TINKERTOY DERBY

Teaching Guidelines

Subject: Mathematics

Topics: Measurement (speed), Operations (division)

Grades: 3 - 7

Concepts:

- Speed

Knowledge and Skills:

- Can create a chart for the collection of experimental results.
- Can divide multi-digit numbers by single digit numbers.
- Can solve problems involving speed.

Materials

- toy racecar
- stopwatch
- strip of paper for measuring distance traveled by cars (250 centimeters long, marked at intervals of 25 cm)

For each team:

- one complete set of Tinkertoys™ or similar construction materials
- one calculator (optional, but recommended)

Procedure:

To begin the lesson, a toy racecar is displayed at the front of the room, with this "Do-Now"* question on the blackboard: "How fast do you think this car can go? Explain why."

Have students spend a few minutes writing their answers to the do-now question. Then ask for some of the responses, and bridge into a discussion of what speed is and how it is measured.

**Do Now: A short warm-up activity that students can do on their own at the beginning of class. "Do now" instructions are usually written on the blackboard before class begins so that students can do the activity immediately and without further direction.*

Ask what units are involved in determining speed, and bridge into a review of time and distance units. Carry this forward into a discussion of how speed is computed from distance and time data for a vehicle ("If a bicycle travels 30 miles in two hours, how would you determine its speed?")

Introduce the "Tinkertoy Derby" and arrange the students into teams of two members each. Their first task is to construct a Tinkertoy vehicle, with either three or four wheels. This is a timed activity—give the teams 10 minutes to build the vehicle.

Once vehicles are built, discuss what data students will need to gather to determine their vehicle's speed. Review again the procedure for computing speed.

Using a wooden plank as a ramp (see diagram), each team will start its vehicle at the top of the ramp and measure how far (in feet) the vehicle travels in 3 seconds after it hits the bottom. The teacher controls the timing, starting the stopwatch just as the vehicle reaches the bottom of the ramp and saying "stop" after 3 seconds have passed. The distance that the vehicle has traveled at that point is noted, to the nearest 25 cm.

Each student should record all of the data (for all teams) and compute the speed in each case, using a calculator if available to check their paper-and-pencil division computations.

Announce the winning team, and wrap up the lesson with a review of how speed is determined.