# Hot Stuff

## Summary

Investigating the heat mechanical and electrical machines produce will demonstrate that heat is produced from motion.

## Main Core Tie

Science - 3rd Grade

Standard 5 Objective 2

## Time Frame

2 class periods of 30 minutes each

## Group Size

Small Groups

## Life Skills

Communication

## Materials

For each group of 3-4 students:

- Thermometer
- Graph paper
- Pencil
- Magazines
- Catalogues
- Scissors
- Glue
- Crayons
- Markers

## Background for Teachers

Anything that gives off heat is a "heat source." Mechanical and electrical sources of artificial light can also produce heat. Mechanical heat is produced as you create friction between two surfaces. For example, when you step on the brakes of a bicycle, mechanical energy from the brake pads rubbing against the wheel produces friction that generates heat. Another way to produce heat is through electrical energy. Electrical machines produce heat that can be felt on the outside of the machine.An operating computer produces heat and is warm. Differences in temperature can be measured on a variety of mechanical and electrical machines to show they produce different amounts of heat.

## Student Prior Knowledge

Students need to know heat can come from not only the sun, but is also produced from motion when one thing rubs against another.

## Intended Learning Outcomes

- Observe simple objects and report observations.
- Conduct a simple investigation when given directions.

Pose questions about objects, events, and processes.
Record data accurately when given the appropriate form and format.
Report observations with models.

## Instructional Procedures

Step 1. Tell students the class will be walking through the school to list mechanical or electrical machines that they think produce heat while they are operating. Have each student create the two categories (mechanical and electrical) in their science journals before beginning. Their task will be to list as many as they can while walking around the school.
Step 2. Start the observations in the classroom. As the students observe, remind them to remember simple machines as well as others. For example mechanical machines could include: scissors, pencil sharpener, stapler, paper punch, flag pole, lunch tables being set up, etc. Electrical machines are items such as computer, projector, television, electrical pencil sharpener, laminator, overhead projector, copier, etc.
Step 3. Return to the classroom and get into small groups. Have each group decide on three mechanical and three electrical machines that they can use for their investigation.
Step 4. Predict what the temperature will be for each machine and record. Then using the thermometers, return to the machines on their list and take the temperature of each machine and graph the results. (Remind students they will need to ask permission to access some of their choices,e.g. laminator, copier. They might also need to be reminded about the importance of electrical safety.)
Step 5. When students return, have them graph their results by temperature. Compare the results of the various groups. Were the predications correct? Some questions that might be discussed:
Which type of machine produced the highest temperatures, mechanical or electrical?
Did the machine that was running longer have a higher temperature than one that was just turned on?

Did any of the machines also produce light?
Step 6. Return to small groups, take a large piece of paper, and fold in half. Create a chart labeled "mechanical" and "electrical" machines. Use the magazines and catalogues to find machines and then paste or glue on the correct side of the chart. They should find at least six different machines for each side.
Step 7. Display charts in the room and share.

## Extensions

1. Assign students to go on a "scavenger hunt" at home to find as many mechanical and electrical machines as they can that produce heat.

## Assessment Plan

Evaluate the charts created of "mechanical" and "electrical" machines for accuracy. Have students identify and record two mechanical machines and two electrical sources of heat in their science journals that they discovered during their experiments.

## Authors

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