

Meter Reading

Grade Level: 3-8, High School

Lesson Overview: Students will learn to read utility meters and compute energy use. After learning to read gas and electric meters, students will then proceed to monitor the energy used in their homes and keep a daily record. At school the information will be compiled and discussed.

TEKS:

Math: 3.1(A), 3.3(A,B), 3.14(A,C), 3.15(A), 3.16(A,B), 4.1(A,B), 4.3(A), 4.4(D), 4.14(A), 4.15(B), 5.3(A,B), 5.12(A), 5.14(A), 5.15(A), 6.11(A), 6.12(A), 7.11(A), 7.13(A), 8.1(B), 8.2(A,B), 8.14(A), 8.15(A)

Science: 3.1(A), 3.2(A,B,C,D,E), 3.16(A,B), 4.1(A), 4.2(A,B,C,D,E), 4.3(C), 5.1(A), 5.2(A,B,C,D,E), 5.3(C), 6.1(A), 6.2(A,B,C,D,E), 6.3(C), 6.4(A), 7.1(A), 7.2(A,B,C,D,E), 7.3(C), 7.4(A), 8.1(A), 8.2(A,B,C,D,E), 8.3(C), 8.4(A),

IPC: 6(C,D)

Environmental Science: 3(B,C), 5(C)

GMO: 9(B,C)

US history: 23(B)

World Geography: 19(B), 20(A,B)

US Government: 20(A,B)

Management: 6(A,B,C,D)

Consumer and Family Economics: 2(E), 6(A), 7(E)

Housing: 2(D), 7(A,B)

Interior Design: 1(F), 6(A,D)

Engineering Principals: 11(B)

Time: 45 minutes for first lesson; 10 minutes per day over one week or more.

Materials: one home meter reading worksheet per student, one sample sheet per group, teacher sheet on an overhead.

Additional Materials Needed for HS Extension: one year's worth of electricity bills from a home, Internet access

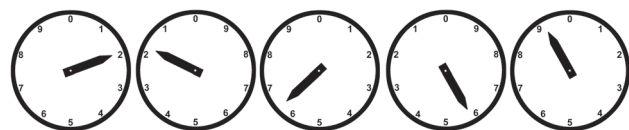
Vocabulary: kilowatts, meter, dials.

Background Information:

Meter reading can be kind of tricky. It helps to remember these rules:

- The dials are like watch faces, but every other dial moves counter-clockwise.
- Always read the faces from left to right.
- Each of the dials represents a ones, tens, hundreds, thousands and ten-thousands column.
- If the pointer is between two numbers, always record the number it has just passed (this is the smaller number, except when passing from 9 to 0: the 0 represents 10 in this case).
- If the pointer seems to be pointing directly at the number, refer to the dial to the right. If the hand on the dial to the right has recently passed zero, then you should put down the number that the other hand seems to be pointing at. If the dial on the right is short of zero, put down the next lower number. (Meter needles are not always positioned precisely; they may appear to have reached a number before it is appropriate.)

Note: Some meters are marked with a x10 or x20. These meter readings should be multiplied by 10 and 20 respectively.



Setting the Stage:

Show the students a sample energy bill and show the students how to read it. Ask them how a clock's hands move. Ask if anyone knows where the meters are at their home or if they have ever seen meters in public.

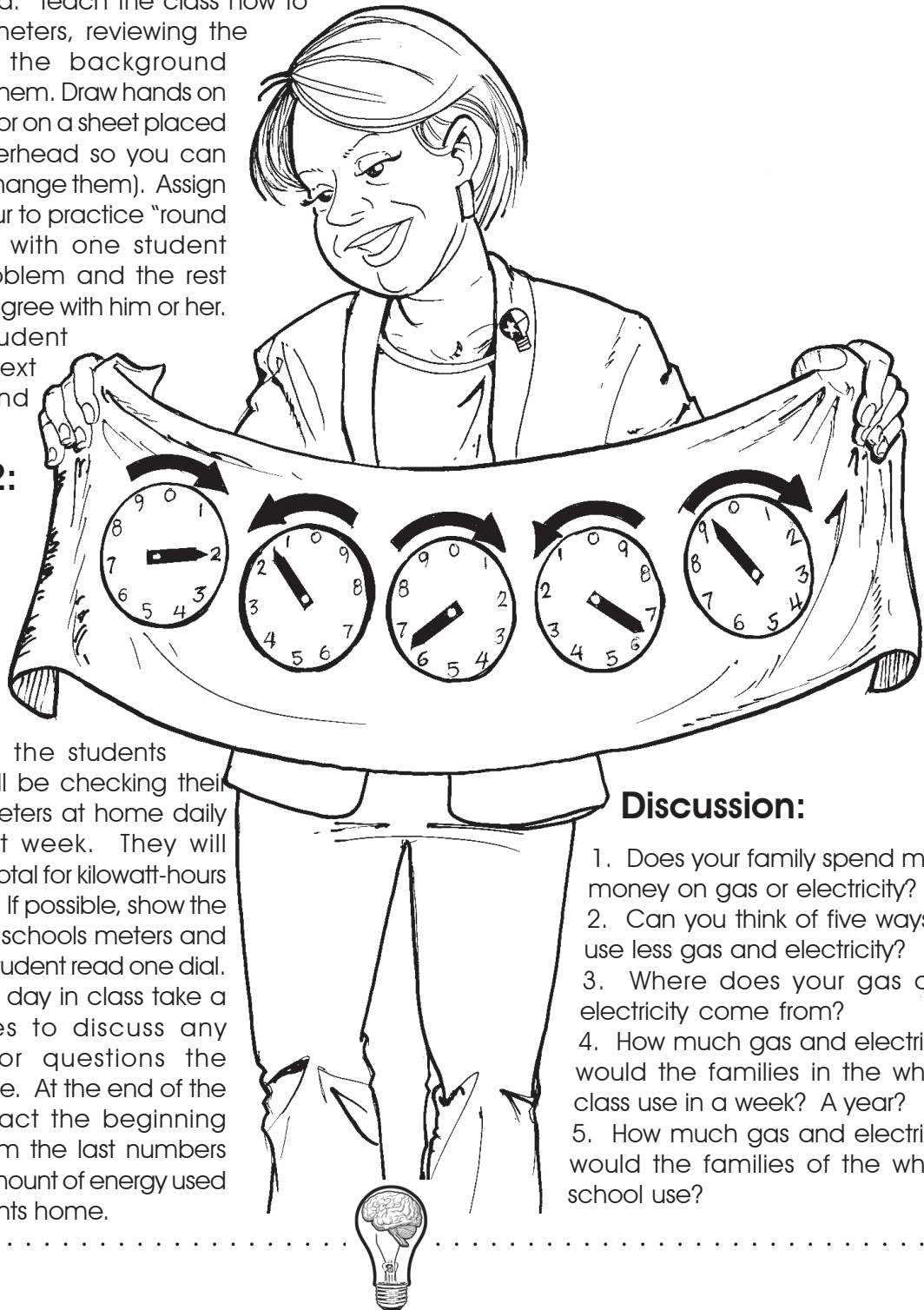
Activity 1: Sample Meters

Give each student a sample meter reading sheet and place the teacher meter sheet on the overhead. Teach the class how to read their meters, reviewing the rules from the background section with them. Draw hands on your meters (or on a sheet placed over the overhead so you can erase and change them). Assign groups of four to practice "round robin" style with one student doing a problem and the rest check and agree with him or her. The next student does the next problem and so on.

Activity 2: Personal Meters- School and Home

Explain to the students how they will be checking their electricity meters at home daily for the next week. They will compute a total for kilowatt-hours of electricity. If possible, show the students the schools meters and have each student read one dial.

Each day in class take a few minutes to discuss any problems or questions the students have. At the end of the week, subtract the beginning numbers from the last numbers to find the amount of energy used in that students home.



Discussion:

1. Does your family spend more money on gas or electricity?
2. Can you think of five ways to use less gas and electricity?
3. Where does your gas and electricity come from?
4. How much gas and electricity would the families in the whole class use in a week? A year?
5. How much gas and electricity would the families of the whole school use?

High School Extensions:

Make copies of the electricity bills for each group or member of the class. Have the students chart a years worth of these energy bills, recording month, actual kWh used, price, days in the month, and last year's information if listed.

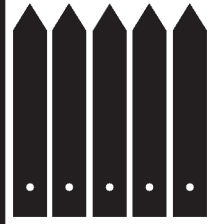
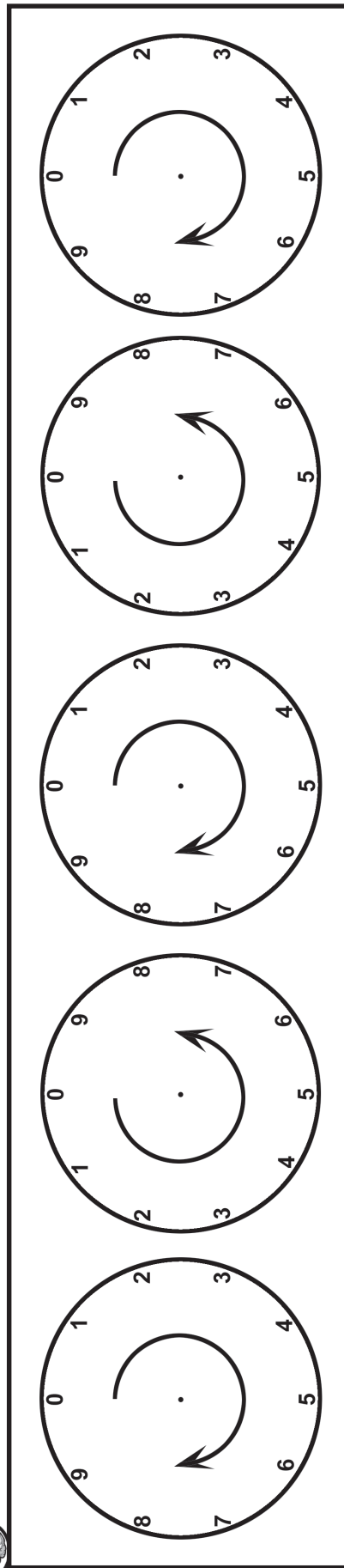
Have students give possible reasons for fluctuations in the amount of electricity used each month. Then research the weather and temperature and add that information to the chart. You may be able to add some pertinent information to their charts if you are using your electricity bills. Reasons the electricity fluctuated such as the purchase of a new refrigerator to replace an old one (this should lower the bill) or installation of shutters (lower the bill) or summer months when you may be at home more and therefore use more electricity would be helpful information

Create a graph using the chart data including month, temperature and number of kWh used or price you paid that month.

Next, research methods of lowering electricity bills. This information is readily available on many electricity company websites and on www.eere.energy.gov/consumer/tips.

Going Further:

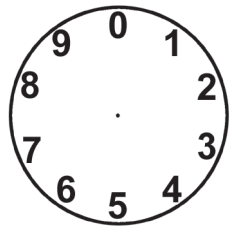
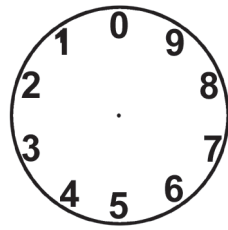
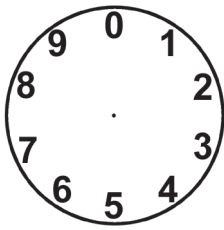
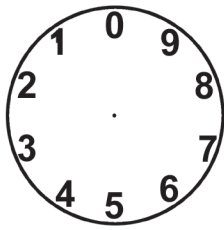
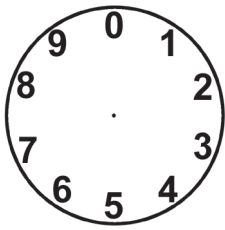
1. Do a spelling bee activity with meter reading; set up a few dials on the board and change the arrows for each player.
2. Chart or graph a year's worth of your own energy bills and present them to your class. Discuss with the students the possible reasons for the fluctuations.
3. Create a Jeopardy type game using the money saving ideas you found. Headings for your game could include windows, air conditioner, lighting, and appliances. Use the Jeopardy game before a teacher meeting as a bit of educational entertainment.



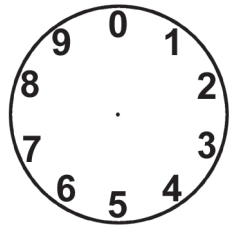
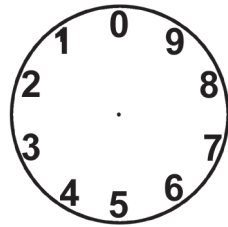
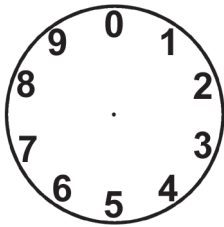
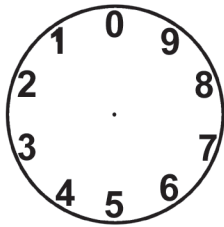
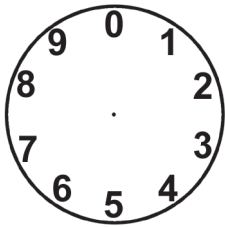
Student Name: _____ Date: _____

Home Meter Reading

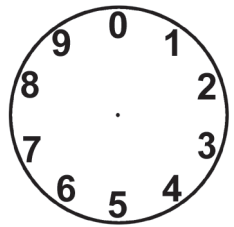
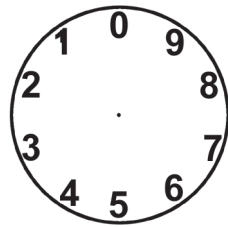
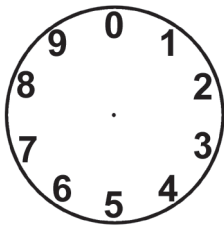
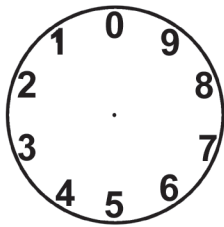
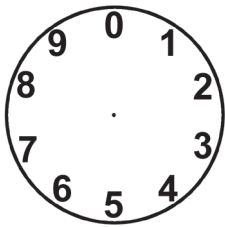
Read your home electric meter each day at about the same time for one week. At the end of the week subtract the day 1 numbers from day 5 numbers to find out how much electricity you used in one week.



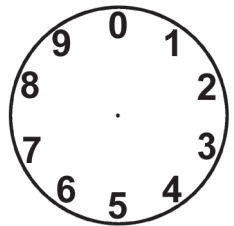
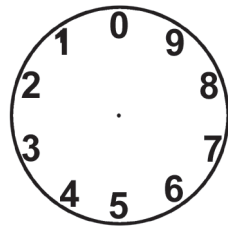
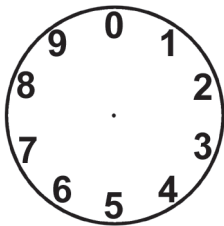
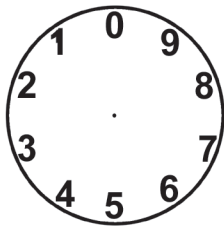
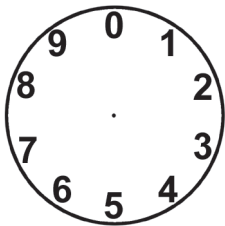
1. _____



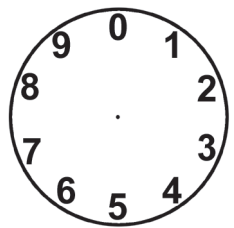
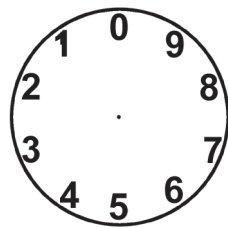
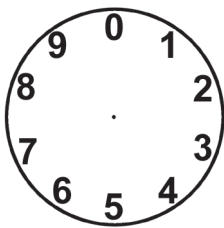
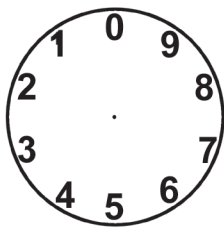
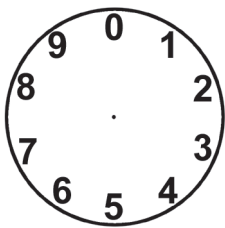
2. _____



3. _____



4. _____



5. _____

_____ kilowatt hours
used in one week

