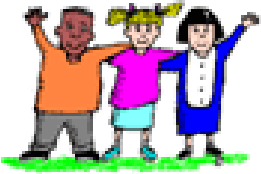


Alliance to Save Energy's Green Schools Program Elementary Lesson Plans

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Why is it hotter when I wear black in summer than when I wear white?

This lesson started when a first grader asked me this question when we were doing a weather unit and it was a hot summer day in Southern California. Many of the best lessons are started by a student or students just being curious and asking questions. This lesson was an example of that. I did this lesson over the period of one week. I have done this lesson twice and the kids have loved it both times. You can of course make it more complicated or even more basic depending on the abilities of your students. This lesson is also very easy in a multiage classroom because of the different challenges that the students need to address.

The first group of students presented their findings at a district school council meeting. The students were so enthusiastic (and I must admit quite cute) that the school board requested that the roof of our school be painted white to better reflect the heat in the summer time.



Why is it hotter when I wear black in summer than when I wear white?

Grade level: K – 5

Subject areas: Science, Math, Language Arts.

Grade level standards are met in each of the subject areas for each of the grade levels.

Time Required: One hour a day for 5 days.

Objectives:

- The students will use the scientific method to discover which colors absorb heat and which colors best reflect heat.
- Students will demonstrate how this information can be used at home and in the community.

Materials/Resources:

- Assorted color construction paper envelopes. Ensure you have a black one and a white one.
- Calculators
- Chart paper
- Some stiff tag board or cardboard.
- Thermometers
- Paper, pencils, crayons
- Journals




Procedure:

Day one

1. Ask students if what they wear makes a difference on how hot or cold they are. Write their answers on the whiteboard. Discuss.
 2. Have students tell you some of their favorite colors. List them on tag board and make sure that you have black and white on your list.
 3. Have students guess what color is hotter and what color is cooler. Use tally marks on the tag board to show the number of student's guesses.
 4. Have students add up the number of votes in each color and the total number of votes.
 5. Have students figure out the percent that each color received of the total vote. They can also figure out the mean, median and the mode. (K-2 use calculators. 3-5 should not need them.)
 6. Have the student write a hypothesis in a science journal or on a piece of paper.
- End of day one.

Day two through five

- Using envelopes that you made out of construction paper that corresponds to the colors that the students chose, Place a thermometer inside each envelope. (K-1 you may have to tap prior knowledge and explain what a thermometer is and does.)
- Make a chart on tag board that looks like this:



Day of the week	Color	Time put in the sun	Time taken out of the sun	How long left in the sun	Temperature before put out in the sun	Temperature after one hour	Difference in temperature
Monday	Blue						
Monday	White						
Monday	Green						
Monday	Black						
Monday	Yellow						
Monday	Purple						
Monday	Orange						

- Make one for each of the four days that you will gather data.
- Get your beginning measurement and put it on the chart.
- Tape the envelopes on to a piece of cardboard and place the cardboard out in the sun.
- After one hour take the students outside and record your data.
- Have the students do the math and record the data in their journals and on the chart.
- Discuss with the students the findings; see if any want to revise their hypothesis. Have them record their thoughts and findings in their journal or log.



Putting it all together:

After all the data collection is complete, have the students graph their findings. Discuss the findings. Talk about how houses are like people. If a house is painted a dark color or has a dark roof it is just like you wearing a dark shirt on a hot summer day. It is cooler if your house, like yourself, wears a light color.



Have the students do an audit of the school and of their homes.
Have the students present their findings to the school or district administration.
Have the students talk to their parents about what they have discovered.



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