

# What you need to know about the MB!

Scouts will operate in patrols. Patrols should be 4 to 8. **Groups less than 8 will likely be combined with other smaller groups for labs.** There are no formal MB prerequisites.

As with all MBs, Scouts should review the MB book ahead of time. Leaders are encouraged to consider a general review as part of a scout meeting (or two) prior to the event. See the requirements below.

Leaders should turn in Scout-completed Blue cards at check-in.

You'll find following each requirement below:

(a) A brief summary of what will happen during DDD (UNDERLINED);

(b) **If applicable, what scouts (and leaders) must know before the weekend and what they must bring with them (IN BOLDFACE);**

(c) *If applicable, what activities scouts can do ahead of time to lighten their weekend load (IN ITALICS).*

## The Engineering Merit Badge Requirements

1. Select a manufactured item in your home (such as a toy or an appliance) and, under adult supervision and with the approval of your counselor, investigate how and why it works as it does. Find out what sort of engineering activities were needed to create it. Discuss with your counselor what you learned and how you got the information.

Under supervision from a DDD Instructor, scouts in patrols will dismantle a home appliance and discuss the engineering involved in its manufacture and its operation.

**We are working with a northeastern Ohio appliance manufacturer who is attempting to provide us with an adequate supply of the same appliance, so that all scouts can work on the same appliance. If that manufacturer is unable to fulfill that request, each patrol will need to bring a used appliance to dismantle (check with your scouting parents and your local resale shops). If that is necessary, we will identify the type of appliance that must be brought. In either situation, patrols must bring a basic toolkit: check back for a list of required tools.**

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2. Select an engineering achievement that has had a major impact on society. Using resources such as the Internet (with your parent's permission), books, and magazines, find out about the engineers who made this engineering feat possible, the special obstacles they had to overcome, and how this achievement has influenced the world today. Tell your counselor what you learned.

Scouts will watch the PBS American Experience Video on the making of the Hoover Dam. Scouts will then hike to Dover Dam, where DDD Instructors who are members of the Corp of Army Engineers will discuss the construction of both dams.

*To lighten your Saturday load, troops may watch the DVD ahead of time. <http://www.pbs.org/wgbh/americanexperience/films/hoover/player/> About an hour long - ideal for a scout meeting. It is available at most public libraries.*

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3. Explain the work of six types of engineers. Pick two of the six and explain how their work is related.
  4. Visit with an engineer (who may be your counselor or parent) and do the following:
    - a. Discuss the work this engineer does and the tools the engineer uses.
    - b. Discuss with the engineer a current project and the engineer's particular role in it.
    - c. Find out how the engineer's work is done and how results are achieved.
    - d. Ask to see the reports that the engineer writes concerning the project.
    - e. Discuss with your counselor what you learned about engineering from this visit.

DDD Instructors/Engineers will present and discuss the information to satisfy these requirements. For those in Camp on Friday, this will be part of the Friday night session. For those unable to attend Friday night, this session will be presented at lunchtime on Saturday.

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5. b. Make an original design for a piece of patrol equipment. Use the systems engineering approach to help you decide how it should work and look. Draw plans for it. Show the plans to your counselor, explain why you designed it the way you did, and explain how you would make it.

Scouts will participate in a session where this requirement will be reviewed, and questions answered. On their own time, patrols will work on this requirement throughout the day. Scouts may approach any Instructor at the Dining Hall immediately prior to, or immediately after dinner, to show their plans and explain why they designed it the way they did, and explain how they would make it.

*Patrols are encouraged (but not required) to work on this prior to the DDD weekend. Patrols may come to the event with their plan fully completed.*

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6. a. *Transforming motion.* Using common material or a construction set, make a simple model that will demonstrate motion. Explain how the model uses basic mechanical concepts like levers and inclined planes to demonstrate motion. Describe an example where this mechanism is used in a real product.

Led by Carl H. Hager Jr., Ph.D., Tribology Specialist, of The Timken Company, patrols will construct a model to demonstrate motion.

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e. *Converting energy.* Do an experiment to show how mechanical, heat, chemical, solar, and/or electrical energy may be converted from one or more types of energy to another. Explain your results. Describe to your counselor what energy is and how energy is converted and used in your surroundings.

Lead by DDD instructors who are engineering students (and some who are Eagle scouts) patrol will make a Rube Goldbergesq device showing energy conversion.

**Check back to see if scouts must bring anything for this requirement**

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7. Explain what it means to be a registered Professional Engineer (PE). Name the types of engineering work for which registration is most important?
8. Study the Engineer's Code of Ethics. Explain how it is like the Scout Oath and Scout Law.
9. Find out about three career opportunities in engineering. Pick one and research the education, training, and experience required for this profession. Discuss this with your counselor, and explain why this profession might interest you.

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