

# MIDDLE SCHOOL APPLIED LEARNING

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## PROBLEM SOLVING

The student completes projects involving at least two of the following kinds of **problem solving** each year and, over the course of middle school, projects involving all three kinds of **problem solving**.

- **Designing:** Identifying needs that could be met by new products, services or systems; and creating solutions for meeting them;
- **Planning and Organizing:** Taking responsibility for all aspects of planning and organizing an event or activity from concept to completion, making good use of the resources of people, time, money and materials and facilities;
- **Improve a System:** Develop an understanding of the way systems of people, machines, and processes work; troubleshoot problems in their operation; and devise strategies for improving their effectiveness.

A single project may involve more than one kind of **problem solving**.

### Designing

The student designs a product, service or system to meet an identified need; that is, the student:

- Develops a range of design options;
- Selects one design option to pursue and justifies the choice, for example, with reference to functional, aesthetic, social, economic, or environmental considerations;
- Uses appropriate conventions to represent the design;
- Plans and carries out the steps of the production process;
- Adjust the production process as required to achieve specified standards of quality and safety;
- Evaluate the quality of the design by considering the criteria for success and by comparison with similar products, services or systems.

### Planning and Organizing

The student plans and organizes an event or activity; that is, the student:

- Develops a plan that:

- Reflects research into relevant precedents and regulations;
- Includes all the factors and variables that need to be considered;
- Makes sense in terms of the order in which things need to be done;
- Makes sense in terms of the people, time and resources available to put the plan into action;
- Is described clearly enough for someone else to use it;
- Implements the plan in ways that:
  - Reflect established priorities;
  - Respond effectively to unforeseen circumstances;
- Evaluates the success of the event or activity, identifying the parts of the plan that worked best and the aspects that could have been improved by better planning and organization, and proposing how the improvements could have been achieved;
- Make recommendations to others who might consider planning and organizing a similar event or activity.

### Improving a System

The student troubleshoots problems in the operation of a system in need of repair or devises and tests ways of improving the effectiveness of a system in operation; that is, the student:

- Describes the management and structure of the system in terms of its logic, sequences and control;
- Identifies the operating principles underlying the system, i.e., mathematical, scientific, organizational;
- Analyses the design and management of the system with reference to its functional, aesthetic, social, commercial and environmental requirements, as appropriate;
- Evaluates the operation of the system;
- Devises strategies for putting the system back in operation or improving its performance;
- Tests the effectiveness of the strategies employed.

## COMMUNICATION TOOLS AND TECHNIQUES

The student makes an oral presentation of project plans or findings to an audience beyond the school; that is, the student:

- Organizes the presentation in a logical way appropriate to its purpose;
- Adjust the style of presentation to suit its purpose and audience;

- Speaks clearly and presents confidently;
- Responds appropriately to question from the audience;
- Evaluates the effectiveness of the presentation.

The student conducts formal written correspondence with a community organization or business; that is, the student:

- Expresses the information or request clearly for the purpose and audience;
- Writes in a style appropriate to the purpose and audience of the correspondence.

The student organizes and communicates information for publication using several methods and formats, such as audio visual technology, handouts and computer generated graphs and charts; that is, the student:

- Collects information to include in published materials;
- Organizes the information into an appropriate form for use in the publication, taking account of the requirements and possibilities of the chosen format;
- Checks the information for accuracy;
- Formats the published material so that it achieves its purpose.

The student translates information from one format to another; that is, the student:

- Chooses a different format that is appropriate for presenting information to better suit the purpose for communicating it;
- Checks that the information has been translated accurately into the new format;
- Gives reasons for any changes made in the information, such as deciding to leave some information out.