

**Mathematical Research
And
Design**

Course Outline

Mathematical Research and Design Course Outline

Students who are pursuing the Distinguished Achievement Program may take Independent Study in Mathematics, local course Mathematics Research and Design, to earn state credit for developing, researching, and presenting their mentorship or independent study advanced measure. In this course, an elective, students conduct in-depth research, prepare a product of professional quality, and present their findings to appropriate audiences. Students, working independently or in collaboration with a mentor, investigate a problem, issue, or concern; research the topic using a variety of technologies; and present a product of professional quality to an appropriate audience.

Requirements/Criteria:

- (1) The student will investigate, independently or collaboratively, a problem issue, or concern within a profession or discipline. The student is expected to:
 - a. review and consider existing topics for possible investigation;
 - b. generate many, varied topics for possible study;
 - c. access information sources and organize ideas related to several interesting topics; and
 - d. use criteria to select a topic of genuine interest for further study.

- (2) The student will address several challenges related to the study of, independently or collaboratively, a problem, issue, or concern within a profession or discipline. The student is expected to:
 - a. review sample research questions;
 - b. generate many, varied, questions for possible study;
 - c. refine several questions into hypothesis; and
 - d. use criteria to select a challenge of genuine interest for further study.

- (3) The student will develop a plan, independently or collaboratively, to research a problem, issue, or concern within a profession or discipline. The student is expected to:
 - a. review existing research plans that depict different methodologies;
 - b. determine the purpose of the project and possible methods of gathering data;
 - c. consider possible product options for communicating the results of the study; and
 - d. develop a written plan that will guide the research process.

- (4) The student will gather information, independently or collaboratively, relative to a problem, issue, or concern within a profession or discipline. The student is expected to:
 - a. review lists of resources;
 - b. access written documents;
 - c. develop and conduct interviews, observations and/or surveys; and
 - d. gather and record pertinent information.

- (5) The student will organize findings related to a problem, issue, or concern within a profession or discipline. The student is expected to:
 - a. organize notes into a logical format;
 - b. select products based on sound criteria;
 - c. develop high quality products to communicate findings to others; and

- d. effectively present findings to others.
- (6) The student will demonstrate an understanding of a problem, issue, or concern by justifying findings to an appropriate audience for public comment or professional response. The student is expected to:
- a. review and revise the plan to present the findings;
 - b. make arrangements for the presentation of the findings to an appropriate audience;
 - c. present findings, simulating the skills used by professionals;
 - d. consider feedback received from the audience;
 - e. reflect on the study and its potential for impact on the field; and
 - f. reflect on personal learning experiences of the study.

Evaluation of Student Research/Project

EVALUATION OF STUDENT RESEARCH/PROJECT

NAME: _____

ID#: _____

SCHOOL: _____

TEACHER: _____

TITLE OF PROJECT: _____

	4	3	2	1	0
STUDENT INTERVIEW					
Purpose of study is described utilizing appropriate vocabulary. Student describes and analyzes how goal was reached and identifies problem solving involved.					
Development of project concept is described. Student explains the process by which the focus of the project was determined.					
Study reflects depth of research. Student explains the research process used and the extent of the research necessary to complete the project.					
Impact of research. Student reflects on the study and its potential for impact in an appropriate field.					
Personal learning experience. Student reflects on the personal learning experience of the study.					
PRESENTATION SKILLS					
Communication Skills					
Verbal strategies					
Rhetorical strategies					
Non-verbal strategies					
Use of Supporting Evidence					
Use of effective Appeals					
Degree of Professionalism					
Organization					
PROJECT ASSESSMENT					
Originality					
Creativity					
Accuracy					
Validity					
Organization					
Conventions of English Language (grammar, punctuation, spelling, sentence structure, etc.)					
Effective Communication of Research and Findings					
SUB-TOTALS					
TOTAL					
RATING (total score divided by 20)					

COMMENTS: _____

SIGNATURE OF EVALUATOR: _____

DATE: _____

PROJECT EVALUATION

SUMMARY PAGE

NAME: _____

ID#: _____

SCHOOL: _____

TEACHER: _____

TITLE OF PROJECT: _____

To determine an overall average score:

1. Add all judge's scores. _____

2. Divide by the number of judges. _____

Scoring Range

Grade Equivalent

4.0 – 3.5

Outstanding

A (100 – 90)

3.4 – 3.0

Good

B (89 – 80)

2.9 – 2.0

Average

C (79 - 70)

1.9 – 1.0

Below Average

D (69 – 65)

0.9 – 0.0

Unsatisfactory

F (64 and below)

The overall average score for this project was a _____,
which is equivalent to a grade of _____. Therefore, one advanced
measure for the Distinguished Achievement Graduation Plan is
awarded/not awarded.

JUDGE'S SIGNATURES

DATE

SCORING CRITERIA

4 **SUPERIOR**

Individual study is outstanding showing exceptional understanding of the project.

3 **GOOD**

Individual work is above average.

2 **AVERAGE**

Quality of work reflects need for growth in one or more areas.

1 **BELOW AVERAGE**

Quality is below average showing significant weaknesses in multiple areas.

0 **UNSATISFACTORY**

Measured area is not evident.