

# Coming Off the Line

## INTRODUCTION:

Over the past few weeks you have discover many patterns as you measured and analyze a mousetrap-powered car. You probably have never considered how math and science is in a toy car! Now it is time to apply the patterns you have found. Your team will be modifying the original mousetrap car to increase its performance. Later, the cars will be raced to determine which car is the fastest.

## CAREER CONNECTIONS:

Mechanical engineer  
Advertising executive  
Event organizer  
Public relations consultant

## ACTIVITY OBJECTIVE:

Upon completion of this learning, you will be able to:

1. Design a product following certain constraints.
2. Working closely with others as a team.
3. Use the DAPIC process for problem solving.
4. Using tools properly and safely.

## EXPLORING I:

Your team will be modifying a mousetrap-powered car to increase its performance for a 2-meter race. Speed is the most important factor. It is time to get started on the car. You have probably heard that proper planning is very important for success. That is true with mousetrap cars. You will be using the DAPIC process, defining, assessing, planning, implementing, and communicating which are represented. Remember, these steps are not necessary done in that order but this is how we will start.

### Planning

1. During this phase you will plan what your car will looks like, what materials you will use and how your are going to build it. You may discover that your best ideas will not work or that you had not defined something correctly. You can go back and change it. Remember, DAPIC do not have to always be done in the orders mentioned
2. Make list of materials needed, and determine where you will get it. Your teacher should have some supplies but you may need to bring others from home.
3. Create a list of the tools that you will need to build a car.
4. Determine who will do what tasks.
5. Record progress.

### Assessing

1. During this stage of design you will be evaluating your ideas to decide which ones are best.
2. What data will you need to guide your decisions?
3. What research is necessary to help determine what will probably not

work? Or what research is necessary to help you determine ideas will not work?

- Someone should record your progress.

### **Implementation**

- Present the list of tools to your instructor.
- Your teacher will learn how to safely operate the tools. **DONT USE A TOOL UNTIL YOU HAVE RECEIVED INSTRUCTION.**
- You may now start building. As you build, you may discover that your plans must be changed. Maybe what you thought was a good idea did not perform the way you expected. The DAPIC often requires going back and forth between steps.
- Test your car to see if it works properly. Make changes as you learn more about what makes a car successful. Be sure your changes are supported by data and not just guesses.
- Record any changes you make to car and the reason(s) for the changes.

### **Defining the Problem**

- Your team can change your car the way you wish, as long as it follows these guidelines:
  - Your changes cannot be permanent.
  - You can bolt things on. But you cannot glue anything to the car.
  - You cannot cut any part of the car.
  - You cannot change the track.
- What research could be done gain ideas?
- Someone in your group should record your progress in your journal.

### **Conclude and Communication**

- The fifth stage of the DAPIC process is communication. Your team has been doing this all along. You have had to talk to each other to work out the design. You discussed the advantages and disadvantages of each idea during the assessment stage. You probably spent a lot of time talking about the car during the planning and implementation stages as you worked out problem. How do you think your car will turn out if your teammates did not communicate well with each other?
- Demonstrate your car design to the other teams. Explain how your design solves the problems that you identified.

### **GETTING THE IDEA I:**

- Why do you think you are asked to start with defining the problem?
- What information about mousetraps, wheels, axles, etc. did you use to define the problem and assess each idea? Where did you get the necessary information?
- What did your team do to be sure that everyone contributed to the

design ideas and that all ideas were considered?

4. How you decide which ideas were best?
5. At any time did you go back to previous steps or change some of your decisions? Why?
6. What is it about your mousetrap car design that you really like? What would you like to change?

**APPLYING THE IDEA:**

Have you ever attended a large sporting event? The noise, the excitement of the crowd, the cheers from the fans, popcorn and hot dogs, and the thrill of victory. Its great! Can you imagine how much work it takes to make a major event, such as the Indianapolis 500, actually happen? Think of all of the people necessary just to handle the food service! For each car entered in the race, there are dozens if not hundreds of people involved. No wonder so many cars, trucks, and campers are parked inside the racetrack!

During this activity your entire class will be working together to plan, organize, and conduct the Mouse Trap 500. It's sure to become the premier sporting event in your town!

The DAPIC process used to modify your cars can also be used to organize your sporting event. The problem solving process will be somewhat different this time than it was when you were designing your car. For your car design, you were working with a few teammates on a problem with a few variables. For the Mousetrap 500, you will be working with lot of people on complex problems.

1. With a problem large and complex as organizing a race, the first step is to select a "Race Chairperson." What qualities do you think the race chairperson should have? Your teacher will help the class select the right person for this important position.
2. **Implement** your plan for the race event. Send out the invitations, draw up the advertisements and post them, contact the local newspaper, etc. Did every committee meet their deadline?
3. **Assess** the ideas. If your event is scheduled for the afternoon, will the invited people be able to come? If you serve food, who pays for it and who prepares? Is serving food a good idea? What problems could it cause? Is it possible to invite other schools to compete? These are many questions that your class must assess.
4. **Plan** the event. The race chairperson may wish to organize the class into committees. Each committee could be assigned one task. What might be some benefits and problems of these committees? How can you be sure that everything is done on time?
5. **Defining** your event will be included. This will require active communication of everyone in the class. When will you schedule the event? Who will be invited? Will you serve food? What must be set up for the preparation? These are just a few of the questions that must be answer during the defining stage.
6. On the day of the event, many things will happen all at the same time. Advanced planning really pays off. If a committee or two has not done their job properly, it will be noticeable. For example, say the committees in charge of setting up the racetrack, forgotten to paint the starting and finish line. How could you solve that problem

quickly?

7. **Communication** is very important. A lot of your communication took place between the committee members. You may have to communicate with other groups to get the information necessary to assess your ideas. For example, if your committee is responsible for publicity, you may have to talk to the scheduling committee to determine the date, time, and place and to the finance committee to find out if you will be charging admission. There will also be a lot of communication with people outside the class. What methods can you use to communicate with a reporter at the local newspaper or TV station? How can you get the necessary information on the contestants? How can you best communicate to a race fan?

### Team Reflection

1. How did every one contribute to the team?
2. Were there some things that needed to be done that no one wanted to do? Who did them and how was that person or committee selected?
3. How were the leaders of team and committee selected?
4. How did the leadership of your team and committee change during the car design and race organization process?
5. How did everything turn out? Are you proud of the work you and your team did in the car and the race event! What changes would you suggest if this event was conducted again next year?
6. What suggestions do you have for improving your team?
7. In what ways did your communication work well? Consider communication between committee members, committees, and people outside of your class. How did you know if communication was not working well?

### EXPANDING THE IDEA:

- Research inventors of the great past. Where did they conduct their work? Who did they work with? Where they get their ideas?
- Ask your parents about teams at their workplace. Do they work on teams? What is their role in the team? What are the difference between teams and a bunch of people all working at the same place?
- Make a newspaper, television, or radio advertisement for your mousetrap car.
- Set up mousetrap car web page on the Internet.
- Produce a promotional or training video concerning teaming.
- Read the Making Connections information following immediately after this learning cycle.