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# ***MADEIRA CITY SCHOOLS PLANNING COMMISSION***

## ***Grading Scale Part 2***

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## Background and Objectives

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This study is a continuation of a look into Madeira's grading policies and follows the Planning Commission Study, "Consideration of the Grading Scale and Related Academic Designations for the Madeira Schools" presented March 26, 2009. The 2009 study resulted in a change in the Madeira grading scale from a 7-point scale to a 10-point scale.

The purpose of this study is to further examine Madeira's grading policies at the high school level, including an in-depth look at:

- a) How the final course grade is calculated, the impact of exam weighting, and additional quality points given for honors and Advanced Placement (AP) classes,
- b) Issues surrounding the "zero effect" on grades, and
- c) The use of pluses and minuses in the grading scale.

## Methodology

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In order to examine Madeira's grading policies, comparisons were made to other Greater Cincinnati school districts. Data was collected primarily from online resources at the other schools including school profiles, student handbooks, and academic course planners. Information from 16 other school districts was compiled in Table 1.2 (page 6).

In order to demonstrate how final course grades are calculated, a random sample of students' grades were used to show how variations of the calculation may impact the course grade. A sample size of 10,000 was used to minimize variance and increase validity of the results.

Various materials were reviewed discussing the impact of averaging a zero into an overall grade, referred to as the "zero effect," and the impact it can have on the final course grade and a GPA. A review was also done of materials relating to the use of pluses and minuses or chromatic grading.

### 1 CALCULATION OF COURSE GRADES

The grading system includes the grading scale, the assignment of quality points, and additional weighting for honors and AP courses, all of which determine the final course grade. Madeira provides detailed information on this calculation in the Academic Course Planner.

#### Current Grading System

Madiera High School uses the following grading scale (at right):

#### How final grades for a course are determined:

- 1) Count each quarter grade as two grades and each exam grade as one (i.e. four quarters plus two exams equal ten (10) grades).
- 2) Add up all these grades (A=4, B=3, ...F=0).
- 3) Divide by the number of grades.
- 4) Round of to get your final grade:  
0.000 - .0599 = F  
0.600 - 1.499 = D  
1.500 – 2.499 = C  
2.500 – 3.499 = B  
3.500 – 4.000 = A

		QUALITY POINTS	
		HONORS	AP
100% - 90% = A	4.0	4.5	5.0
89.99% - 80% = B	3.0	3.5	4.0
79.99% - 70% = C	2.0	2.5	3.0
69.99% - 60% = D	1.0	1.5	2.0
Below 60% = F	0.0	0.0	0.0

\* To receive credit for a year, a student must earn a passing grade in at least 2 of 4 grading periods in addition to quality points. One of the passing quarters must be in the second semester.

\* To receive credit for a semester course a student must earn a passing grade in at least one of two grading periods in addition to quality points.

As part of the examination of the course grade calculation, we looked at how a grade could be impacted by using the percentage grade instead of the quality point in the calculation. Exhibit 1.1 shows an example of applying the two methodologies. Because the quality point allows for a 10-point range, it seems that by using the actual percentage in the calculation might result in a more accurate and potentially different grade. The example using these two methods in Exhibit 1.1 does not result in a different grade.

**Exhibit 1.1 – Comparison of Methodologies for Calculating Final Grades**

Method 1 – Quality Points Assigned to Final Course Average

q1	q2	SemEx	q3	q4	FinalEx	Course_Avg	Course_Avg_QP
85	89.5	90.5	86.3	82	92.6	86.9	3

$$0.2(85) + 0.2(89.5) + 0.1(90.5) + 0.2(86.3) + 0.2(82) + 0.1(92.6) = 86.87$$

Method 2 – Quality Points Assigned to Average in Each Grading Period and Exams

q1QP	q2QP	SemExQP	q3QP	q4QP	FinalExQP	Final_Trad_QP	Final_Letter_Trad
3	3	4	3	3	4	3.2	3

$$0.2(3) + 0.2(3) + 0.1(4) + 0.2(3) + 0.2(3) + 0.1(4) = 3.2$$

\* Quarter grades are calculated as the weighted average of Tests/Quizzes (60%), Homework (30%) and Behavior (10%). Scores in each category, as well as for exams, are generated from various normal distributions with means and standard deviations estimated from experience.

However, when scores were randomly generated for 10,000 simulated students, 175 (1.75%) fared worse, 9,347 (93.47%) earned the same score, and 478 (4.78%) scored better under the percentage calculation. This does not represent a significant difference meriting a change at this time.

### **Comparison to Neighboring School Districts**

A comparison of Madeira's grading policies to 16 other districts in the Cincinnati area shows that Madeira is consistent with the majority of the other districts in virtually every category. See Table 1.2 on the following page.

The specific areas compared include the following:

- Grading scale
- Use of plus/minus
- Quality point equivalents
- Weighting for honors/AP courses
- # of AP classes offered
- Exam weighting
- Grading period

Eleven of the sixteen other school districts are on a 10 point grading scale, which validates the findings that led Madeira to change to the 10-point scale beginning with the 2009-10 school year. Most of the other districts do not use pluses and minuses as part of their grading scale. Like Madeira, most of the other districts assign quality points with an A=4, B=3, C=2, D=1, and F = 0. In the majority of other districts, the exam weighting of 20% that Madeira utilizes, was most prevalent. In addition, almost all other school districts follow the 4 quarters, 2 semesters grading period schedule for the school year.

The category relating to the grading policy with the most variation was the assignment of extra quality points for honors and AP classes. Additional weightings for more academically challenging classes are given to differentiate a class in order to determine class rank and provide more information to colleges and universities on strength of curriculum. Madeira adds .5 to the quality points for honors classes and 1.0 for AP classes. While not specifically relating to grading policies, one of the categories listed in Table 1.2 was the number of AP classes offered. Madeira was on the low end with 12 AP classes offered but was on par with other schools similar in size.

**Table 1.2 – Data from Surrounding School Districts**

SCHOOL	GRADING SCALE	PLUS/MINUS	QUALITY POINTS	WEIGHTING FOR		# of AP Classes Offered	EXAM WEIGHTING TOWARD GRADE	GRADING PERIODS
				HONORS	A/P			
MADEIRA	10	NO	A=4	0.5 added to quality points	1.0 added to quality points	12	20%	4 quarters, 2 semesters
CINCINNATI COUNTRY DAY	10	YES	A=4			12		4 quarters, 2 semesters
CHCA	10	NO	A=4	0.5 added to quality points	1.0 added to quality points	15		2 semesters, Winter Term
FINNEYTOWN	7	NO	A=5	1 added to quality points	1 added to quality points	10		4 quarters, 2 semesters
INDIAN HILL	10	NO	A=4		.03 added to GPA	21	20%	4 quarters, 2 semesters
KINGS	10	NO	A=4	0.5 added to quality points	1.0 added to quality points	12		4 quarters, 2 semesters
LAKOTA	10	YES	A+ = 4.33	1 added to quality points	1 added to quality points	19	20%	4 quarters, 2 semesters
MARIEMONT	8	NO	A=4	1 added to quality points	1 added to quality points	13	20%	4 quarters, 2 semesters
MASON	10	NO	A=4	.03 added to GPA	.03 added to GPA	18	15%	3 trimesters
MILFORD	10	NO	A=4		.025 added to GPA	11	20%	4 quarters, 2 semesters
MOUNT NOTRE DAME	7	NO		1.2 X numerical grade	1.25 X numerical grade	17	20%	4 quarters, 2 semesters
ST. URSULA ACADEMY	10	YES	A+=4.33	0.5 added to quality points	1.0 added to quality points	17		4 terms, 2 semesters
ST. XAVIER	modified 10 pt	only A+	A+ = 4.3			24	varies by course	4 quarters, 2 semesters
SYCAMORE	10	NO	A=4	0.5 added to quality points for weighted classes		20	20%	4 quarters, 2 semesters
URSULINE	7	YES	A+=4.34	.66 added to quality points for honors		16		4 quarters, 2 semesters
WALNUT HILLS	10	NO	A=4	currently A=6, B=4.5, C=3 for honors and AP changing with Class of 2012 to 1.25 for AA, 1.5 for AP		22	25%	2 semesters
WYOMING	10	YES	A=4	1 added to quality points	1 added to quality points	17	20%	4 quarters, 2 semesters

## 2 THE ZERO EFFECT

The “zero effect” refers to the dramatic impact that receiving zeros on assignments or assessments can have on a student’s quarter grade in a class and, carrying forward, on their grade point average (GPA). This concept is quite polarizing among middle and high school educators. Numerous articles have been published in education journals in favor of and opposed to the utilization of zeros in grading. Education websites have forums soliciting opinions on the topic. Valid arguments can be made on both sides of the question regarding whether it is fair to give a zero to a student for assignments, papers, projects, quizzes, tests or exams that are missed or are done so poorly that no credit can be given.

Educators who support the utilization of zeros generally believe that when no effort is expended on an assignment, no points should be granted. Grades are one of the few tools that teachers can use to motivate students and gain compliance with classroom expectations, since they lack access to the personal/social types of “motivators” parents have (removal of cell phone, television, computer or videogame time for poor grades). The assumption is that if a student receives a zero, he or she will be less likely to perform deficiently on or skip an assignment in the future. Removing zeros, according to some educators, would be enabling those students who are extremely disorganized, incompetent, or irresponsible.

Other educators believe that zeros are overly punitive. When a student fails to do or turn in an assignment (or misses all or nearly all attainable points) and receives a zero, the impact to their overall course grade can be devastating, particularly because the current system of grading is based on the determining the mean or average of scores. The problem with zeros, simply described, is a mathematical one. By assigning a zero, the teacher has actually disproportionately given the missed/poorly done project additional weight because a zero is at the lowest end of the F scale and quite far from the lowest score required to be a D (60%). To keep the weight of each score the same, the interval between all the grades should be the same. Additionally, introducing a zero to a collection of assessment evaluation numbers (grades) violates the concept of the mean as a measure of central tendency.

While grades can have the power to motivate students, there is no data to suggest that using zeros or low grades results in greater effort on the part of the student. Often, students will withdraw from learning because they either feel helpless to improve their grades or tend to self-protect by regarding low grades as meaningless and “not caring.” Roderick and Camburn (1998) observed in Chicago high schools how few students recover from grade failure, and how early failure often translates into poorer later performance. Educators generally do not want students to be in the hopeless position of being unable to impact their final grade, particularly if the student expresses interest in working hard to do so.

On a philosophical level, the concern is that a zero grade is actually not a reflection of learning or achievement but rather of behavior. The question then becomes whether teachers are charged with assessing behavior as well as mastery of subject material through the grades that appear on a report card. Should a lack of effort be treated the same as putting forth effort but being wrong?

### Solutions to the Zero Effect

Some solutions to the problem of the “zero effect” have been proposed in the literature by researchers such as Thomas R. Guskey, Douglas B. Reeves, and James H. McMillan. Some of the possible solutions for consideration are outlined below. For examples of grade calculations using several of the methods found below, see Exhibit 2.1.

#### Mathematical Solutions:

1. Adjust the grading scale such that the intervals between the top and bottom scores for a grade are equal. In Madeira City Schools, that would mean 90-100% is an A, 80-89.9% is a B, 70- 79.9% is a C, 60- 69.9% is a D and 50-59.9% is an F. Therefore rather than assigning a zero, a skipped/missed assignment would be scored as 49%.
2. Ignore zeros when they are outliers or deviate from a student’s consistent performance record. This would have to be applied uniformly to all students, however.
3. Use a median rather than an average as a measure of central tendency. Teachers would rank order grades and count more important tests/exams a multiple of times more than homework/quizzes to apply additional weight.
4. Eliminate the top and bottom scores from a set of scores. An example of this is found in sports such as diving and gymnastics, where the top and bottom scores are cancelled prior to calculating the score, thus eliminating the potential for one judge to severely skew results.
5. Change grading scales from percentage grading scales, where 90-100% is an A, 80-89% is a B, etc., to whole number scales, where A=4, B=3, etc. to reduce the effect of zeros.
6. Use zeros only for a very small percentage of the final grade. In other words, continue the practice of awarding zeros for skipped homework assignments, but weigh them minimally toward the final quarter grade. With this approach, zeros would not be given for major tests, projects, papers, etc.



## Exhibit 2.1 - Calculation of Final Course Grades for Different Students Using Various Methods

### 2.1.1 *B Student with One Zero*

Assignment/Test scores	1	2	3	4	5	6	Final	Grade
Average Including 0%	79	88	92	84	87	0	71.7	C
Average Substituting 49%	79	88	92	84	87	49	79.8	C
Average Ignoring 0%	79	88	92	84	87	---	86.0	B
Median	92	88	87	84	79	0	85.5	B
Avg. w/o Top/Bottom %	92	88	87	84	79	0	84.5	B
Avg. of Quality Points	4.0	3.0	3.0	3.0	2.0	0.0	2.5	C

### 2.1.2 *B/C Student with One Zero*

Assignment/Test scores	1	2	3	4	5	6	Final	Grade
Average Including 0%	79	89	91	80	75	0	69.0	D
Average Substituting 49%	79	89	91	80	75	49	77.1	C
Average Ignoring 0%	79	89	91	80	75	---	82.8	B
Median %	91	89	80	79	75	0	79.5	C
Avg. w/o Top/Bottom %	91	89	80	79	75	0	80.8	B
Avg. Of Quality Points	4.0	3.0	3.0	2.0	2.0	0.0	2.3	C

### 2.1.3 *C Student with One Zero*

Assignment/Test scores	1	2	3	4	5	6	Final	Grade
Average Including 0%	82	74	73	69	76	0	62.3	D
Average Substituting 49%	82	74	73	69	76	49	70.5	C
Average Ignoring 0%	82	74	73	69	76	---	74.8	C
Median %	82	76	74	73	69	0	73.5	C
Avg. w/o Top/Bottom %	82	76	74	73	69	0	73.0	C
Avg. of Quality Points	3.0	2.0	2.0	2.0	1.0	0.0	1.7	D

**2.1.4 C Student with Two Zeros**

Assignment/Test scores	1	2	3	4	5	6	7	Final	Grade
Average Including 0%	82	74	73	69	76	0	0	53.4	F
Average Substituting 49%	82	74	73	69	76	49	49	67.4	D
Average Ignoring 0%	82	74	73	69	76	---	---	74.8	C
Median	82	76	74	73	69	0	0	73.0	C
Avg. w/o Top/Bottom %	82	76	74	73	69	0	0	58.4	F
Avg. of Quality Points	3.0	2.0	2.0	2.0	1.0	0.0	0.0	1.4	D

Other Solutions:

1. Give a separate grade for effort that is not directly tied to the grade for achievement.
2. Award students with incomplete or not-turned-in assignments an “incomplete” (I) such that the assessment is not tied to a behavior. The consequence of failing to turn in an assignment is that the student must complete the assignment.
3. Use zeros only as a consideration for students with borderline grades.

The Zero Effect in Two Ohio Schools

Only nine state departments of education in the U.S. have adopted a uniform grading scale and Ohio’s has not done so. The responsibility for all policies regarding grading, therefore, lies in the hands of the local school boards. The Chillicothe Board of Education is considering a proposal by the Assistant Superintendent, Jon Saxon, which would change the grading scale such that no student would ever receive a zero; the lowest grade would be a 50%. “We look at the practice of giving students zeros for work that’s not completed and it’s punitive, it’s like an F to the sixth degree, because the grade that’s given for a zero is six times greater than the work that’s poorly done,” Saxon said. The Chillicothe Board of Education agreed in the summer of 2009 to pilot the No Zero Grade Policy at an elementary school in the district.

A middle school in Beachwood, Ohio has gone to an A, B, C, and I grading scale. Students who receive a grade of “I” must do additional work to bring the grade(s) up to an acceptable level under the theory that if teachers do not accept substandard work, students will not submit it and will work toward timely and satisfactory submission of assignments. The policy at Beachwood

Elementary also supports students with what would have been zeros or Fs by requiring attendance at after-school or Saturday sessions to complete the work.

### The Zero Effect in Madeira City Schools

In Madeira City Schools, because of the caliber of the students and the infrequency of suspensions and expulsions, the zero effect does not dramatically impact overall GPA or graduation rates. In general, teachers establish the policy regarding failure to turn in work for their classroom and announce it at the start of the course, either orally or via the syllabus. Many teachers request sign-off from parents acknowledging that they have read the teachers' individual classroom rules.

Policies vary among teachers regarding missing or skipped assignments or assessments. Some assign an automatic zero for work not turned in on time with no allowance for work turned in late. Some teachers allow late work to be submitted, deducting 10% of the grade credit per day that it is late. Others deduct 50% for late assignments. In general, Madeira teachers give students ample opportunity to be successful and use zeros sparingly.

Zeros can be seriously deleterious to a student's grades in the event of suspension or expulsion. Any assignments, tests, projects due on the days of suspension/expulsion are given zeros. Depending on the student, even a relatively short suspension may yield numerous zeros on their record, dramatically impacting quarter grades, jeopardizing their admissions and scholarships to secondary educational institutions, and preventing athletic eligibility.

### 3 USES OF PLUS/MINUS IN THE GRADING SYSTEM

Along with the “zero effect,” whether to incorporate subcategories including plus and minus versions of the standard five categories of grades (shown in Table 3.1) is highly controversial. The arguments both for and against the practice of grading achievement using five groups versus using twelve groups (as shown in Table 3.2) are numerous. The bulk of the available research has been conducted at the college level where the conversion to more grading groups has already taken place. The discussion of advantages and disadvantages of a plus/minus grading system below assumes that the data collected at the post-secondary level has application to the secondary level.

Table 3.1  
Five Category Grade System and Equivalent Quality Points

A	B	C	D	F
4.0	3.0	2.0	1.0	0

Table 3.2  
Twelve Category Grade System and Equivalent Quality Points

A+/A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
4.0	3.67	3.33	3.0	2.67	2.33	2.0	1.67	1.33	1.0	0.67	0

#### Advantages of a Plus/Minus Grading System

A review of the literature revealed the following advantages of a grading system using pluses and minuses, sometimes referred to as chromatrics, in addition to standard grades:

- *Fairness and accuracy in grading:* Pluses and minuses may offer a more accurate reflection of a student’s performance. For example, there can be large disparities in the quality of work between students who score at the top end of the grade scale versus the bottom end. Pluses and minuses may provide more accurate feedback to the student and to the parents.
- *Incentive:* A single letter grade system may limit a student’s incentive to work hard and learn more to improve one’s course grade. With a plus/minus system, the student has a better chance of being rewarded for reasonable effort. Say a student finds himself with an average score in the mid-80s, a B. In order to get an A in the course, the student might have to score

greater than a 98 on final test, a potentially daunting task. With pluses/minuses, the student may, with significant but not heroic effort, be able to improve to a B+.

- *Increased “value” of a 4.0 GPA:* For top tier students, a GPA of 4.0 has greater meaning if pluses/minuses are awarded because students with A- scores will no longer have 4.0 GPAs but 3.7.

Other studies and researchers can dispute the above-cited advantages. With regard to fairness and accuracy, it has been demonstrated that increasing grading categories from four to six lowers the reliability and validity of the measures (Chang 1993, 1994). Also shown was that as the number of grade categories increases and teachers are required to identify subtle differences in students’ performances, subjective elements are more influential.

In a study conducted at Ball State University, the use of chromatics in grading had no statistically significant impact on student motivation as a key to success (as determined by proxy by total points earned during a semester). This is in contrast with the concept that students have greater incentive to succeed within a plus/minus grading system.

#### Disadvantages of a Plus/Minus Grading System

The disadvantages to the addition of pluses and minuses to the A, B, C, D, and F grading system are identified in the literature as follows:

- *GPA reduction:* Numerous studies have demonstrated that while the impact on GPA is not large with the addition of pluses/minuses, there is a decrease in GPA. Students have their GPA hurt more than helped but the largest percentage remains unaffected. One of the chief causes of GPA reduction is the lack of balance between minuses and pluses in the A grade range. Most chromatic systems assign 4.0 quality points to an A and an A+ and 3.7 quality points to an A-.
- *Reduced reliability of assigned grades:* With greater numbers of grade categories, more classification errors occur. The errors are of a lesser magnitude (moving from an A- to a B+ is less of a difference than from an A to a B) but raw numbers of errors increase.
- *Grade disputes/changes:* Because of the greater number of grade categories, there is likely to be a larger number of borderline grades and, likewise, students disputing grades in the quest for higher ones.
- *More clerical errors:* Because of the increased number of grading categories, there is an increased opportunity for clerical errors in grading.

There are several drawbacks to the plus/minus system that can, potentially, be rectified. Although an A+ is rarely awarded more than 4.0 quality points, some schools have begun awarding 4.3 points to create parity between pluses and minuses in the A grade range. Further, it has been suggested that a 4.3 be awarded only for an A+ as a course grade but that GPAs be capped at 4.0 in order to remain comparable to other schools. In order to reduce the number of grade categories, and therefore lessen the burden on teachers and improve reliability of grades, some schools utilize pluses only, use no pluses or minuses in the D grade range, or consider A+, A and A- all as A.

#### Utilization of Pluses and Minuses by Surveyed Schools

In Table 1.2 (page 6), of the sixteen schools for which there is information regarding the utilization of pluses and minuses in grading, six use chromatics and ten do not.

## Conclusions

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Grades are important as a measure of mastery of course content. The grading policies at Madeira are comparable to other surrounding school districts and provide an outcome that meets the needs of all constituents. There is no indication that a different or, presumably, better method of calculating grades is appropriate at this time.

The primary consumers of grades are students, parents, and colleges and universities. Progress Book provides students and parents with the opportunity to know exactly where the student stands on a percentage basis within a grade range at any given time during the school year. Because Madeira has this tool, it is not necessary to differentiate a grade within a 10-point scale with the use of pluses and minuses. Further, if the goal is to maximize the quality of Madeira students' GPAs for college admission, utilizing a plus/minus system would yield, on average, a lower GPA for students vs. the GPA generated under the current 10-point scale.

For colleges and universities, the existing admission practices provide an appropriate comparison of Madeira students with other applicants. From our research, there does not seem to be any inherent "disadvantage" to the existing grading practices.

The committee found no indication of clear, consistent direction being given to teachers on the handling of "missed" assignments and the treatment of a "zero" into the grade calculations. While the student handbook indicates that assignments missed because of an unexcused absence (including suspension/expulsion) may not be made up, this policy fails to fully recognize the potential effects of a zero on final grade calculations.

## Recommendations

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- 1) Evaluate the need for a methodology on assigning zero grades at Madeira. There is a difference between instances where a student "chooses" not to turn in an assignment(s) (and receives a zero) and when they are not permitted to turn it in. These situations may merit different treatment.
- 2) Provide professional development for teachers to discuss best practices for grading policies. There seems to be inconsistency between several grading practices, such as percentage rounding and the treatment of late/missing assignments, that may have an impact on a student's grades and resulting GPA.