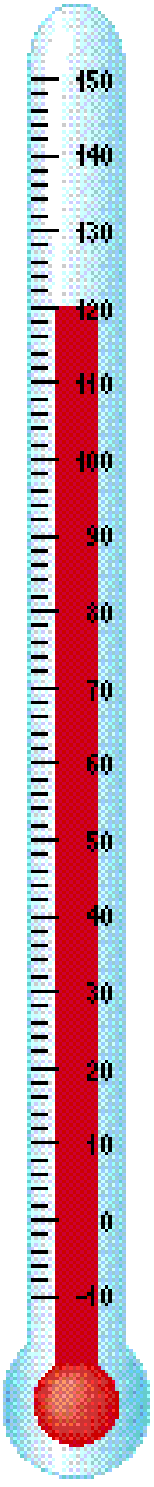
Section 5

Pulling It Together

The activities in this section allow students to reflect on what they have learned and what they would still like to find out. At this time, students also consolidate their knowledge and skills by carrying out a final project, individually or in small groups, and sharing their work with others. The unit ends with a student self-assessment and completion of a posttest.

Answers and Questions



How many of the questions students posed at the start of this unit have they answered? What answers have students found? What else would they like to learn? In this activity the class looks back at its original questions and considers the extent to which those questions have been answered. Students select questions to pursue in a final project.

math goals

- Students consolidate knowledge and skills acquired in previous sections.
- Students pose and solve authentic problems.
- Students apply reasoning and problem-solving skills to independent projects.

ongoing assessment

Observing students as they work on projects will inform you about their mathematical disposition, persistence, creativity, and ability to use mathematics appropriately to solve non routine problems.

advance preparation

materials

chart paper from the brainstorming session students did in Activity 1

any answers students found for their questions during the unit

1 copy of Reproducible Master 31 (Project Planner) for each student

Depending on projects, students may need the following:

- thermometers
- graph paper
- calculators
- StowAway™ data logger
- electronic spreadsheet
- access to Blue Skies and other Internet resources
- maps
- reference books

what students do

1. The class considers the questions generated during the brainstorming session in Activity 1.

   Guide students in considering questions like these:
   - What questions have we answered?
   - How did we find the answers?
   - What questions remain unanswered? How might we find answers for these questions?
   - What other questions do we have?

2. Students choose from a set of suggested projects or define their own project (see Background Information).

   Ask students to use the Reproducible Master 31 (Project Planner) to record their question and their plan for answering it.

3. Students work independently, with a partner, or with several other students to complete their projects.

   Provide guidance to any students who need help in deciding how to share the tasks involved in completing their projects or what steps to accomplish first.

Teachers' Stories

Teacher A

This year, two groups of students were especially intrigued with the idea of temperature maps. It was interesting to me that they went off in two entirely different directions. One group used archival temperature data for major U.S. cities and made a series of maps to show the "Coming of Spring" over a period of three months. Another group wanted to see if the pattern of temperatures in our room changed at different times of day. This group's maps and line graphs were fascinating to look at because they revealed so much going on that we never suspected!

Teacher B

It was quite a challenge for me to support students who were doing so many different things at the same time. I think next time I will try to be more careful about talking to students about their ideas and plans before they start to work on their projects. I might even have them write a proposal first. That way, I'll be able to check on their progress and help move them along.

background information

Independent project work gives students an opportunity to develop their own ideas and pursue questions that interest them. Project work calls on students to exercise initiative as they design and carry out the work they have chosen for themselves. Framing each project as a question to be answered will help students think about what they might do to answer the question. It will also help them focus on how well they have answered the question. Some students may have difficulty thinking of a question to answer, although they will have an idea about what they want to do. Give such students extra encouragement to help them formulate a question.

Be sure to interview all students or student groups at least twice during their project work to ensure that they have chosen a reasonable task and are making suitable progress. Students who have selected an especially challenging question to answer or who have run into an unexpected difficulty should have their efforts acknowledged regardless of how successfully they answer their question. In project work, learning occurs throughout the process, even when the learning is about what doesn't work rather than what does.

Skymath Project

project ideas

How Accurate Is Your Personal Scale?

Put the temperature scale you made in Activity 5 on a real thermometer. Take readings with it. Determine whether or not your scale is accurate. If not, adjust your scale. Prepare a report describing your scale and how you calibrated it.

How Much Does the Temperature Vary?

Record and describe the temperature in an area that you think will show some interesting variation—for example, different rooms in your home or different places in your neighborhood. Or record temperatures at different times of the day but in the same place. What's typical? What causes variations?

What's Normal?

Compare your minimum and maximum temperatures in your weather log with normal data reported by a weather service for the same period. Make graphs to show how the data compare. Decide whether or not your current temperatures are normal and write a short report that shows how you reached your decision.

What's Your Average Ambient Temperature?

What temperatures do you experience in 24 hours? How cold does the air around you get in a typical day? Take the StowAway™ with you everywhere you go (but don't get it wet!). Present your data in statistical and graphical form to illustrate your day and night. Was it a typical day?

How Did It Change?

Where would you expect the temperature to show a lot of variation, in both magnitude and frequency? Put the StowAway™ there and log the data. When did the temperature change most rapidly? How quickly did it change? When did it change most slowly? How slowly did it change? How much and often did it change? Can you explain the reasons for the various amounts, rates, and frequency of the changes?

What Patterns Can You Find?

What patterns can be found in the temperature data collected in your classroom? Use the data to make different graphs that might reveal certain patterns. For example, make double or triple bar graphs to show different locations at two or three different times of day. Or make a temperature map of your classroom to show the pattern of change throughout the room at a particular time of day.

How Do We Compare?

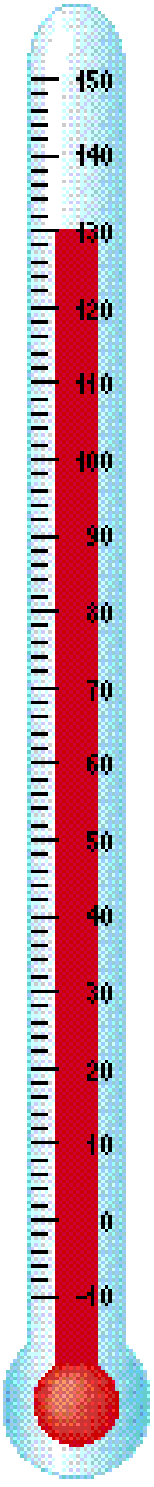
Exchange weather log or room temperature data with your partner class. Use tables, graphs, and/or maps to show how your data compare with their data. What were the ranges and averages? Which class experienced the most change in temperature? Which class had the most extreme temperatures?

What Does the Weather Service Do?

Imagine that you have your own weather service. Choose one of the following assignments for your final project:

- A nationwide orange and grapefruit co-operative wants to start some new groves. Citrus crops cannot thrive in locations where the temperature is 32 degrees Fahrenheit or lower for three days in a row. The co-operative has asked you locate places somewhere west of the Mississippi River where its members might be able to start new groves. Where would you recommend they go? How would you back up your recommendation?
- A local TV station has asked you to determine and report the typical temperature in your general area for a certain time of day and also for an entire day. Write a letter to the station manager explaining how you will do so.
- The producer of a radio program has asked you to design a procedure for gathering and reporting useful temperature information for farmers. What information do you think would be useful? How would you advise the producer to collect, analyze, and report the information?

15 Presentations and Reflections



What were the results of students' projects? The culminating project presentations bring closure to the unit. In this activity, students display what they have learned in their independent work and look back at what they have accomplished over the entire unit.

math goals

- Students use mathematical communication to explain the results of their work on a final project.
- Students explain how they solved problems.
- Students reflect on what they have learned.
- Students assess their own progress and achievements.

ongoing assessment

Students' final projects will enable you to assess their ability to present and communicate a problem they have solved by using mathematical reasoning and skills acquired in this unit.

advance preparation

materials (materials needed will depend on student projects)

examples of student work from each section of this unit

Reproducible Master 32 (Skymath Wrap-Up)

what students do

1. As students complete their projects, they put together a short presentation.

   Encourage students to use the following questions as a guide for their presentation:
   - What question did you try to answer?
   - Why did you choose your question?
   - What did you do to answer it?
   - What problems did you have as you worked on your project?
   - How did you solve or resolve your problems?
   - What answer did you find?
   - Who might find your answer useful or interesting? Why?

2. Students present the work they did for their final project.

   Presentations may take the form of a poster session, demonstrations, or short talks. Students may want to invite parents or members of another class to be part of their audience. They may also decide to share their work with their partner class.

3. When all presentations are completed, students address the question "What did we learn while doing Skymath?"

   Help students to look back over examples of the work they did in previous sections. Encourage them to recall what they learned about
   - temperature,
   - the use of computers and other tools, and
   - math.

Teachers'

Teacher A

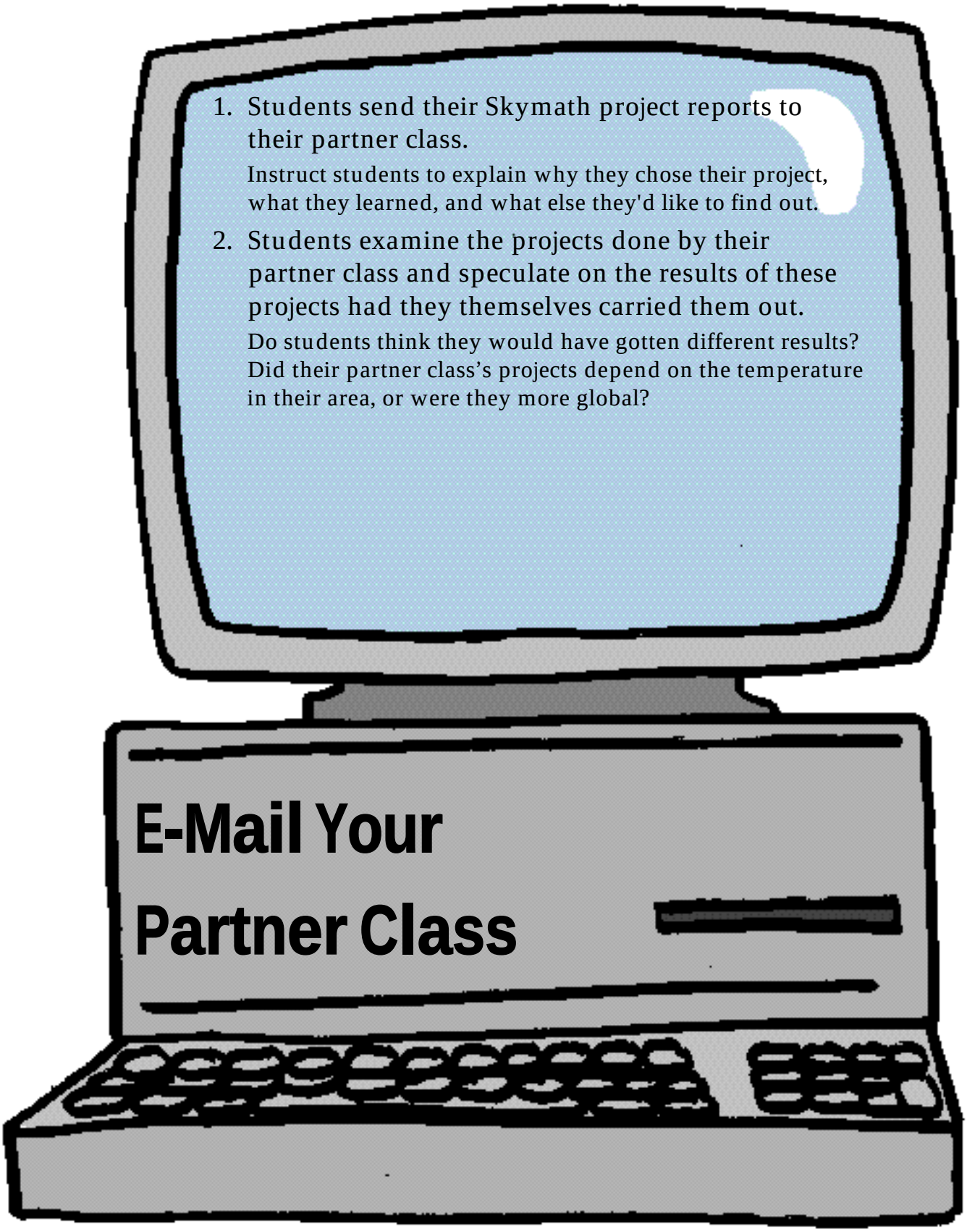
I invited the fifth grade to our classroom to see the student presentations. The younger children were excited and eager to see what they would be doing next year. The sixth graders really worked hard to gear up for the big day, and the pride they took in their work was obvious.

4. Students complete a self-assessment activity. Each student completes Reproducible Master 32 (Skymath Wrap-Up).

Stories

Teacher B

With a lot of help from our computer coordinator, we were able to publish students' reports on the Internet. Our partner class sent us a videotape of its presentations. Being able to see each other's work in these ways added a great deal to the entire experience. Students used their free time to watch the video and look at their classmates' work on the computers in the lab.


1. Students send their Skymath project reports to their partner class.
Instruct students to explain why they chose their project, what they learned, and what else they'd like to find out.
2. Students examine the projects done by their partner class and speculate on the results of these projects had they themselves carried them out.
Do students think they would have gotten different results? Did their partner class's projects depend on the temperature in their area, or were they more global?
E-Mail Your
Partner Class