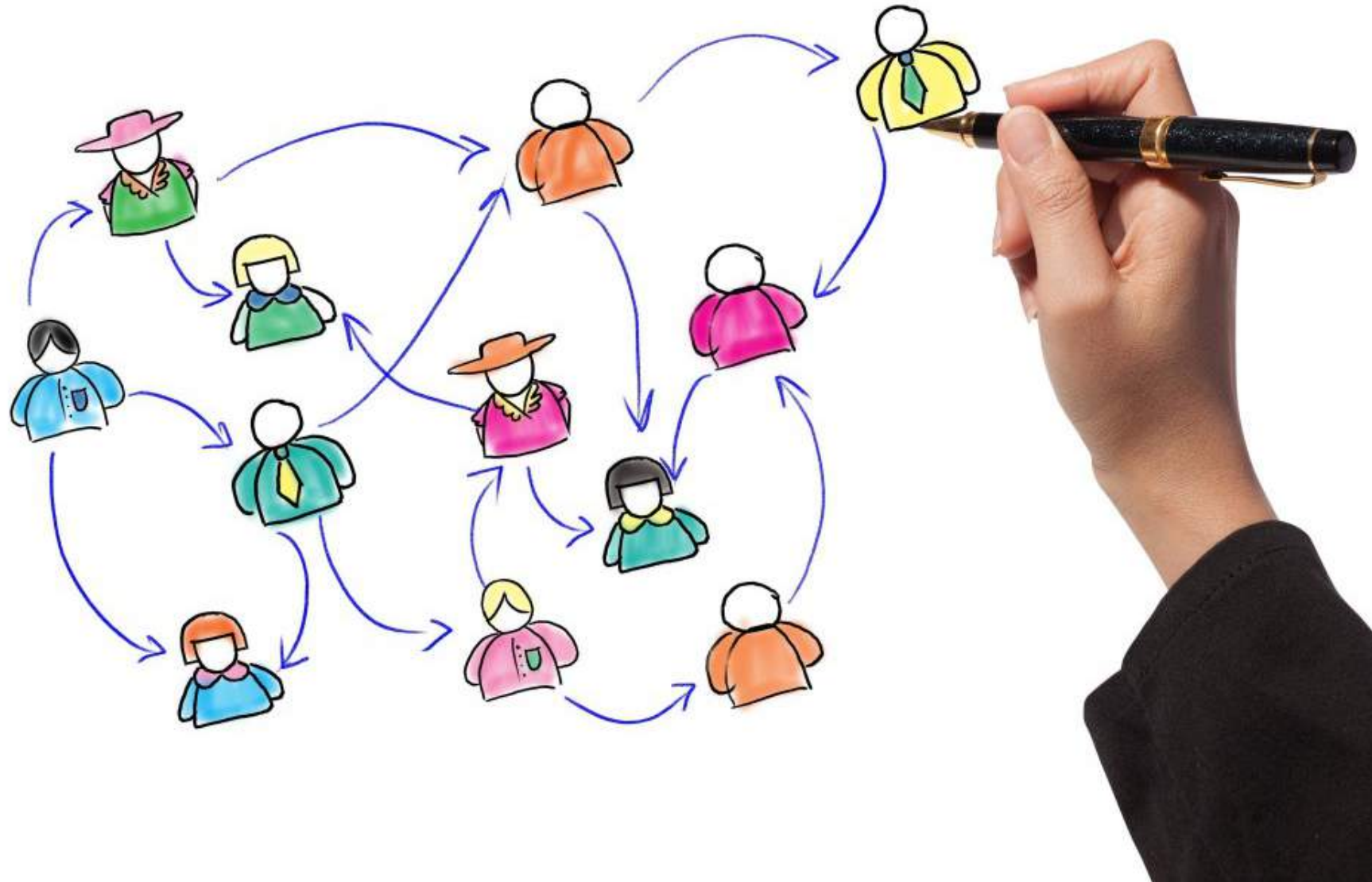
What is Social Science?

Study of the relationships between people with use of the scientific method

Why Social Science?

Identifies most effective behavior intervention strategies that influence energy efficiency

Commitment

- Strategies that encourage commitment to executing an action by a specific date
- Goal-setting
- Begin with small commitments
Example: Energy-saving pledges

PowerSave Energy Pledge

I, _____, understand that my school is trying to save energy and money through the PowerSave Schools Program. I pledge to try the following energy-saving practices in my classroom:

1. **Right-Lighting**
2. **Last Out Lights Out**
3. **Closing doors and windows when the AC/heater is on**
4. **Turning off computers when not in use**

I will allow the **PowerSave Team** to conduct an **energy audit** of my classroom (less than 10 minutes) to determine my **right-lighting level** and investigate where energy is being wasted. The best times/days to audit my classroom are (circle all that apply):

After School   At Lunch   During these times: _____

I will also take part in the **PowerSave Energy Patrol Contest**. The classroom that sticks with the most energy-efficient behaviors wins a **prize**!

My classroom is on board to help the PowerSave Team!

Signature: _____   Date: _____   Classroom #: _____
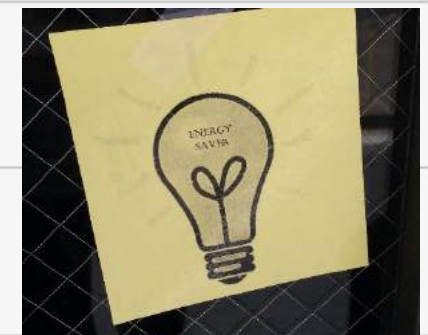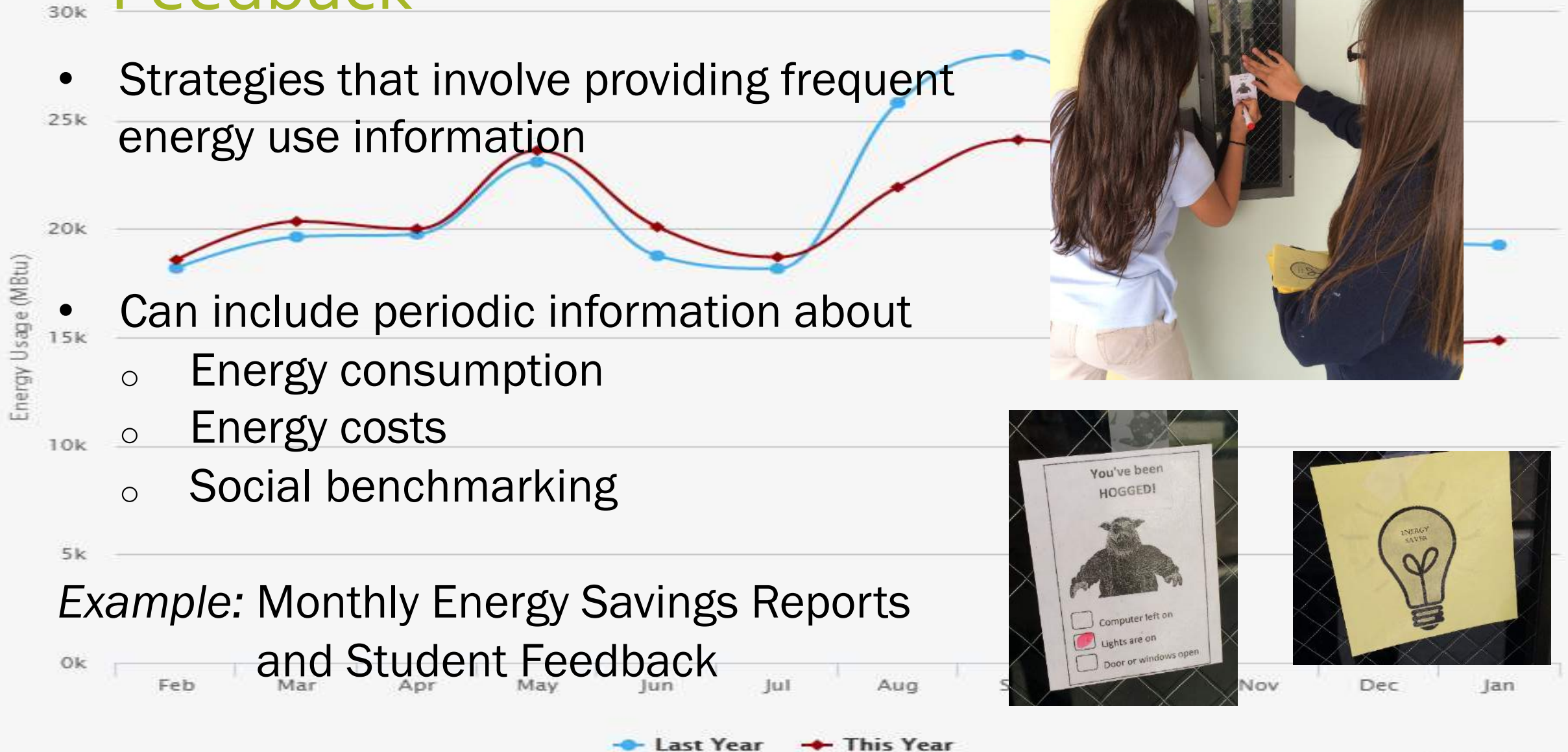
Feedback

- Strategies that involve providing frequent energy use information

- Can include periodic information about
    - Energy consumption
    - Energy costs
    - Social benchmarking

Example: Monthly Energy Savings Reports and Student Feedback

Social Norms

- Strategies that leverage the power of "normal"

- Presenting efficiency behaviors as commonly accepted and widely adopted aka peer pressure

Example: Energy Savings Leaderboard
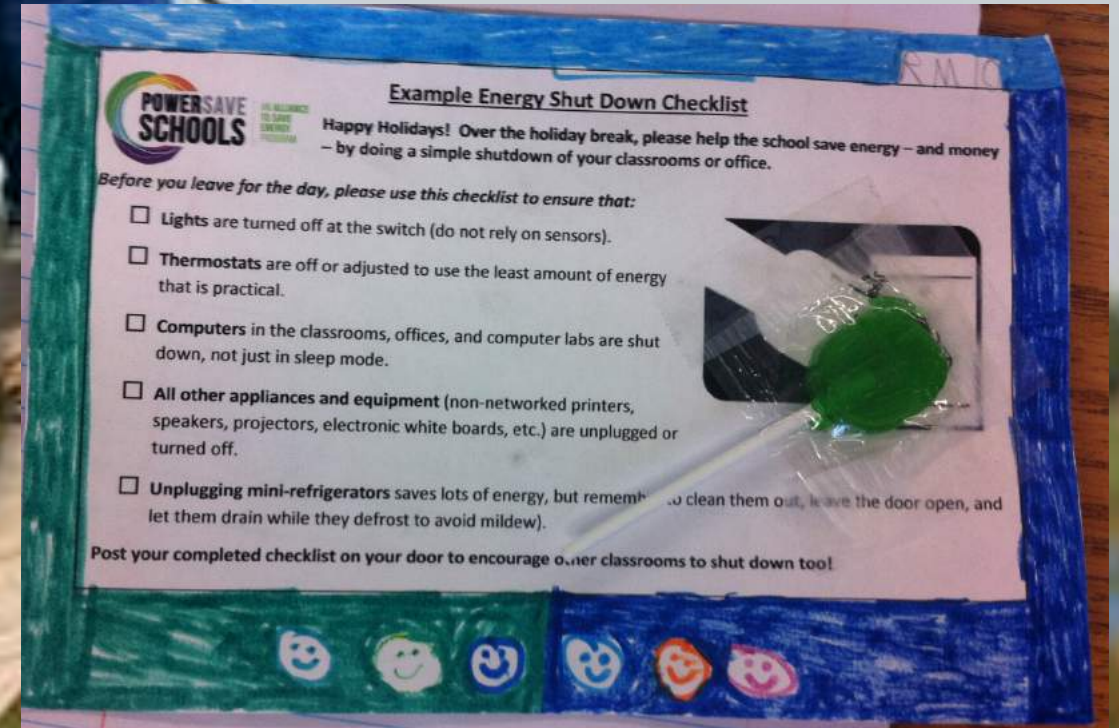
Competition/Rewards

- Utilize commitment, feedback, and social norms to drive competition

- Publically reward for achieving certain goals or leading the pack

Example: Classroom Energy Patrols

Follow-through

- Strategies that remind individuals to make good on their stated intention or commitment

- Provide prompts or reminders

- Ask individuals to create their own energy reduction plan

Example: Holiday Shutdown Checklist

Example Energy Shut Down Checklist

POWERSAVE SCHOOLS

Happy Holidays! Over the holiday break, please help the school save energy – and money – by doing a simple shutdown of your classrooms or office.

Before you leave for the day, please use this checklist to ensure that:

☐ **Lights** are turned off at the switch (do not rely on sensors).

☐ **Thermostats** are off or adjusted to use the least amount of energy that is practical.

☐ **Computers** in the classrooms, offices, and computer labs are shut down, not just in sleep mode.

☐ **All other appliances and equipment** (non-networked printers, speakers, projectors, electronic white boards, etc.) are unplugged or turned off.

☐ **Unplugging mini-refrigerators** saves lots of energy, but rememb[...] clean them out, leave the door open, and let them drain while they defrost to avoid mildew).

Post your completed checklist on your door to encourage other classrooms to shut down too!

In-person Interactions

- Strategies include face-to-face connections between individuals and trusted members of the community

- Encourage desired behavior through credible, familiar messengers

- Model behavior and ask questions

  Example: Student Presentations

Multi-pronged Strategies

- The most effective strategies leverage more than one type of intervention to affect behavior

- Combine frequent feedback with rewards and social comparison

- Activate cognitive dissonance via a commitment (pledge)

Example: PowerDown Challenge

SAVINGS FEEDBACK

REWARDS

ENERGY CONTEST

PLEDGE

PRESENTATION

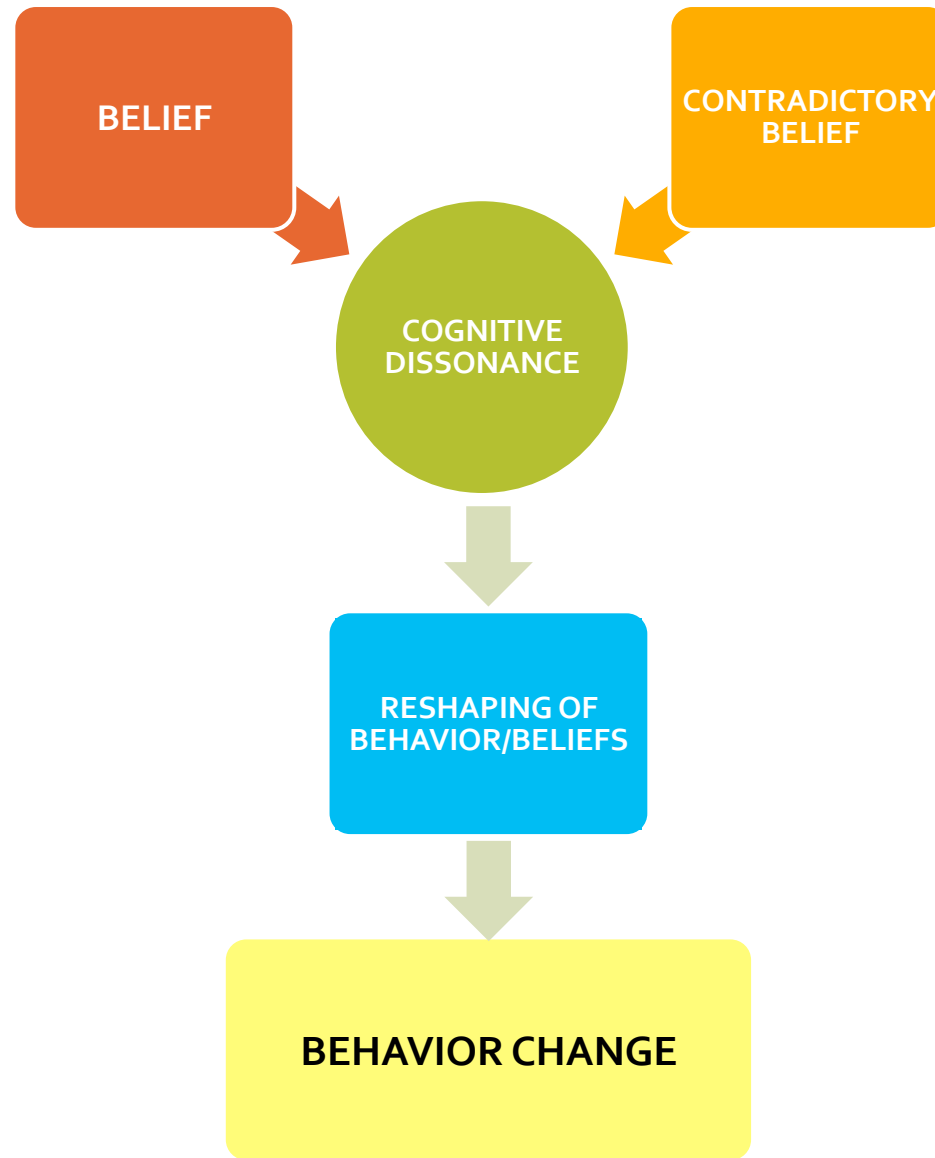Audit Recommendations
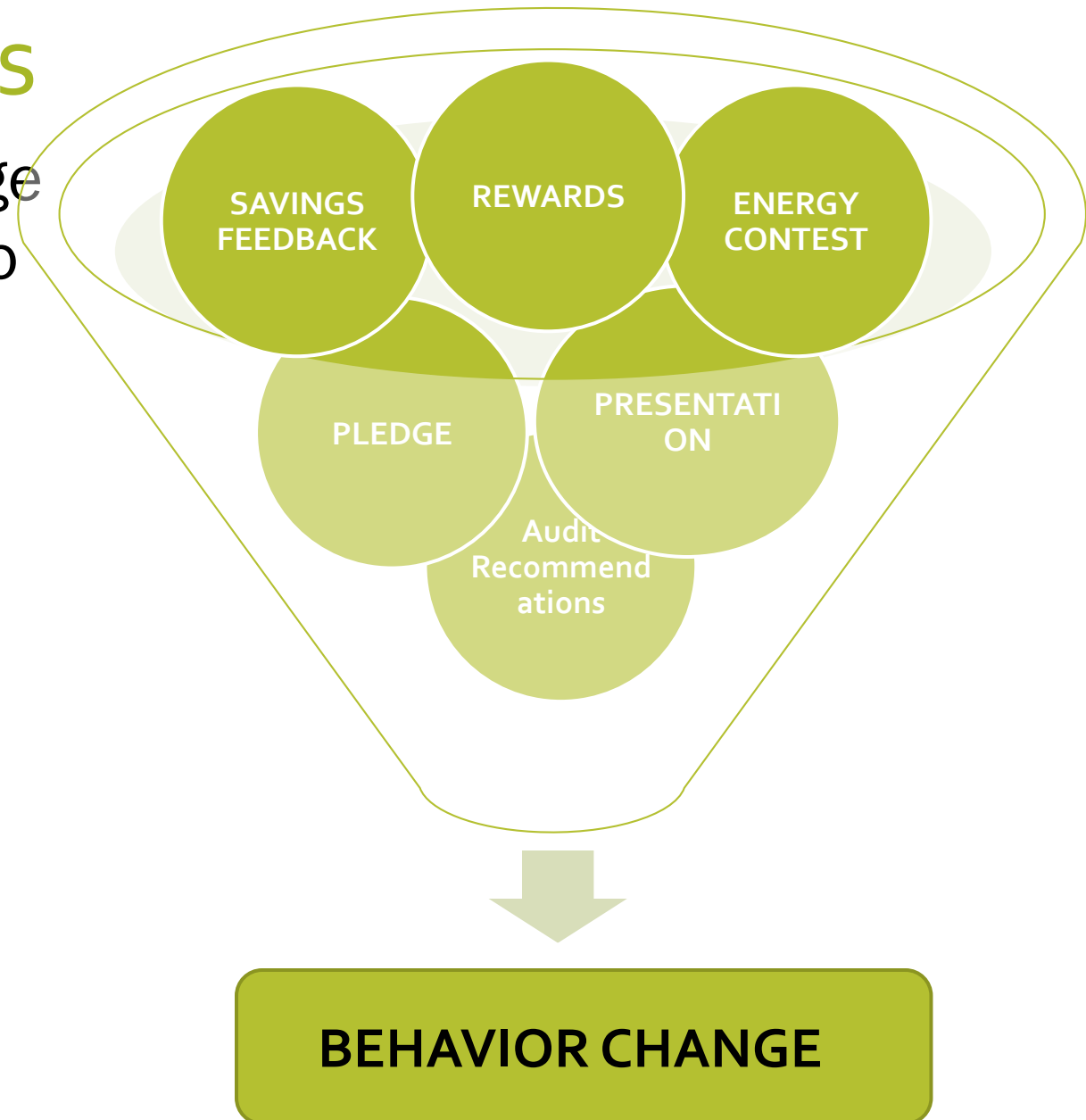
BEHAVIOR CHANGE

Cognitive Dissonance

experiencing two or more *conflicting ideas*, beliefs or behaviors

feeling of discomfort leading to a change in order to restore balance

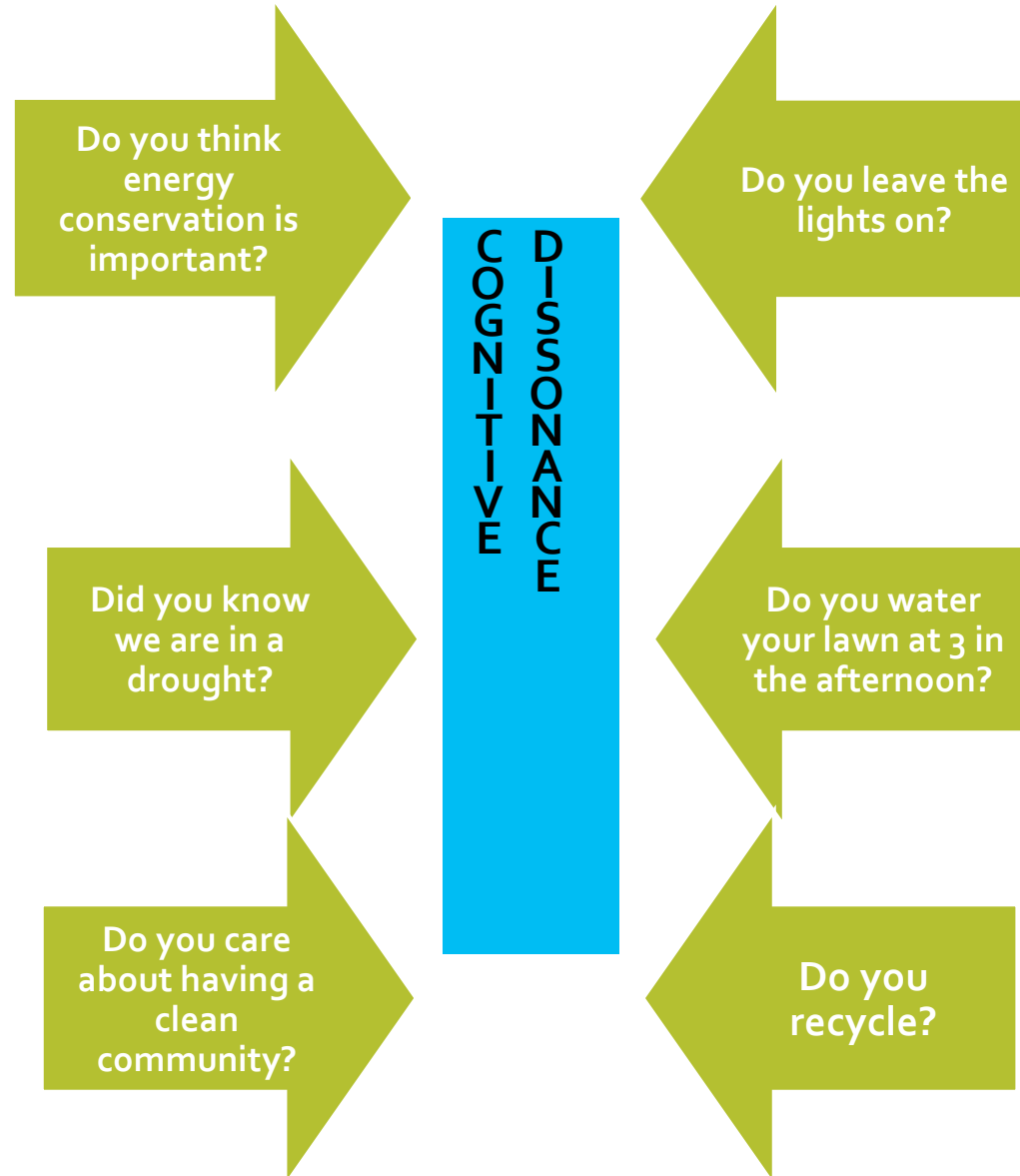MY COGNITIVE DISSONANCE IS KILLING ME!

Cognitive Dissonance

- Dr. Richard Osbaldiston of Eastern Kentucky University
- *Environmental Sustainability and Behavioral Science: Meta-Analysis of Proenvironmental Behavior Experiments*
- 253 experimental treatments
- Encouraged pro-environmental behaviors (recycling, water conservation, energy efficiency, etc.)

COGNITIVE DISSONANCE WAS THE MOST EFFECTIVE TREATMENT IN CREATING **ENVIRONMENTAL BEHAVIOR CHANGE**
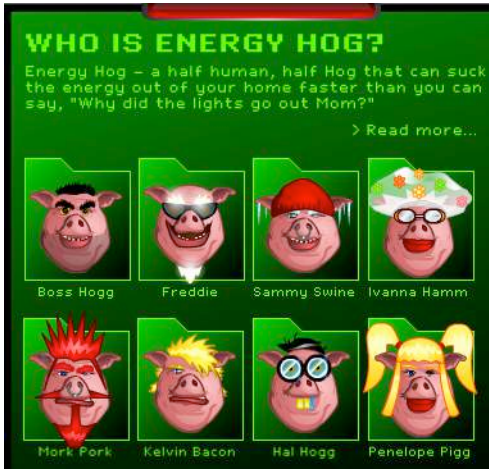
Cognitive Dissonance Examples

Do you think energy conservation is important?

Do you leave the lights on?

COGNITIVE DISSONANCE

Did you know we are in a drought?

Do you water your lawn at 3 in the afternoon?

Do you care about having a clean community?

Do you recycle?

Student Empowerment

LAST OUT LIGHTS OUT

Promoting energy conservation in the primary grades

A brief look at the Lupine Hills Powersave program

Bill Hodges
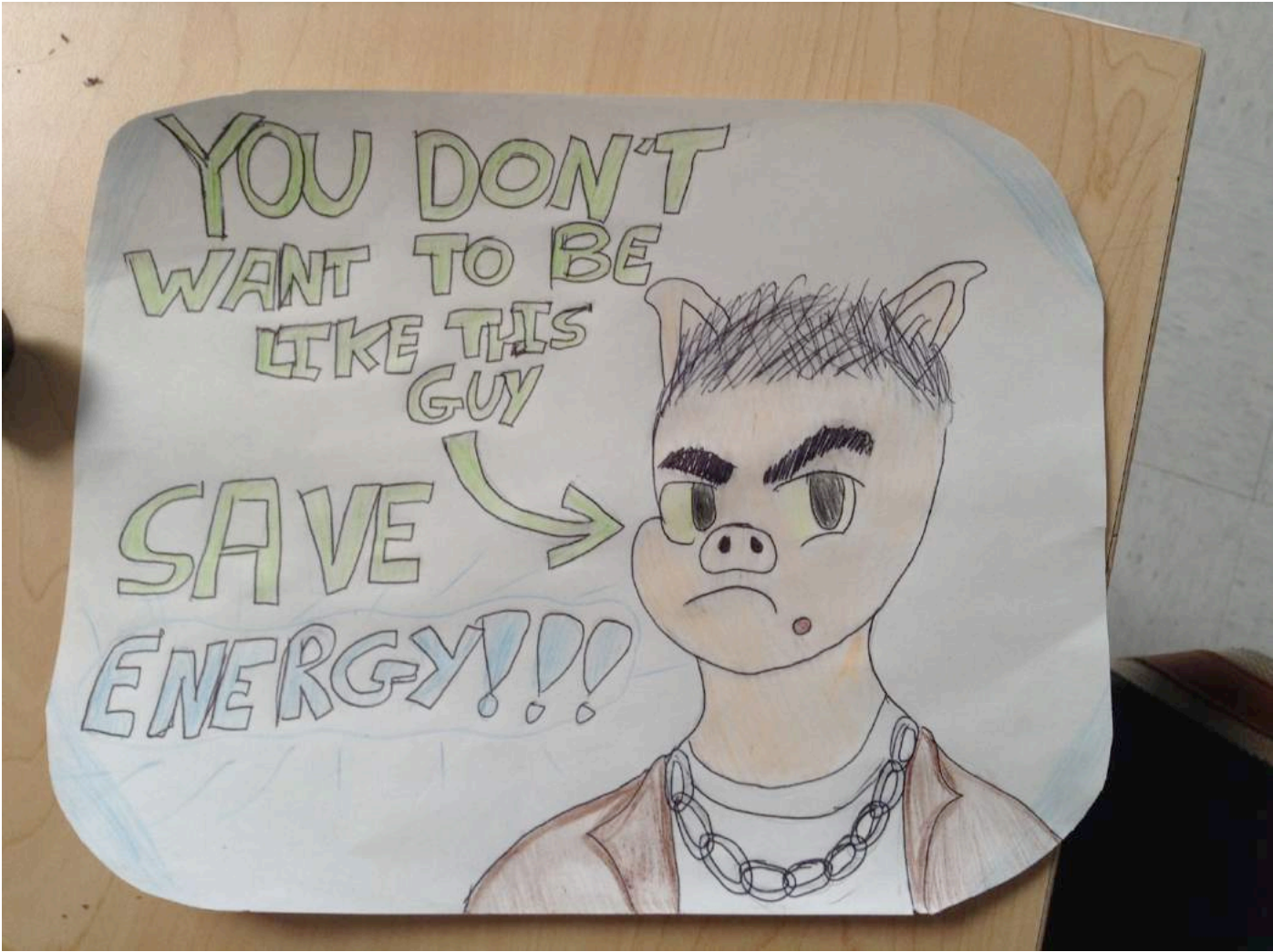5th Grade Teacher
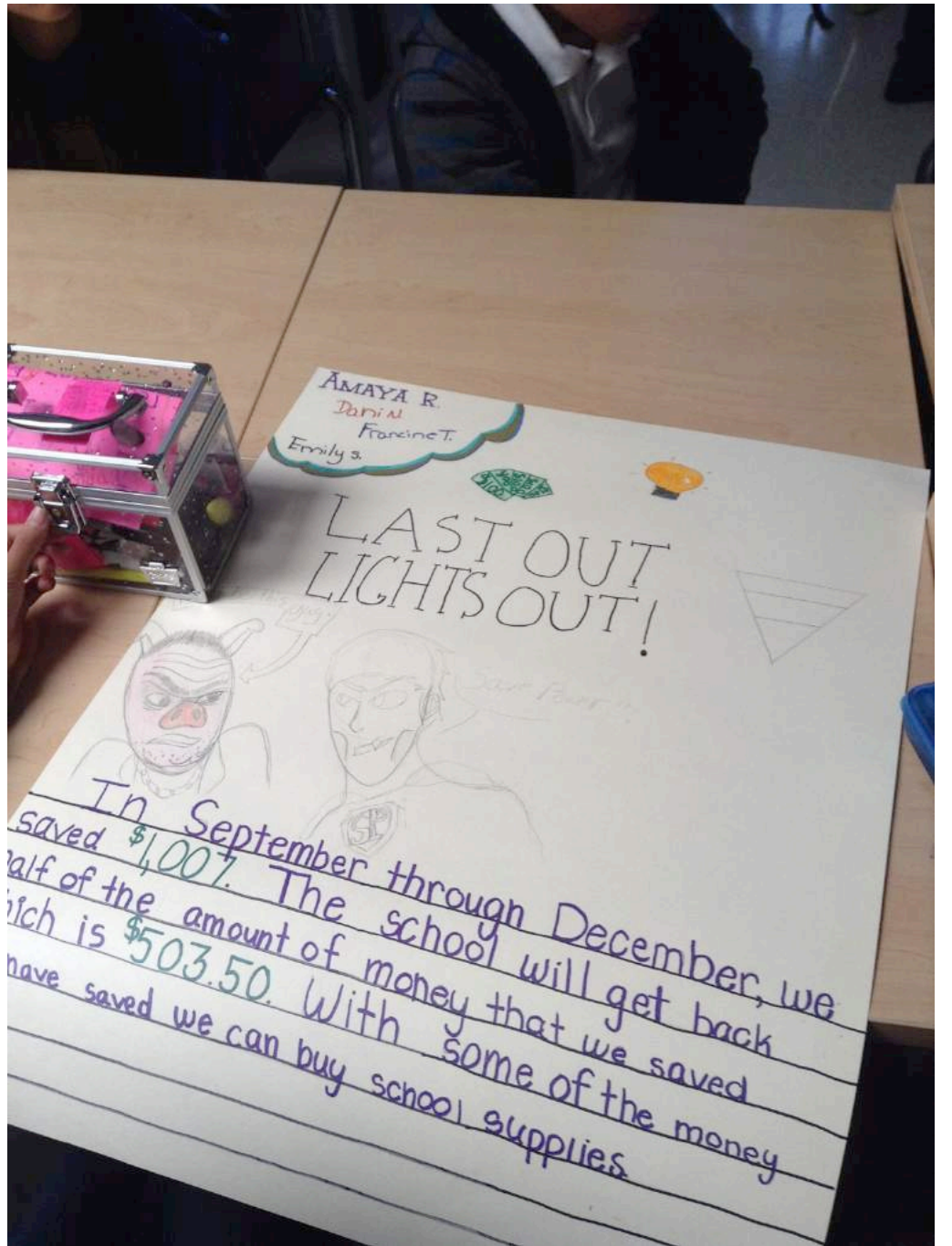Lupine Hills Elementary

At the beginning of the school year:

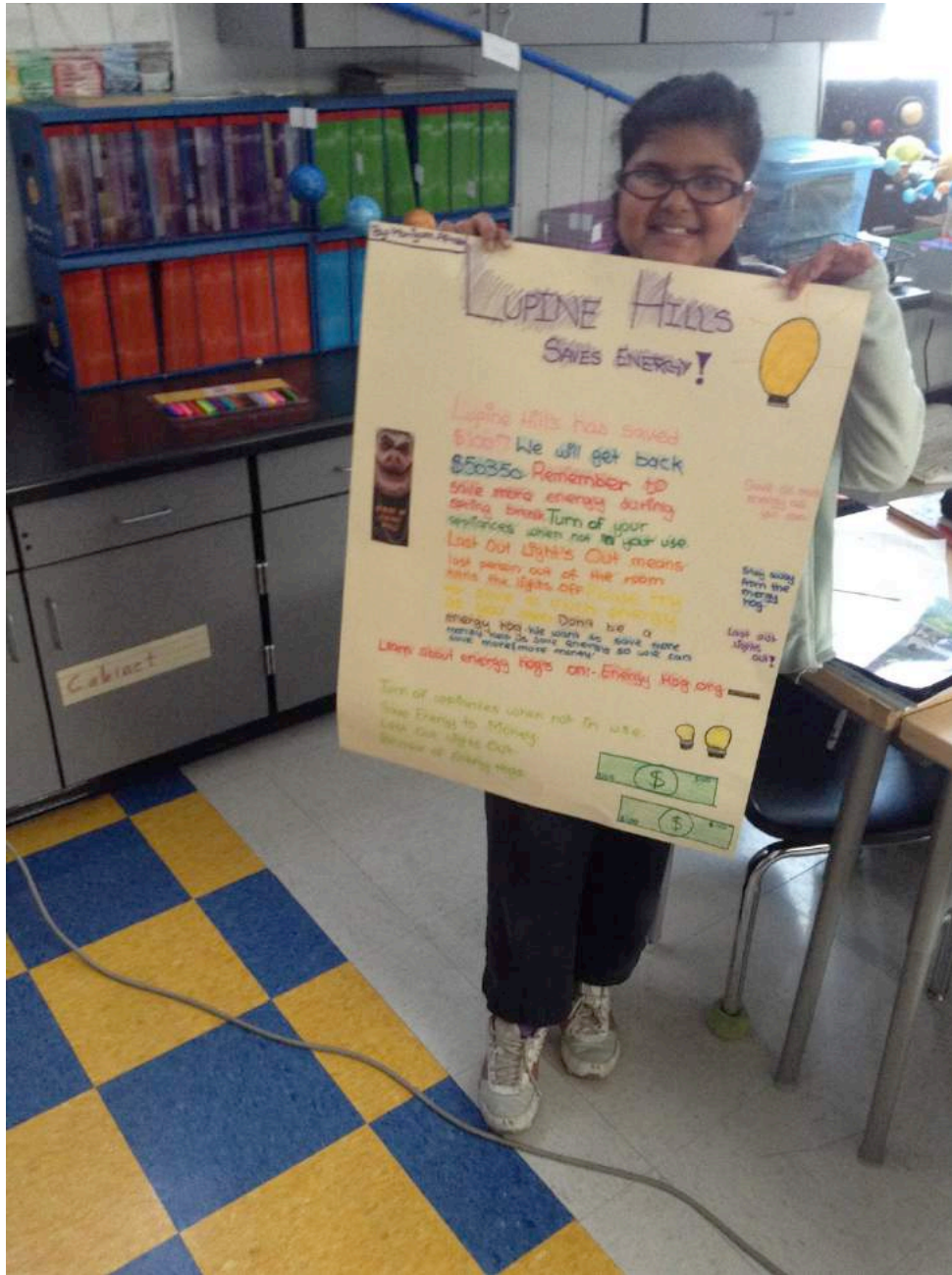Students presented to the faculty at a staff meeting.

LAST OUT LIGHTS OUT!

Amaya R.
Dani N.
Francine T.
Emily S.

In September through December, we saved $1,007. The school will get back half of the amount of money that we saved which is $503.50. With some of the money we have saved we can buy school supplies.

Questions?

Contact Information

David Younan-Montgomery

dmontgomery@ase.org

(805) 748-8721

Vanessa Goh

vgoh@ase.org

(530) 574-5088

Bill Hodges

William.hodges@wccusd.net