I have used this project with my 7th graders with great success. I allow 4 days including grading.

This project fosters critical thinking , group work and creative problem solving.

Times can be adjusted according to class make-up.

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Losing Your Marbles

This fun and challenging technology learning activity teaches middle schoolers problem-solving basics.

By Allen Parker and David Bohan

As middle school technology teachers, we constantly search for interesting short-term projects for our classes. Our school district has given our program good support as we have made the transition from more traditional industrial arts to technology content. The "Losing Your Marbles" projects described here evolved from an elementary technology project that we observed in New Jersey's Washington Township, and it is anything but traditional.

Our technology-based program relies heavily on problem-solving activities. Competitive, challenging activities motivate our students. They invariably surprise and amaze us with the results of their efforts. Students sharpen their critical-thinking skills as they work their way through this problem with minimum help from the teacher.

Technology classes at our school generally draw from a heterogeneous student body, which includes special education students. This activity has proven equally successful for all our students.

Project details. We give our eighth-grade students a simple problem: Move a marble from one corner of an 18" × 24" fiberboard base to any other corner of the board. The materials they need are readily available and very inexpensive: fiberboard, recycled index cards, sheets of recycled paper, and masking tape. The project generally runs over a period of two to four weeks.

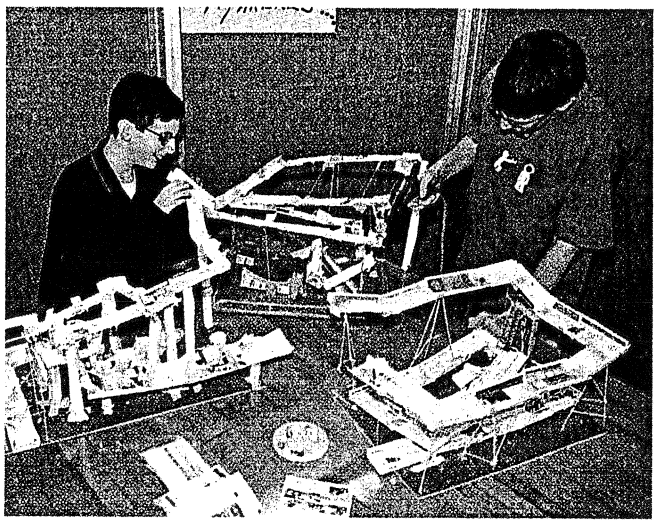
Students receive a project sheet that provides the following details:

Design brief

Working in teams of two or three, design and construct a trail or chute that will control the fall of a marble. The marble must start on one corner of the base, change direction at least three times, and end up on any other corner. The system should include some type of mechanical machine.

Procedure and limitations

1. Each team should obtain a fiberboard base measuring 18" × 24", 24 recycled 3" × 5" index cards, six sheets of 8-1/2" × 11" recycled paper, and 36" of masking tape.
2. Create a design that will allow a marble to roll for the longest possible amount of time. A stopwatch will be used to measure time.
3. Once the marble starts its journey, no one may touch it.
4. Overall appearance will be considered in grading.
5. Keep a daily journal describing all activities, successes, failures, problems, and concerns.



Their creativity and competitiveness sparked, students come up with an amazing variety of designs.

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Great results. We have been impressed with the level of interest, activity, hard work, and creativity shown by all students who have completed this activity. Final designs clearly demonstrated innovative thinking and good problem-solving skills. Some students adapted or used the designs of toy parts. Some created speed controls for chutes and constructed towers using paper tubes. Recently, we modified the activity to allow the use of dry spaghetti strands, which students used as structural towers. Adding a new material allows for many possible new solutions.

The ready availability of a good supply of materials lets students experiment with a variety of solutions. Especially at the middle school level, being able to easily restart an activity keeps students active and motivated. We've found that students continue to modify and improve their designs right up to grading time.

Integrating the academics. Technology classes at our school play a role in a curriculum strategy that seeks to integrate all subject areas. The daily journal that we require

Marble is suspended 6-8 seconds- Makes at least 3 turns and drops on base	C
Marble is suspended 9-12 seconds – Makes at least 4 turns and is deposited on base	B
Marble is suspended over 13 seconds- makes 4 or more turns and rolls out on base	A

Loosing your Marbles Grading Rubrics

Group names Time Grade