

Design a Bobsled



QUESTION: What factors affect the speed of a bobsled?

MATERIALS:

- | | |
|---------------------------|-----------------------------|
| 3x5 card | stop watch |
| bobsled design box | wood blocks (an assortment) |
| plastic rain gutter - 2 m | |

PROCEDURE:

1. In this activity you are to design a bobsled that will have the fastest speed in the Bobsled Race. In constructing your bobsled you may only use the materials provided in the box. You do not have to use all of the materials, but you cannot add anything to the box. When finished the bobsled cannot have a mass greater than **8 grams** and it must fit behind the starting line (black line) on the race track.
2. Once you have designed your first bobsled, record its mass.
3. Set up the bobsled run by propping your length of rain gutter on the edge of a table or desk so that it is at about a 45° angle. Use the masking tape and the blocks of wood to help keep your bobsled run stationary. Use a permanent marker to make a start line about 20 cm from the upper end of the run. Place your bobsled behind the start line and let it go.
4. Time how long it takes to make the run to the bottom. Record this time.
5. With your team members, analyze your first design and make modifications to improve its speed. Record the modifications you have made and record the mass of your new bobsled. Time how long your second bobsled takes to make the run. Record this time.
6. Again analyze your design and make modifications. Be sure to record your modifications and the mass of the bobsled. Time how long your third bobsled takes to make the run. Record this time.
7. Continue to try different designs until you think you have the best design possible. Get ready for the final Bobsled Race. Record your final time.

*Bobsled Design box contains construction materials that can be used to make your bobsled. These materials include:

- | | |
|-----------------|--------------|
| craft sticks | scissors |
| drinking straws | toothpicks |
| masking tape | twist ties |
| paper clips | wood skewers |
| pipe cleaners | |

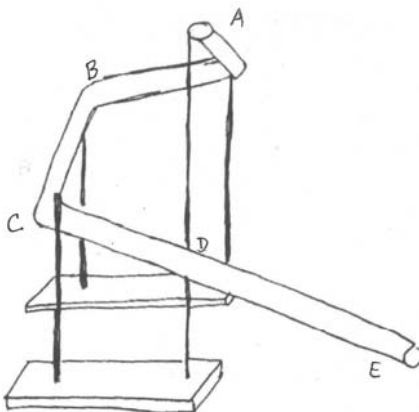
PS – Activity #6

DATA:

| | MASS | SPEED | MODIFICATIONS |
|-------------------|------|-------|---------------|
| Bobsled #1 | | | |
| Bobsled #2 | | | |
| Bobsled #3 | | | |

QUESTIONS:

1. Look at the diagram below and identify at what point the statements about kinetic and potential energy of the bobsled are true. Write the letter of the point on the bobsled track on the space corresponding to the statement that matches.



- ___ 100% kinetic energy, 0% potential energy
- ___ 0% kinetic energy, 100% potential energy
- ___ 25% kinetic energy, 75% potential energy
- ___ 50% kinetic energy, 50% potential energy
- ___ 75% kinetic energy, 25% potential energy

PS – Activity #6

2. When the bobsled reaches the bottom of the track and stops, does it have potential energy? Does it have kinetic energy?

3. What factors can be modified to increase the speed of your bobsled?

4. What force/s cause/s your bobsled to accelerate down the track?

5. What effect would waxing the bottom of the bobsled run have on the speed of the bobsleds? Why?

6. What would happen if you made your sled heavier?

7. Would your sled go faster if a lot of your sled were touching the track or if it only touched a little? Why?

8. Of the materials you had available to make the runners, which would produce the least amount of friction?

9. Is there a different shape for your sled that would produce a faster time?