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## Action Research: Alternative Assessments in Middle School Science Classrooms

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Action Research: Alternative Assessments

Action Research: Alternative Assessments in Middle School Science Classrooms

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Bowling Green State University

Abstract

*The purpose of this study is to see how alternative testing can alter students' test anxiety levels. A survey will be given to the students before a written assessment, measuring the students' test anxiety level before a standard test. Then the students will be given multiple options for an assessment on their understanding of the content, rather than a written test. A second survey will be given to the students to measure the students' anxiety levels before turning in their alternate assessment. The two surveys will be compared to see if providing alternate ways to measure understanding rather than a traditional paper/pencil test will lower students' anxiety levels about assessments.*

## Action Research: Alternative Assessments

### Introduction

Have you ever been so nervous for a test that your hands are sweaty, you forget basic information, or felt like you were going to be sick? If you have felt this way, then you might have a form of test anxiety. According to Lisa Webb and Amy Miller, who both specialize in learning strategies for students at the Virginia Commonwealth University, test anxiety is defined as “a state of uneasiness and distress before and during a test that often lowers performance” (Webb & Miller, 2012). When a student does not feel comfortable when taking a test, they can often make simple mistakes, which may not have happened if the student had felt completely secure. Test anxiety can lead the student to be nauseous, forget information the student had previously known, have increased heart rate, and make small errors on the test due to their nervousness (Niu & Henderson, 2014). I believe that as the test anxiety in the student increases, the academic performance of the student is likely to decrease. There are multiple other forms of assessment a teacher can create in order to reduce students’ anxiety over an assessment.

Written tests do not need to be the only form of assessment provided to the students to measure the students’ understanding of the content. Alternative forms of assessment, such as projects or presentations, may allow the student to show their understanding of the content, while minimalizing the anxiety the student experiences over the assessment. These alternative methods can still allow the student to study the information, but instead contributes to the student feeling more prepared for the assessment and the grade that is aligned with the measurement.

I am personally intrigued by this research because I too have test anxiety. I can spend hours studying the material and feel very prepared, but once I get the written test, I

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tend to become very nervous and make small innocent, errors that have large impact on the final grade of the test. I would always feel more comfortable when I had to write a paper, do a presentation, or do a project instead of having a written test. I believe I learned the information better with the alternative assessments because I was exploring the topics more than when I was just memorizing the facts for the test. I believe providing alternative assessments may help reduce students test anxiety.

The level of the student's test anxiety will be measured with a quantitative survey given to the students before a written test and before an alternative assessment. The results of each survey will be reviewed and compared to see if the students' anxiety levels had adjusted. This paper discusses the research that has already been conducted on test anxiety, and how the research for this project will be conducted. The goal of this research project is to see if students' anxiety levels are reduced when given an alternative form of assessment rather than a written test.

### Literature Review

Test Anxiety is an issue that is affecting students' performance every day. Due to the large number of students who have this anxiety, researchers are beginning to look into ways to reduce the students' fears. The research suggests providing an alternative method of testing students will help the students perform better academically and make more connections with the content. Alternative testing has multiple benefits but most importantly, it can help lower students' anxiety levels, and help the students feel more confident in their abilities in the subject.

Alternative testing can also help students become more in charge of their education, which can in return make the students feel more confident and less anxious. In

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a study by Maimouna Al-Ruqeishi and Salma Al-Humaidi, who are both English Foreign Language teachers who studied to see how alternative assessments affects both teachers and students, alternative testing can help students take control of their learning (Al-Ruqeishi & Al-Humaidi, 2016). When teachers provide alternative assessments, which allow the students to be creative with their learning, the students are still studying the same information as they would with a paper test, but they are exploring the information more and making more connections with the content. This allowed for the students to become prouder of themselves for their knowledge in the subject, and in return helped the students feel more confident in their abilities, which helped the students become less anxious. For example, when the students were asked to write journal entries after each class, this allowed the students to reflect and explain back to the teacher the information they had learned and allowed the teacher to formatively assess the students on their understanding of the lesson. The authors say, “The main aim of alternative assessment is to illustrate learners’ growth and progress over time and to promote their engagement in self-assessment and self-reflection” (Al-Ruqeishi & Al-Humaidi, 2016). This suggests that alternative assessment can allow for students to take more control of their knowledge on a subject and can help teachers better understand the students’ progress. Alternative testing can help students become more reflective of their work and be more creative with their learning, which also helps the student feel more confident in their knowledge of the subject, which helps lower the students’ anxiety level.

Alternative assessments have been shown to help lower anxiety levels for students, and can help the students perform better academically. In a study by Handan Gunes, Sibel Demir, and Mihrican Balaban, allowing the students to create a portfolio to show the class

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what the student has learned, helped reduce the anxiety level of their students (Gunes, Demir, & Balaban, 2015). Their study found when the teacher was discussing the portfolio project to the class, the students had high anxiety levels due to the fact that this was a new project and unfamiliar to the students. However, as the students received a thorough rubric for the assignment and as the students worked with the project, the students' anxiety levels decreased and they felt more confident in their work. The study had two sets of groups, a control group, which took a tradition paper/pen test, and an experimental group, which did the portfolio project. The study found the experimental group had far better grades on the assignment than the students who took the test, the experimental group showed better understanding of the content, and the control group had higher anxiety levels than the experimental group (Gunes, Demir, & Balaban, 2015). This article shows how alternative testing can create positive changes in students' understanding of the content and lower their test anxiety.

Alternative assessments can help the students grow as individuals and feel prouder of their work, which can help the students feel less anxious about the assessment. The authors of *Making Assessment A Meaningful Part of Instruction*, David Gilman, Richard Andrew, and Cathleen Rafferty, allowed the students to make portfolios of their work and be creative with the assessment (Gilman, Andrew, Rafferty, 1995). The authors say the portfolios allowed for student to, "recognize the value of their work and reflect on what the students' see as their greatest accomplishments" (Gilman, Andrew, Rafferty, 1995). When the students are told to put together their work, the students reflect on their assignments and see how they could improve while seeing the effort they have given to their tasks. This alternative assessment allowed the students to put more meaning into

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their assignments, for the students to see their progress, for the teacher to assess the students work, for the students to make connections with the information to other content they have previously learned, and allowed for the students to feel more relaxed than when taking a traditional test (Gilman, Andrew, Rafferty, 1995). The alternative assessment can help students feel prouder of their work, while helping their anxiety levels decrease as they feel more prepared for the assignment.

Abalı Öztürk, Y. Şahin also found positive results on alternative assessment and its effect on students' achievement and anxiety levels about the assessment. In this study, the author had the students do a poster on a subject and then self-evaluate and later evaluate their peers (Abalı Öztürk, Y. Şahin, 2014). The results showed the students had lower anxiety levels over their assessment, because the students did not feel as nervous about their work. The students felt confident in their poster and this helped the students learn more about the content. When the students were directly working with the subject, instead of just memorizing the information, the students were able to recall the content better and had better understanding of the subject. When the students had to evaluate themselves on their poster, it helped the students reflect on what they could have done better while showing the students the positive attributes of their poster. Similarly, when the students evaluated their peers, they were able to make connections with their classmates' poster and learn new aspects of the information from seeing their classmates' knowledge on the subject (Abalı Öztürk, Y. Şahin, 2014). This form of alternative testing helped the students gain confidence in their abilities and lowered the anxiety the students felt about assessments.

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When students do not feel confident in their work and feel anxious over the assessment, often students can become less motivated to learn the content. In a study by Dawson Hancock, he found that when students have to present their understanding of the content, such as through a real-life scenario, the students felt more motivated to learn the information, rather than when the students were given a paper and pencil test (Hancock, 2007). When the students were working hands-on with a real-life situation of the information, the students were much more engaged and responsive to the content. The students became less anxious about the assessment, but rather excited about learning more than the teacher had originally provided. Furthermore, the students who were engaged with the activity succeeded academically for the assignment, and overall the students performed better academically in the performance assessment than with a standard pencil and paper test (Hancock, 2007). When the students complete alternative assessments, they perform better academically as well as feel less anxious about the assessment.

As the research has suggested, alternative assessment options can allow the students to feel more comfortable and prepared for their final grade. Alternative assessments can allow the students to have more control of their education, feel less anxious about a summative assessment, and perform better academically. Alternative assessments can allow the students to be creative with their learning and make more connections with the content, in a way that a formal test may not provide. The research suggests alternative assessments can greatly increase students' performance in the classroom and lower the students' anxiety levels.



## Action Research: Alternative Assessments

### Methodology

In order to measure students' test anxiety, the students were given the exact same survey twice, once for the traditional assessment and once for the alternative assessment. The research was done in an eighth-grade science classroom over the span of about two months. Each of the students were given a permission slip to ensure the students and parents are both comfortable with the students participating in the research. The survey has three parts with a total of eight questions.

At the beginning of the fall semester, the students took the standard version of an assessment, a written test. Prior to taking the test, the students were given part one of a three-part survey, see Appendix A. Part one of the survey asked the students four questions including: on a scale of 1-10, with ten being, "I am so nervous I could throw up" and one being "I am not nervous at all", how do you feel about this assessment, on a scale of 1-10, with ten being "very prepared" and one being "not prepared at all" how prepared do you feel for this assessment, how many hours did you spend preparing for this assessment outside of the classroom, and what grade do you think you will earn on this assessment. After filling out the survey, the students were able to begin their written test. Once the tests were finished and graded, the teacher gave the students part two of the survey prior to giving the students their feedback from the traditional assessment, see Appendix B. The two questions for part two of the survey included: on a scale of 1-10, with ten being "I am so nervous I could throw up" and one being "I am not nervous at all", how nervous are you to receive the feedback from your assessment, and what grade do you think you should earn on this assessment. Once the students were done with the two questions from survey two, the teacher gave each student their feedback and grade on

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the traditional assessment. After the students had reviewed their feedback and grade, the students answered part three of the survey, see Appendix C. Part three of the survey had two questions that included: what grade did you earn on this assessment, and on a scale of 1-10, with ten being “I am very happy with my grade” and one being “I might meet with the teacher because I do not like my grade” how do you feel about the grade you earned on this assessment.

In the middle of the fall semester, the students were given options for alternative assessments, see appendix D. The options for the alternative assessment included creating a commercial, writing a story, designing a tri-fold poster, presenting a powerpoint, writing a play, singing a song, or the students had the opportunity to design their own project and have it approved by the teacher. The paper had the specific requirements listed for each individual assessment. The students can pick one of the provided options for their assessment, or come to the teacher with their own idea and make the requirements with the teacher.

The students were given three class periods to work on their alternative assessment, and then the students presented on days four and five. Before the students presented their project, the students were given part one of the three-part survey. This survey had the same exact questions from the survey the students were given prior to the traditional assessment. After the students have completed the survey, the students presented their projects. After all of the assessments had been graded, the students were given part two of the survey. Once the students had filled out the two questions from part two the survey, the students were given their feedback and grades from the alternative

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assessment. After the students had reviewed their feedback and grades, the students were asked to fill out the two questions from part three of the survey.

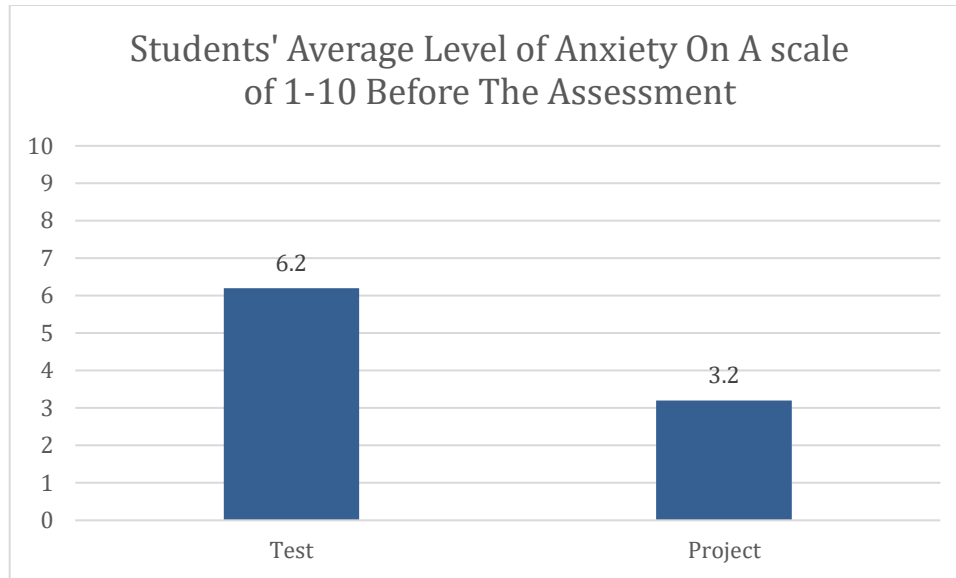
Testing anxiety can dramatically influence students' performances on assessments. However alternative assessments can help students grow their confidence in difficult subjects, lower their anxiety levels, and do better on the assessment. The goal of this research project is to show how giving the students alternative assessment will help the students perform better in the class. Alternative assessments can be a valuable tool to use in any subject area, and can be better for the students than a standard pencil and paper test.

### Data Analysis

Forty students took the three-part survey. These forty students were from two separate class periods and each student filled out all eight questions. Section one had a total of four questions, and students filled out these same exact questions before the traditional assessment and before the alternative assessment. Question one asked the students "On a scale of 1-10, with ten being, 'I am so nervous I could throw up' and one being 'I am not nervous at all', how do you feel about this assessment?" Below is a graph displaying the average responses for this question.

### Graph One

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The graph above, Graph One, shows that the forty students had an average anxiety level of a 6.2 out of ten before the traditional assessment, and a level 3.2 before the alternative assessment. This is a 3.0 difference and implies that the students felt less anxious before the alternative assessment than before the traditional assessment. This is a significant difference because 3.0 is a large difference out of ten, and leads us to believe that students will feel calmer in class when performing an alternative assessment rather than a traditional assessment.

The second question in the first part of the survey asked the students “On a scale of 1-10, with ten being “very prepared” and one being “not prepared at all” how prepared do you feel for this assessment?” On average, the students described their level of preparedness a 7.2 on the traditional assessment and an 8.1 on the alternative assessment. This is a difference of 0.9, which implies students feel only slightly more prepared with the alternative assessment rather than the traditional assessment. This is not a large difference and implies that the students felt confident before the traditional assessment

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and the alternative assessment, which is valuable information for comparing the grades on the two assessments.

The third question on the first section asked the students “How many hours did you spend preparing for this assessment outside of the classroom?” For the traditional assessment, on average the students spent 1.3 hours preparing, and for the alternative assessment the students spent an average of 0.8 hours. This is a difference of 0.5 hours. This suggests that students are more likely to spend time outside of the classroom preparing for their traditional assessment rather than preparing for their alternative assessment.

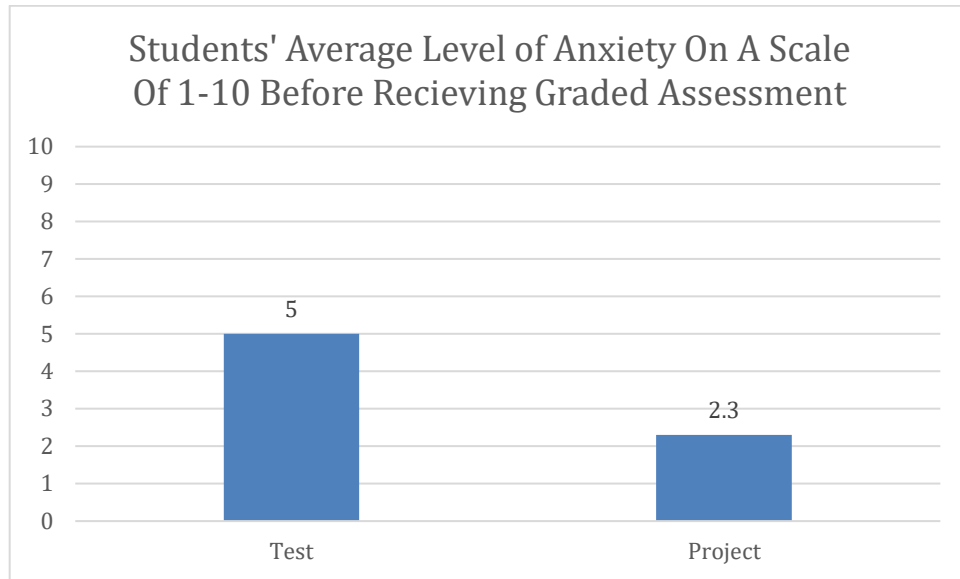
The final question on the first section asked the students “What grade do you think you will earn on this assessment?” On average, the students believed they would receive an 84.9% on the traditional assessment and a 93.0% on the alternative assessment. This is a 8.1 percent difference, which is important because this implies that students will perform better and earn a higher grade when performing an alternative assessment rather than a traditional assessment. Students are lowering their standards for their performance on the traditional assessment by 8.1 percent than from their performance on the alternative assessment, and this is before the students have started the traditional assessment.

The second part of the survey was given prior to the students seeing their feedback and grade on their assessment. This section had two questions, and the first question was “On a scale of 1-10, with ten being ‘I am so nervous I could throw up’ and one being ‘I am not nervous at all’, how nervous are you to receive the feedback from

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your assessment?” The graph below displays the students’ average results on this question.

Graph Two



The graph above, Graph Two, shows that the students on average ranked themselves a 5.0 out of ten on the traditional assessment, and a 2.3 out of ten on the alternative assessment. This is a 2.7 difference, and signifies that students will feel calmer and less anxious before receiving feedback from an alternative assessment rather than a traditional assessment. Also, when comparing these results to the results from graph one, it shows that the students felt less anxious when receiving the feedback than before taking the either assessment. This implies that students will feel more anxious before taking either set of assessment than when the students are preparing to receive the feedback from their assessment.

The second and final question from section two asked the students “What grade do you think you should earn on this assessment?” On average students believed they would receive an 83.1% on the traditional assessment and a 94.0% on the alternative

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assessment. This is a difference of 10.9% which indicates the students felt highly more confident with their performance on the alternative assessment than the traditional assessment. In most, if not all, schools a 10.9% difference is an entire letter grade change on the grading scale. Students believe they are performing a letter grade, 10.9%, better on the alternative assessment than their performance on the traditional assessment before the students saw their feedback.

Section three of the survey had two questions, and the first question asked, “What grade did you earn on this assessment?” On average, the forty students received an 87.5% on the traditional assessment and 93.0% on the alternative assessment. This is a 5.5% difference, and indicates that students will earn a higher grade on an alternative assessment rather than a traditional assessment. The final question of the three-part survey asked the students “On a scale of 1-10, with ten being ‘I am very happy with my grade’ and one being ‘I might meet with the teacher because I do not like my grade’ how do you feel about the grade you earned on this assessment?” The traditional assessment average response was a 7.9 and the alternative assessment response was an 8.8, which is a difference of 0.9. This indicates that students are slightly happier with their grade on the alternative assessment rather than the traditional assessment.

## Conclusion

The goal of this research study was to see if students felt less anxious when taking an alternative assessment versus when they take a traditional assessment. There were forty students who answered an eight-question three-part survey. The data shows that these forty students felt more anxious before taking a traditional assessment than when the students took the alternative assessment. The data also showed that on average

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the students believed they would perform 8.1% better on the alternative assessment than the traditional assessments, and this is before the students begin the traditional assessment or the alternative assessment. Students are walking into class and setting their standards lower on their performance on the traditional assessment than the alternative assessment, and this negative mindset may result in the students performing worse on the traditional assessment. The second part of the survey showed that before the students had received their feedback, the students on average believed they had performed 10.9% better on the alternative assessment than on the traditional assessment. A 10.9% difference is a significant change and shows that the students are feeling more confident with their performance in a alternative assessment than a traditional assessment. When students are feeling more confident in their performance in a summative assessment, their overall confidence in themselves and in their academics, will improve. The data also shows that the students did perform better on the alternative assessment than the traditional assessment. There was a 5.5% difference between the grades on the traditional assessment than the alternative assessment. This is a significant difference and the data shows that students are performing better and feeling less anxious when taking an alternative assessment than a traditional assessment.

Although the data leads to the belief that alternative assessments can cause less anxiety than traditional assessments, there were a couple variables that may have skewed the results. For the alternative assessment, the students were given three days in class to work on the project. These extra days could have caused the students to spend less time on the assessment outside of the classroom, which would change the results from question three of part one of the survey, and may have led the students to feel more



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prepared for the assessment, which would skew the results from question two of part one of the survey. Also, for the alternative assessment, the students were given a rubric to show exactly what was expected of them in order to receive the best possible grade. For the traditional assessment, we did review information about the unit prior to taking the test but the students were not aware of the questions that would be asked on the assessment. The rubric from the alternative assessment may have led the students to feel less anxious prior to turning in their assessment, and the students may have felt more anxious about the traditional assessment because they did not know what questions they would be asked to answer. The extra class time and rubric for the alternative assessment may have helped the students feel less anxious about the assessment, and may have skewed the results.

Alternative assessments allow for students to feel more comfortable in the classroom. Results shows that students feel less anxious and more confident in their performance when taking an alternative assessment versus when the students took the traditional assessment. The data shows that students felt less anxious before the alternative assessment than the traditional assessment, students believed they would perform 10.9% better on the alternative assessment than the traditional assessment, and the students did perform 5.5% better on the alternative assessment than on the traditional assessment. The data and the research imply that alternative testing can have a positive impact on students' comfortableness in the classroom and in their performance on summative assessments.

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**Appendix A**

Part One of the Survey

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Assessment before given test

1) On a scale of 1-10, with ten being “ I am so nervous I could throw up” and one being “I’m not nervous at all”, how do you feel about this assessment?

1	2	3	4	5	6	7	8	9	10
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2) On a scale of 1-10, with ten being “Very prepared” and one being “not prepared at all” how prepared to do you feel for this assessment?

1	2	3	4	5	6	7	8	9	10
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3) How many hours outside of class did you spend preparing for this assessment?

\_\_\_\_\_

4) What grade do you think you will earn on this assessment?

\_\_\_\_\_

**Good luck on your assessment!**

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**Appendix B**  
Part Two of the Survey

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Assessment given before given feedback

- 1) On a scale of 1-10, with ten being “ I am so nervous I could throw up” and one being “I’m not nervous at all”, how nervous are you to receive your assessment back?

1	2	3	4	5	6	7	8	9	10
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- 2) What grade do you think you should earn on this assessment?

\_\_\_\_\_

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**Appendix C**  
Part Three of the Survey

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Assessment given after receiving feedback

- 1) What grade did you earn? \_\_\_\_\_
- 2) On a scale of 1-10, with ten being “I am very happy with my grade” and one being “I might meet with the teacher because I do not like my grade” how do you feel about the grade you earned?

1	2	3	4	5	6	7	8	9	10
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**Appendix D**

## Alternative Assessment

Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Directions:** You are going to create either a commercial, story, tri-fold poster, powerpoint presentation, play, or write a song representing reproduction. The goal of this project is for you to achieve our learning goals for this unit.

## Learning Goals:

1. I can describe reproduction as the transfer of genetic material from one generation to the next.
2. I can explain that every organism alive today comes from a long line of ancestors who reproduced successfully every generation.
3. I can relate the process of mitosis to its functions in single-celled and multicellular organisms.
4. I can describe the process of meiosis and its role in sexual reproduction.
5. I can compare end products of sexual and asexual reproduction with an emphasis on their advantages and disadvantages in relation to the continuation of the species.

Each of your presentations must include mitosis, asexual reproduction, meiosis, and sexual reproduction. You will be given three days in school to work on this project, and then present on the fourth day. At the end of your presentation, you will have to assess yourself. You will have to say what score you believe you should receive and explain why you believe you deserve that score. Below are the requirements for each project.

**Commercial:** Must be 5-10 minutes that can be either recorded or performed in front of the class on the day of the presentation.

**Story:** You can write a 3-5 page story about reproduction. On the day of the presentation, you will say at least three sentences to the class summarizing your project.

**Tri-fold Poster:** You can create a tri-fold (you would have to buy the materials) to represent reproduction. On the day of the presentation, you will say at least three sentences to the class summarizing your project.

**Powerpoint Presentation:** You can create a Powerpoint presentation about reproduction. It must be 5-10 slides, and cannot be cut and paste from our notes and activities. You will teach your Powerpoint to the class on the day of the presentation.

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**Play:** You can create a play representing reproduction. There must be a script and it must be between 5-10 minutes. You will perform the play for the class.

**Write a Song:** You can write a song representing reproduction. You must write out the lyrics and it can be between 3-5 minutes. You can either perform the song in front of the class or record the song and play it for the class on the day of the presentation.

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## Rubric for Alternative Assessment

Superior (5 points)	Satisfactory (3 points)	Poor (1 point)	Total
Student accurately represented the learning goals (meiosis, mitosis, sexual reproduction, and asexual reproduction)	Student had 1-2 errors in their explanation of the learning goals (meiosis, mitosis, sexual reproduction, and asexual reproduction)	Student had three or more errors in their explanation of the learning goals (meiosis, mitosis, sexual reproduction, and asexual reproduction)	____/5
Student gave information on five learning goals	Student gave information on three of the five learning goals	Student gave information on one or two of the five learning goals	____/5
Student was ready and able to present on the day the project was due	Student was one day late on presenting their project	Student was more than one day late on presenting their project	____/5
Student's project was neat and easy to follow	Almost all of the student's project was neat and easy to follow	Less than half of the student's project was neat and easy to follow	____/5
Student was able to self-assess and provide an explanation to their assessment	Student self-assessed but did not provide a clear explanation to their assessment	Student did not self-assess or did not provide an explanation.	____/5
			Total x 2 ____/50