

Manitoba Arts Education Curriculum Programming “Exemplars of Learning”



This exemplar includes



appropriate for grades

K

1

2

3

4

5

6

7

8

Simple machines

Demonstrating understanding through music and movement.

This exemplar includes student experiences in



Music

Language, and Performance Skills

Students develop skills for making music through aural, written, and visual music systems.



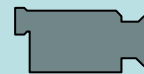
Creative Expression

Students develop ideas in music, creatively integrating music elements, techniques, and compositional tools.

Understanding in Context

Students experience and develop awareness of a variety of music genres, styles, and traditions.

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Valuing Experience

Students assess their learning in performing, creating, and experiencing music.



*Every student is a creator and composer.
Students must be given opportunities
to tap into their creative capacities and
express themselves through the
creation and sharing of their own
MUSIC. **

This integrated Music/Science project
enabled students to deepen their
understanding of Simple Machines
while developing their creative capacity
in music.

The Learning Context

The Big Idea: What is a simple machine?

The students: This Grade 5 class was heterogeneously grouped with students at a wide variety of levels. This class regularly worked collaboratively on criteria setting and routinely used their criteria as a benchmark for learning. The students in this class were becoming adept at goal setting, reflection and self-evaluation. This class had the ability to work together productively in flexible groups and were willing to take risks in order to extend their learning.

Prior learning: The students

- had the opportunity to create music as individuals and in small groups
- had the opportunity to listen to, respond and reflect to music from a wide variety of sources
- were introduced to all of the simple machines and their functions
- studied movement of simple machines through gestures and gesture drawing
- were given opportunities to extend their learning through open ended assignments

Classroom Setting was a music room and the regular classroom setting. Students received music instruction 90 minutes in a 6 day cycle.



Overview of teaching and learning experiences

First the students

- studied a variety of simple machines including their function, how they worked and real life examples

Next they

- studied simple machines through movement in the classroom and notated these movements through gesture drawing

Then they

- used the Design Process with both the classroom and music teachers
- viewed a DVD, *Animusic Pipe Dreams*, as an activator
- had a collaborative discussion to set criteria for the project

Next they

- explored, revised and created their simple machine using movement and sound. Students notated their creations

Finally the students

- as a class, created a large scale machine accompanied by appropriate sounds

As an extension the students

- presented their large machine to a variety of audiences including other students studying Simple Machines



First the students participated in a discussion about risk taking.

Teacher: *“Think about times when you have been creative. Can you think of an example of an ‘Ah Ha!’ moment? A serendipitous moment?”*

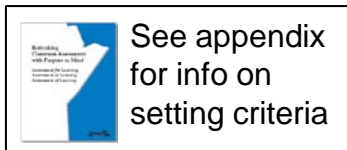
Students discussed examples of when they encountered “Ah ha!” moments and this led into a conversation about risk taking. As a class they then built criteria for supporting a risk taking environment.

Teacher Comments:
“We felt that this was the most important criteria to lay out at the onset. A risk taking environment was needed in order for the project to be successful.”

Criteria
for supporting a risk taking
environment

- Show support through clapping, watching, listening, complimenting, smiling.
- Build others confidence by finding one good (item, part, aspect) of what they are doing.
- You need to trust each other
- Feel comfortable with peers
- Stay focused, and on task
- Positive feedback, pushing ideas even further
- Encourage people

In Valuing Musical Experience, students collaborate in establishing appropriate criteria for assessing and guiding own learning in music (process and product)
5–8 M–V 4.2



Wheel
and
Axle

Lever

Pulley

Wedge

The students then studied a variety of simple machines including their function, how they worked and real life examples.

Students were given a booklet to guide their learning on simple machines.

Screw

Inclined
Plane

Gear

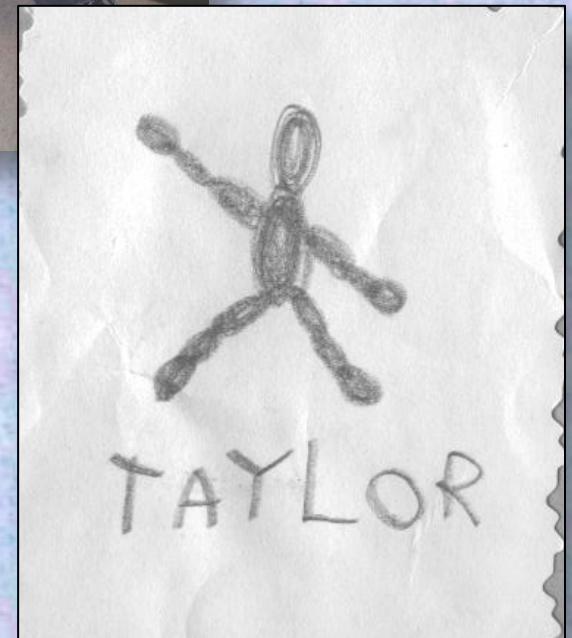
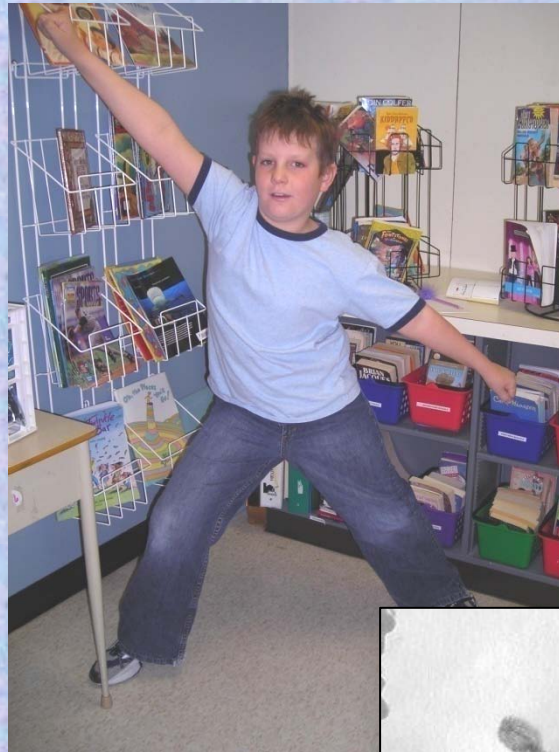
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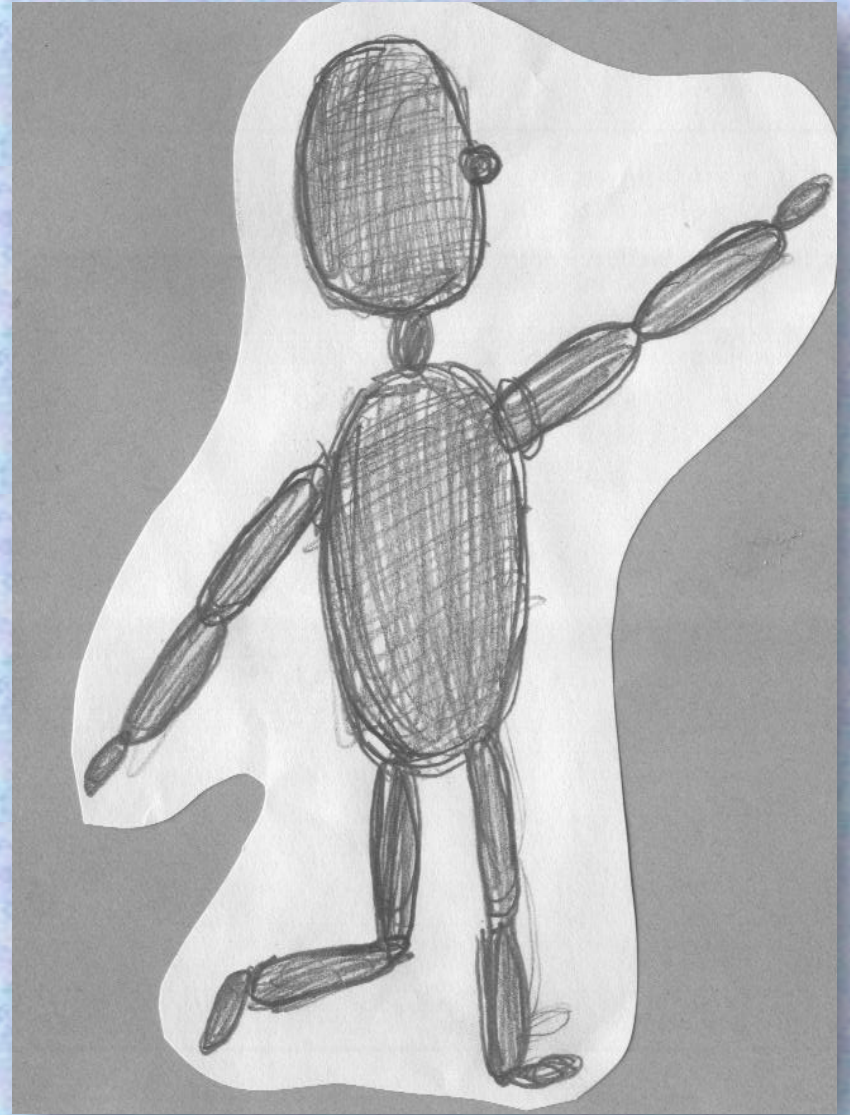
The students studied the movement of simple machines and notated these movements with drawings and diagrams.

Each student created a body movement to represent a specific machine. Students were encouraged to be as unique as possible while creating their movement.

In order to notate their body movements the students created gesture drawings.

In Art Language & Tools, students demonstrate facility with a variety of observational drawing strategies (e.g., use gesture drawing to show movement) 5–6 A–L3.2









Then the students

- were introduced to the Design Process with both the classroom and music teachers.
- Viewed *Pipe Dreams 2* from the *Animusic 2* Series. This was an example of music fitting together with the movement of simple machines. Students commented on what simple machines were present in the video and how the music added to the overall effect of the video. This video offered students a concrete example of music and simple machines working together.

• <http://www.animusic.com>

In Creative Expression in Music, students collect and explore a wide range of resources (e.g., sound recordings, visuals, stories, poems) for stimulating and developing own musical ideas 5–8 M–C1.5



The students were given ample time to explore, revise and create their simple machine using movement and sound. Students notated their creations.



Select photo



for video



Students began by choosing partners. Together the students chose one of their simple machine movements and then found an instrumental sound that would accompany that movement.

For this project it was important for the students to remember that the movement led the sound.



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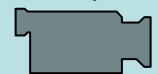


Students shared their movement and sounds with their classmates and students critically analysed each performance. Students were encouraged to give constructive criticism using concrete examples of what they liked about the movement and sound and how improvements could be made.

The students made necessary adjustments to their performance.



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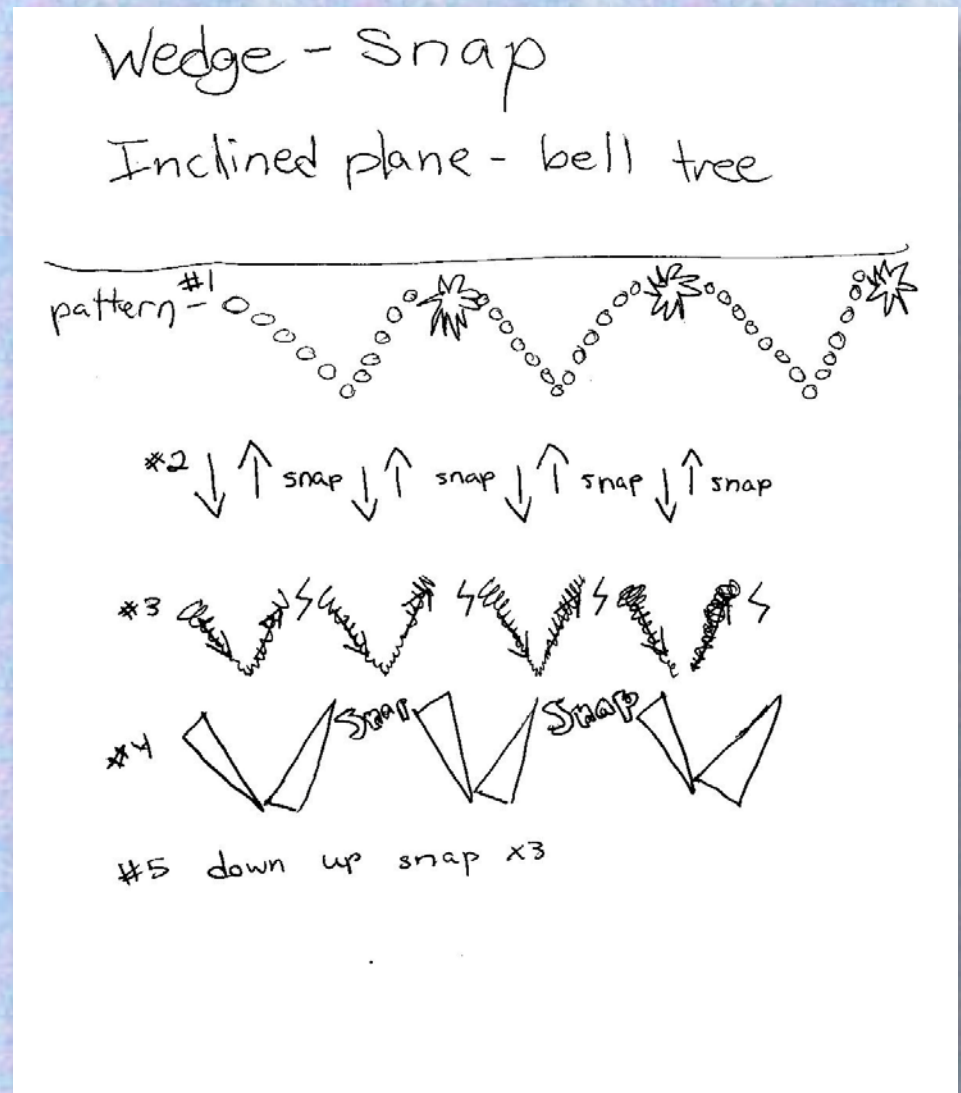


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In Music Language & Performance Skills, students respond appropriately to non-verbal cues and gestures when making music – M – L2.4

The students notated their performance. A majority of the students used invented notation in order to notate their sounds.

Students were encouraged to make their notations simple enough to allow another individual to be able to duplicate their sound.



In Music Language & Performance Skills, students use standard and invented rhythmic and melodic notation and expressive symbols and terms to record own and others' musical ideas M L2.3



The students chose larger groups to work with resulting in pairs or triads of movements and sounds.

Students explored how to put two simple machines together. Students experimented with putting the movements together and then ensuring that the sound for both machines could be heard.

The entire class viewed, commented and assisted in revising these larger machines.



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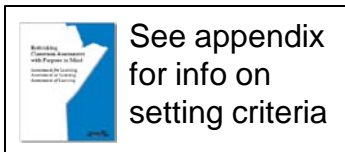


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In Creative Expression in Music, students collaborate with others to develop and extend musical ideas K-8 M-C2.5

The students

- discussed necessary components in order for the final product to be created
- set evaluation criteria to refocus the final task back to the curriculum outcomes.



Evaluation Criteria

For integrated Simple Machine and Music Project

- ___ Have I applied my knowledge of simple machines by creating a prototype
- ___ Have I been part of group conversations
- ___ Have I shared ideas and stayed on task
- ___ Have I improvised and created a simple instrumental piece
- ___ Have I revised and performed an idea from notation
- ___ Have I responded appropriately to nonverbal cues
- ___ Have I shared and justified my own preferences for musical experiences
- ___ Have I been able to find a sound and a simple machine that matched
- ___ Have I been part of the evaluation process



The students

- were given an opportunity to explore movement and discussed how they could include different body levels in order to create interest in their final machine.
- collaborated as an entire class to create their first prototype for a large simple machine. They ended up with a large U shaped machine that clearly highlighted the individual components.



*In Dance Language & Performance Skills, students use movement to demonstrate an integrated understanding of **space** in dance: dimensions, directions, levels, and pathways 5–8 DA–L1.2*



The class decided that they needed to create an even more complex machine with connecting movements.

The students chose to be part of 2 different groups. Each group created a machine that was visually interesting, used a variety of levels with clear cues for the accompanying instruments. The students chose to name their machines “Thing 1” and “Thing 2”.



Finally

The students

- chose a final performance form:

Introduction – U shaped formation

Transition

Thing 1 – 3 times through

Thing 2 – 3 times through

Thing 1 and 2 combined – Three times through

- notated their musical machine using overhead strips and permanent markers. The students created their invented notation and then placed their notation in the proper sequence



They rehearsed their final performance and performed their final product to be video taped.



Select photo



for video

In Creative Expression in Music, students share own musical ideas, compositions, and interpretations with others through performances, composition portfolios, and/or sound/video recordings K-4 M-C3.5

Commentary: Student Reflections



...we used the wheel and axle, and the wedge...



...we used all the simple machines to make a machine...



....we're going to demonstrate our machine at "Kids for Kids" assembly ...



...I liked it cause it was really fun when we did all these movements...



Commentary

Classroom Teacher Comments:

“This was a replacement for the standard design process in science.

Entering into this process both teachers (classroom and music) were willing to work together to cover each others’ outcomes. We knew this might mean a little bit of time table juggling and that the classroom teacher would have to be willing to let go a little of her control over the science outcomes.

The process, once we had started was easy, and the students were excited and engaged. We started the project in the classroom and carried it over with both classroom and music teachers present into the music room. The students definitely demonstrated their knowledge of how simple machines worked, and as a classroom teacher I was able to do final evaluation of their prototype as well as reflections throughout the process to put into their learning portfolio.”



Commentary

Teacher Comments:

“The biggest surprise was with regards to an at-risk student who rarely participates. Due to the inclusive nature of the project, as well as the risk-taking environment, the student felt comfortable enough to take an integral role. Once he had begun, he felt accountable to the group and continued to participate throughout. By the final performance, this student had taken on a leadership role in keeping the class on task.”

Commentary



Classroom Teacher Comments:

“It was great to not only see the students in a different environment, but to see them come alive in this project. Some of the students who are rarely heard in the science classroom were contributing and engaged in the music room. It left room for exploration and risk taking which made some of the less academic students shine.

After doing this once both the music and classroom teacher agreed it would be quite easy to try another time and even with a different topic. The learning curve was steep; however students and teachers trouble-shoot together and that made this even more authentic.”

Music Teacher Comments : Future Learning

“In the future there are some changes that could be made to this project. Although the results reached the goals there is still room for growth. Musically it was hoped that students would create a melodic performance and the result was a piece using non-pitched percussion. In the future I would set up the initial exploration to be done mainly on melodic instruments and then non-pitched percussion instruments would be introduced. This would guide the students to think melodically throughout the project.”



Appendix:

Learning Across the Curriculum

SCIENCE OUTCOMES:

- Recognize that a gear is a wheel and axle used to turn another wheel and axle.
5-3-05
- Identify and describe types of simple machines.
Include: levers, wheel and axle, pulley, gear, inclined plane, screw, wedge 5-3-10
- Use the design process to construct a prototype containing a system of two or more different simple machines that move in a controlled way to perform a specific function. 5-3-14
- 5-0-1C. Identify practical problems to solve. *Examples: How can I determine the mass of air? Which prepared pizza should I buy?* GLO: C3
- 5-0-1D. Identify various methods to solve a practical problem and select and justify one to implement. *Examples: constructing and testing a prototype, evaluating consumer products, accessing information from a variety of sources*
GLO: C3 (Math: SP-II.1.5)



Appendix:

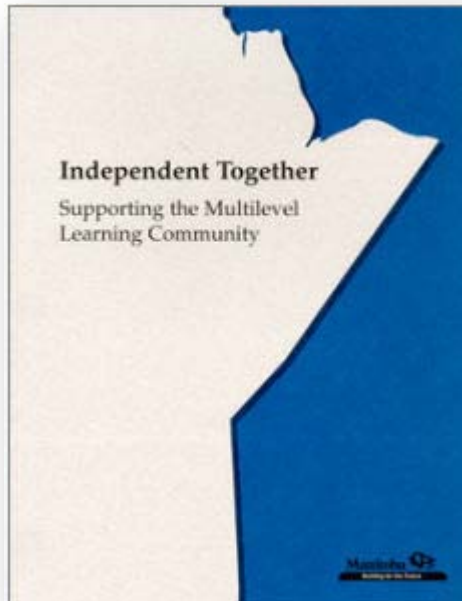
Learning Across the Curriculum

SCIENCE OUTCOMES:

- 5-0-3D. Develop criteria to evaluate a prototype or consumer product.
- 5-0-4B. Construct a prototype.
- 5-0-4D. Assume various roles and share responsibilities as group members.
- 5-0-4C. Work cooperatively with group members to carry out a plan, and troubleshoot problems as they arise
- 5-0-5C. Select and use tools and instruments to observe, measure, and construct.
- 5-0-6D. Identify and make improvements to a prototype and explain the rationale for the GLO: C3, C4
- 5-0-6E. Evaluate the strengths and weaknesses of a consumer product based on pre-determined criteria. GLO: C3, C4
- 5-0-7F. Use prior knowledge and experiences selectively to make sense of new information in a variety of contexts.

Appendix: Manitoba Education Resources

Independent Together: Supporting the Multilevel Learning Community



For more information, see:

[Independent Together:
Supporting the Multilevel
Learning Community](#)

“Constructing Student-Generated Criteria for Quality Work

The process of constructing student-generated criteria for *quality work* is a four- to six-week learning-teaching sequence. Develop only three to five criteria to reflect the targeted learning outcomes or essential learnings. Keep in mind that “less is more.”

- Clarify the purpose of a task and target the appropriate learning outcome(s).
- Share “exemplary” models of quality work.
- Guide students to identify and respond to “What’s powerful?” from a model or exemplar.
- Invite students to share “What’s powerful?” from their own work.
- Discuss “What is quality work?” Record responses on a class experience chart.

- Continue to chart responses over several days/weeks to “see” the differences and gain a grounded sense of the qualities, characteristics, and development of the criteria.
- Use charted responses to Sort and Predict the BIG ideas (significant aspects of the task, essential questions, skills or behaviours being assessed). Repeat this process throughout the theme or unit over four to six weeks to enhance and deepen reflective thinking and raise expectations for quality work.
- Post a checklist and have students use the checklist or T-chart for self-assessment and peer assessment. Use the same criteria for monitoring observations and summative assessments.
- Revise criteria constantly as learning becomes more sophisticated, *always raising the bar. .*”

Independent Together BLM2

Constructing Student-Generated Criteria for Quality Work

BLM 2

The process of constructing student-generated criteria for *quality work* is a four- to six-week learning-teaching sequence. Develop only three to five criteria to reflect the targeted learning outcomes or essential learnings. Keep in mind that “less is more.”

- Clarify the purpose of a task and target the appropriate learning outcome(s).
- Share “exemplary” models of quality work.
- Guide students to identify and respond to “What’s powerful?” from a model or exemplar.
- Invite students to share “What’s powerful?” from their own work. Discuss “What is quality work?”
- Record responses on a class experience chart : EG: *A quality _____ looks/sounds like:*
- Continue to chart responses over several days/weeks to “see” the differences and gain a grounded sense of the qualities, characteristics, and development of the criteria.
- Use charted responses to Sort and Predict the BIG ideas (significant aspects of the task, essential questions, skills or behaviours being assessed). Repeat this process throughout the theme or unit over four to six weeks to enhance and deepen reflective thinking and raise expectations for quality work.
- Post a checklist or T-chart such as the following:

Criteria for Quality Work

Met (M)

Not Yet Met (NY)

*
*
*

- Have students use the checklist or T-chart for self-assessment and peer assessment. Use the same criteria for monitoring observations and summative assessments.
- Revise criteria constantly as learning becomes more sophisticated, *always raising the bar.*

Independent Together: Supporting the Multilevel Learning Community: BLM 2

Adapted, by permission, from Kathleen Gregory, Caren Cameron, and Anne Davies, *Setting and Using Criteria: For Use in Middle and Secondary School Classrooms* (Merville, BC: Connections Publishing, 1997), 7-14.

Why was this exemplar a valuable learning experience?



Music Language and Performance Skills

Students developed understanding of and facility with elements, concepts, and techniques for making music.

Creative Expression in Music

Students collaboratively and individually generated, developed, and communicated ideas in creating original and interpretive music for a variety of purposes and audiences.

Understanding Music in Context

Students connected music to contexts of time, place, and community, and develop understanding of how music reflects and influences culture and identity.

Valuing Music Experience

Students analyzed, reflected on, and constructed meaning in response to their own and others' music.