Problem Solving: What's the Matter?

Transdisciplinary Theme:

How We Organize Ourselves:

An inquiry into the interconnectedness of human-made systems and communities; the structure and functions of organizations; <mark>societal decision-making</mark>; economic activities and their impact on humankind and the environment.

Central Idea (Macro Concept) List of Concepts*;* sample concepts

People identify problems and design solutions to solve them. (Problem Solving)

Lines of Inquiry (Key Concepts) - an inquiry into...	*Essential Questions:*
- The properties of materials (form) - How materials can be reused or repurposed (causation) - Our responsibility to the Earth (responsibility)	- What is matter? - How do we describe matter?

Briefly answer the questions below.
How did the strategies we used throughout the unit help to develop students' understanding of the central idea?
Students learned throughout this unit how to set up experiments and follow procedures to investigate. They also used a lot of reflection on how their experiments went and what they learned from them. Students learned a lot about how to make an observation and they used this throughout the unit. Students learned how to work like a scientist and engineer. During math, students were working on word problems. They had to use strategies and design solutions to solve these problems. Most of our self-management throughout the day worked on problem solving on their own.We were able to tie this back to our Conflict Unit and problem solving with peers.
What would you like to remember about the section above for next year?
This central idea and lines of inquiry are really connected to our How the World Works unit of inquiry. We moved this unit to earlier in the year so that students would have a background on materials before learning about geography and how we try to prevent erosion from impacting our lives. This seemed to be a better fit.
Reflection 12/8/24: We moved this unit to October so that we could revise the Short Story Unit to make it more applicable. Student choice continues to be important for students as one class chose to create more instruments than previous years.

Big Ideas of the Unit:

Patterson International's POI – *This link provides our school's programme of inquiry for each grade level. This will help you know what students should have knowledge about before your grade, and what they are expected to learn after your grade. This could help you know prior knowledge that students are coming with to this unit.*

What connections are there to learning within and outside the unit of inquiry? What opportunities are there for students to develop conceptual understandings to support the transfer of learning across, between, and beyond subjects?

This unit will have a great connection to our previous units on Sharing the Planet and How the World Works where we looked at habitats and earth systems. It will also lead into our Where We are in Place and Time when we look at how people have a positive impact in our world.

Learning Goals and Success Criteria

What do you want students to know, understand and be able to do?
Provide the learning targets you are addressing from the student proficiency scales in Bridge to Curriculum. Please make sure to include all 3.0 proficiency scale learning targets that you will address. Link the proficiency scales you are using to this document so you can quickly open them up and see the 2.0 scaffolds that you might have to use for some of the students. The student proficiency scales are preferred, but you may use the other proficiency scales if you choose.
- I can

Common Assessments and Summative Task to Guide Instruction:

What do you want students to know, understand and be able to do? How are learning goals and success criteria co-constructed between teachers and students?
List the pretest, or provocation, you will use to learn more about your students at the beginning of this unit. Think about how this information might guide future learning experiences for your students.

Pretest/Provocation

Task:
Evidence:
Tool:

List the summative, or end of unit task, you will use to gather information about what your students learned in this unit.. How might students help co-construct the success criteria for the summative?

Summative/End of Unit Task

Task: Students will reuse materials brought from home to design a new toy or instrument. They will create an engineering plan that explains the process to build their toy/instrument.
Evidence:
Assessment Tool:

Learner Profile: Learner Profile Posters	*Approaches to Learning:* ATL Posters	*Action That Might Come:* Action Category Posters
List 2-3 learner profile attributes that students will focus on for this unit. All learner profile attributes should be included in a planner at least once at each grade level. The link above will lead you to the attributes of the Learner Profile. Reflective	*List the ATL skills that will be focused on for this unit. All ATL skills should be included in a planner at least once at each grade level. The link above will lead you to the attributes for each ATL. If using research skills, make sure to look over our* Academic Integrity Policy.	*What opportunities are there for building on prior learning to support potential student-initiated action?* Lifestyle Choices What are the ways we can change our lives both at home and school to make a positive change?

	Self-Management Skills ● I stay organized to help me plan, carry out, and complete activities. ● I reflect before I make my choices ● I can manage time effectively so I can complete all tasks. Thinking Skills ● I can apply what I have learned in new ways. ● I can analyze information and situations in front of me.	-What are you bringing from home to store your lunch and snack? -What is in our recycle bin and trash can? What can we do to make a bigger impact with these items?
● Inquirer ● Knowledgeable		

Briefly answer the following questions below after the unit of inquiry is over.

What learning experiences best supported students' development and demonstration of the attributes of the learner profile and approaches to learning?
Our cracker experiment helped students with their thinking skills because they had to know the properties and then connect it to what was in front of them. This caused them to be knowledgeable about the properties and then be inquirers about how these properties applied to the crackers in front of them. The Playdoh experiment caused students to be inquirers because they had to think of ways to change the matter. All of the experiments that we did, students used self-management skills to follow the procedures in order to conduct the experiments. In the summative, students had to use time management to create a repurposed toy, game, or instrument within a given timeframe. They made multiple choices throughout the summative on how to plan and create their object. Students shared their projects with classmates, and had to explain why they picked the materials they used. This unit has a lot of voice and choice within limits.

To what degree did our monitoring, documenting and measuring of learning inform our understanding of student learning?
Our experiments and class conversations helped us realize if the students were getting the big idea of if a change is reversible or irreversible. We also noticed through assessment that we need to emphasize more with "assemble" and "disassemble." In math, our assessments really helped us see who understands how to identify the different kinds of problems and then how to solve it. We could see who understood the idea of missing addend and missing total. Students had to be thoughtful when looking at the available materials for their summative project. They had to think a little out of the box and be able to explain why they chose the materials they did.

What would you like to remember about the section above for next year? Before the unit begins, make sure to gather some related books (i.e. *Choose to Reuse)* we could use to kick off the unit, as well as, throughout the unit to help explain the concepts. We would like to think more about some provocations that could help students start thinking about how resources are repurposed/reused. For example, using the Making Thinking Visible strategy of Zoom In, students could look at a full picture of something repurposed and then Zoom In to see what materials were used to do this…or start by looking at the materials in a picture and then Zoom Out to see the entire picture of what was made.

Reflection 1/28/25-

DESIGNING AND IMPLEMENTING

Resources to support this unit: TPT States and Properties of Matter
ESL Vocabulary Support
ESL supports for Choices and Decisions (see pages 3 and 4 for differentiated sentence frames)

What are our learning goals? *-List the line of inquiry you are focused on with this set of lessons.* *-List the learning target or essential question you will use with your students for this set of lessons.*	**What are the learning experiences?** *-What is the student task?* *-Which resources are needed?* *-Have you thought about differentiation?* *-How is it connected to ATL and/or Learner Profile?* *-Does it match what you are trying to achieve in the first column?* *-Have you thought about what the students are interested in learning while creating these experiences?*	**How will we show our learning?** *-What evidence will you gather from students to make sure they are meeting the learning goals?*

You can add rows below if you run out of room. To add a row, right click on the row above where you want to add a row. Then go to the tab that says "insert row below." It is difficult to capture all lessons throughout the day, so add the key lessons that connect directly with your lines of inquiry and can guide any teacher through this unit.

Transdisciplinary Lessons to Support the Unit

Subject	Lesson

Music	**Materials used for musical instruments**
	- **Examine instruments:**
	  - **Which materials are used to make them?**
	  - **How does the material help make the sound?**
	  - **How would the instrument sound different if it was made from different materials?**
	Decisions composers make
	- **Using known chords, how do composers choose which chords to use in a piece of music?**
	- **How do chords sound when used in various patterns?**

What are the student inquiries/questions? -Write the inquiries/questions below. -Indicate in the lessons above where students were able to explore some of these inquiries/questions.	**How are students taking action?** Action Category Posters -Write the actions taken below. -What type of action were they exploring?
.	

Make sure to respond to all the reflection questions below about the yellow boxes above.

What evidence do we have that students are developing knowledge, conceptual understandings and skills to support the transfer of learning across, between and beyond subjects?
Students are starting to be better problem solvers throughout the day. The skills that they learned through this unit on problem solving is transferring to academics and self-management throughout the day, especially in math. Students used quick jots during our procedural writing in science. These quick jots transferred from writing instruction. Also, the idea of descriptive writing showed up with describing their science plan.

What student initiated inquiries arose and how did they inform the process of inquiry? What adjustments were made, and how did this enrich learning?
It is a great unit, but now we need to include more student inquiry for the future. Throughout the rest of the school year, some students chose to create repurposed items at home and bring them into school to share. Some students have shown interest in helping the IB Student Ambassadors with the recycling program. Some specific questions asked were: If something is solid, why does it break so easily? When something is broken down into the tiniest pieces is it still a solid? What is fire?

How are students supported in having voice, choice and ownership in the unit of inquiry?
This unit has so much voice, choice, and ownership. Students are maturing more and have more self-management skills to support the voice, choice, and ownership. Our summative in this unit probably has the most student ownership and the students love it.

What would you like to remember about the section above for next year? We need to find more nonfiction texts at different levels that support this unit. We are also wondering what is happening during Art that might connect to this unit. Generation Genius is a great resource for this unit. There is a dam experiment with Legos that we think connects well with this unit. We did not get to it this year, but next year would be one we want to include.

Other notes: What might be a field trip or guest speakers that could support this unit? Maybe look at when we do this unit during the school year.