

# Transformative Social and Emotional Learning in **Mathematics**

Oregon Teacher's Guide and Lesson Sparks

## About This Guide

In Oregon, leaders envision Transformative Social and Emotional Learning (SEL) as extending beyond a specific curriculum or standalone program, moving from a focus on each individual's development to an approach that is fully integrated with other aspects of teaching and learning and that supports all members of a school community in learning and thriving. To spark inspiration and provide guidance for teachers as they plan lessons that integrate Transformative SEL into their curricular focus, this resource offers examples of K–12 learning activities tailored to specific Mathematics and Transformative SEL standards in Oregon.

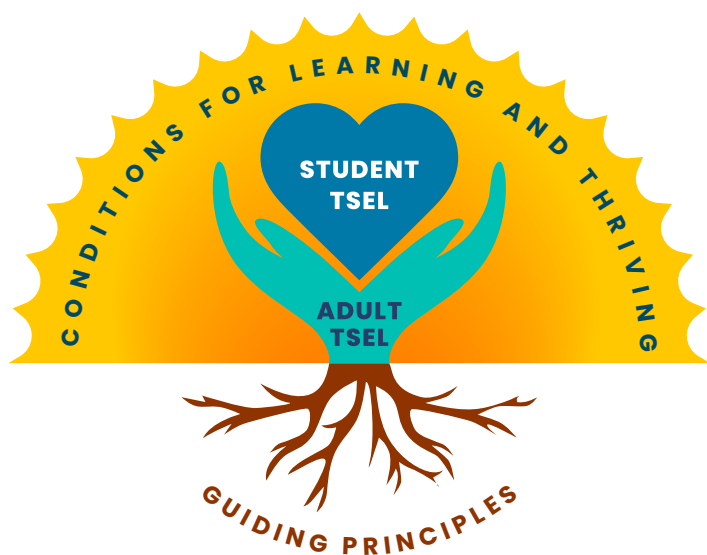
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# Teacher's Guide to Transformative SEL Instruction

Just as an environmental ecosystem requires a balance of sunshine, water, nutrients, and a healthy atmosphere for plants to flower and bear fruit, the school ecosystem needs individuals, relationships, and the environment to work in interdependence so that everyone can flourish and thrive (Figure 1). For Transformative SEL to take root in schools, adults can reflect as learners on their own social, emotional, and cultural competencies so they can provide responsive, inclusive, and engaging learning opportunities for students. Teachers play an essential role as

**Figure 1. Oregon's Transformative SEL Framework**



the gardeners of the learning ecosystem, creating an environment where learning can flourish, developing relationships with and between students, and guiding students in their personal and academic journeys.

Academic instruction serves as the soil in this learning ecosystem, as instruction is full of opportunities for integrating Transformative SEL so that students can experience consistent, high-quality learning. A transformative approach to SEL instruction must consider not just individual students, but also the social systems around them by recognizing that

student actions and attitudes are influenced by systemic conditions. Conditions for learning and thriving therefore act as nutrients for instructional soil, as teachers should cultivate authentic partnerships, equitable policies, and thriving learning environments in order to meet the full range of students' social, emotional, and academic needs.

The Transformative Social and Emotional Learning in Mathematics Guide aims to help teachers build vibrant, engaging classroom communities that celebrate identity, build agency, cultivate belonging, foster collaborative problem-solving, and encourage curiosity. Rather than offering one-size-fits-all lesson plans, this resource provides “lesson sparks”—ideas and practices that are intended to spark inspiration in teachers and can be used dynamically to help shift classroom practices and policies toward transformation. The guide refers frequently to the accompanying [Transformative SEL Lesson Spark Tool](#) which teachers can use as they engage in the processes of reflection, integration, and lesson planning.

### This guide includes:

- Guiding Principles from the Oregon Department of Education
- Guidance on Transformative SEL, including how to embed it into instruction
- Information on and examples of Signature Practices grounded in Transformative SEL and Mathematics, organized by grade band
- Additional resources and inspiration for units and lesson plans

### The companion [Lesson Spark Tool](#) offers:

- Reflection questions to demonstrate the necessary mindsets, values, and beliefs for Transformative SEL
- Guidance for instructional and Transformative SEL alignment
- A resource for planning Signature Practices

## Guiding Principles

Figure 2. Oregon's Transformative SEL Guiding Principles



This guide is grounded in the guiding principles outlined in Oregon's Transformative Social and Emotional Learning Framework and Standards (Oregon Department of Education, 2023). The principles are the roots of the learning ecosystem, serving as foundational values and beliefs that can lead to fruitful interactions, communication, and decision-making. The principles include **culturally responsive** education as a powerful pedagogical approach to cultivating Transformative SEL practices in students and adults by affirming and honoring their ways of being, knowledge, experiences, and cultures to promote engagement and learning. The principles also encourage teachers who bring a culturally responsive lens to their instruction to be **community responsive and strengths based** by centering and affirming students' lived experiences, perspectives, and contributions as assets for learning academic content. Finally, the framework is grounded in instruction that is **trauma informed** and in the **science of learning development**, acknowledging the importance of recognizing behavior as communication while building consistent, positive routines to ensure all students are primed for new learning.



## What is the relationship between culturally responsive education and Transformative SEL?

A transformative approach to SEL invites adults and students to see and understand the systems and structures that influence their attitudes, beliefs, behaviors and interactions. Culturally responsive education offers an essential pedagogical approach for creating the conditions in which Transformative SEL can take root. Culturally responsive education stems from a long history of pedagogical research by scholars such as Gloria Ladson-Billings, Django Paris, Geneva Gay, in addition to Shawn Ginwright, who brings a focus on healing-centered engagement, and Liza Talusan, who offers identity-conscious practices. By nurturing their self-identity, agency, and curiosity, culturally responsive teachers committed to Transformative SEL can harness the innate capacity of youth to actively create change in their own lives and the world.

## How do teachers take a culturally responsive approach to their TSEL instruction?

- Teachers build on students' cultural identities, perspectives, and contributions as key assets in the classroom
- Teachers encourage intellectual risk-taking and emotional connection to academic content
- Teachers understand and address the role that toxic and traumatic stress (including racial oppression) can play in shaping students' histories as learners, without seeing them as victims
- Teachers support students to make sense of the world around them, so they can name and act upon the norms, values, institutions, and systems that produce and maintain inequities
- Teachers practice critical self-awareness by reflecting on how their multiple and intersecting identities inform and affect how they act, how they interact with others, and how they see the world around them

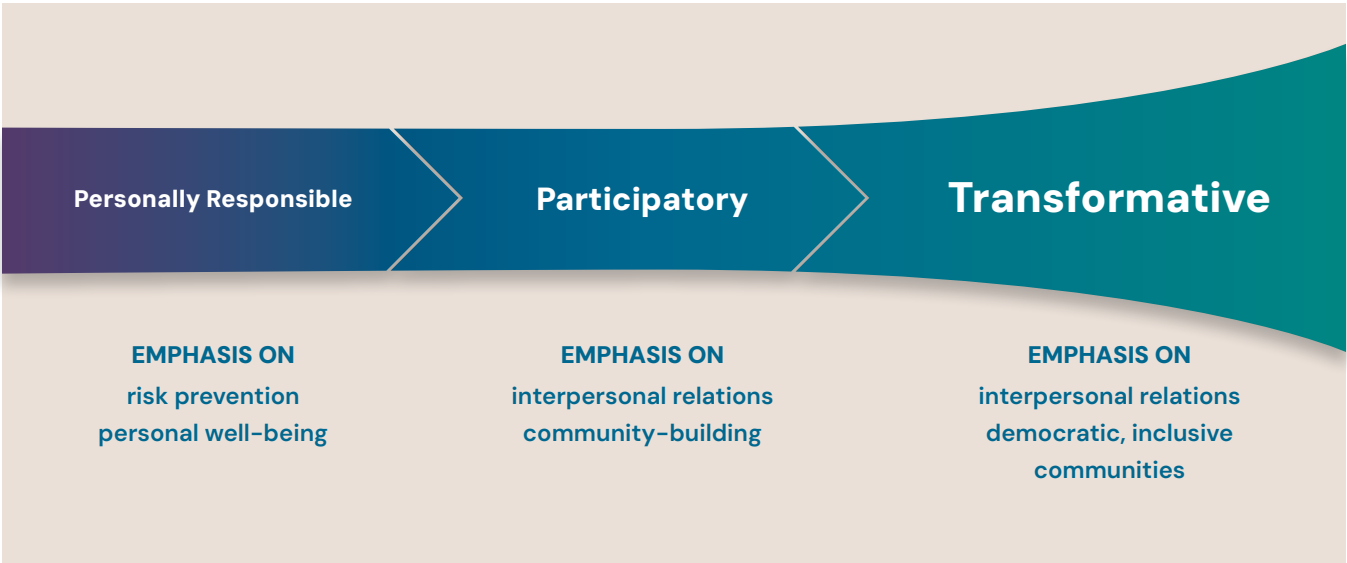


Each of these guiding principles is built into the sample activities throughout the guide. Teachers can use **Step 1** of the [Transformative SEL Lesson Spark Tool](#) to reflect on the current strengths and skills they bring to enacting Transformative SEL in your classroom. The tool's prompts are designed to get teachers thinking about their own learning journey in preparation for working with their students.

# Continuum of Transformation

A transformative approach to SEL is not confined to a single person, lesson, or specific time of the day and is not a one-size fits all program or curriculum. Instead, it is an ongoing process and practice of how adults and students show up for one another in moments throughout the school day. SEL practices exist on a continuum, moving from personally responsible and participatory SEL to a Transformative SEL approach (Figure 3). Transformative SEL was developed to shift the focus of educators away from behavior management and toward creating the conditions that support respectful, dignifying, and affirming interactions among all students and adults along the continuum of transformation. Once conditions for learning and thriving are put in place, students can learn to set goals, manage their own behaviors, and ultimately participate, improve, and change institutions and systems in ways that promote equitable outcomes (Jagers et al., 2019). When Transformative SEL is embedded throughout the day, it has the potential to humanize the learning environment by honoring students’ and adults’ lived realities of race, class, culture, and other intersectional identities.

Figure 3. Continuum of Transformation



## Transformative SEL in Mathematics

Effective mathematics instruction develops students’ deep understanding of rigorous and relevant mathematical concepts. It provides students with skills that are integral to using mathematics to solve real life problems, including self-awareness, self-management, social awareness, and relationship skills. In such environments, student-to-student mathematical

conversation and collaboration is expected and supported; students' own mathematical thinking and ideas are actively elicited, centered, and built on by the teacher; mathematical tasks draw on contexts and topics relevant to students' experiences, backgrounds, goals, and interests; and mistakes and struggle are a normal and productive part of the process of constructing mathematical understanding.

Mathematical problem solving is not only a quantitative challenge but a human one as well. In a highly effective mathematics classroom, students at all grade levels have opportunities to develop self-awareness, self-management, social awareness, and relationship skills through collaboration and group problem solving. They learn self-awareness and self-management through explicit instruction around productive persistence, the science of learning, and academic mindset. Rich tasks situated within relevant contexts provide opportunities to examine how mathematics can support responsible decision-making.

The purpose of studying mathematics is not merely to calculate efficiently and find numerical answers to quantitative problems, but to develop profound mathematical understanding to empower each and every student as a confident and capable mathematical learner. All students, in light of their humanity—their personal experiences, backgrounds, histories, languages, and physical and emotional well-being—must also have the opportunity and support to learn rich mathematics that fosters meaning making, empowers decision making, and critiques, challenges, and transforms inequities and injustices (Aguirre, Mayfield-Ingram, & Martin, 2014).



Teachers can refer to **Step 2** of the [Transformative SEL Lesson Spark Tool](#) to help determine how instructional goals align with Transformative SEL standards. [See Appendix A](#) for a more detailed Standards Crosswalk to support curricular integration.

## Explore Integrated Signature Practices

Oregon's Transformative SEL standards include guidance on practices and growth indicators. The guidance is intended to be broad enough to support adaptation while also specific enough to provide useful takeaways for adults to use with students across all contexts. Teachers may choose to adapt Transformative SEL from many different entry points, including:

- Aligning Transformative SEL standards with academic objectives by emphasizing student skillsets and outcomes in lesson planning



- Building a climate and culture for Transformative SEL, by placing student interests, needs, and learning styles at the center of instructional decision-making
- Integrating Transformative SEL through Student-Centered Instruction that puts collaborative problem-solving and student curiosity at the center of learning

Because Transformative SEL is an ongoing process, this guide describes how teachers can use Signature Practices as an entry point to Transformative SEL in the classroom by embedding predictable opportunities for relationship- and community-building and moving their practices along the continuum of transformation. Developed by the Collaborative for Academic, Social, and Emotional Learning (CASEL), the three Signature Practices are Inclusive Welcome, Engaging Strategies, Intentional Close.

For each Signature Practice, this guide provides universal and content-specific examples of how Transformative SEL might look in the classroom. These examples are intended to demonstrate how teachers can weave classroom routines and strategies that align to their learning objectives and the Transformative SEL focal constructs.



**Step 3** of the [Transformative SEL Lesson Spark Tool](#) provides space to identify how Signature Practices can help support student outcomes, and **Step 4** includes a template for teachers to sketch their own practices.

CASEL developed the Signature Practices in response to frequently asked questions such as “What does SEL look like? How can we start?” After teachers choose a curricular focus, using CASEL Signature Practices can help teachers instill their classroom with routines and interactions that nurture Transformative SEL focal constructs while also connecting to disciplinary learning outcomes.

The following sections provide guidance and examples for teachers to use in integrating Signature Practices into their classrooms.

## SIGNATURE PRACTICE:

### Inclusive Welcome



Consider opening each class period with a welcome that is inclusive and respects cultural and linguistic diversity, builds community, and sets the stage for learning.

#### Examples include:

- ⦿ Whole-group greeting activities
- ⦿ Deep breathing or mindfulness
- ⦿ Morning circles or rituals
- ⦿ Interactive do-nows, such as peer-to-peer homework help or quick pair assignments

Engage students in **square breathing** as an **Inclusive Welcome** to help them focus on their breath and release tension before a potentially activating lesson such as taking an assessment.

#### TRANSFORMATIVE SEL IN MATHEMATICS 6–8 LESSON SPARK:

### Mathematical Feels

Students reflect on feelings and emotions that happen when they find themselves faced with a problem that involves fractions and anonymously hear from other students about their own emotional responses. This reinforces to students that complex mathematical ideas such as working with fractions takes time and practice, and it is normal to feel confused.



**See the 6–8 Lesson Spark in Appendix B** for a more detailed lesson activity.

## Engaging Strategy



Consider embedding interactive or reflective opportunities that vary in complexity and style to allow students to grasp content while connecting learning to their experiences throughout the school day.

### Examples include:

- **Think, Ink, Pair, Share** — silent time to reflect; time to write; partner discussions; close with a group share out
- **Mindful Minute Brain Break** — a calming activity, promoting focus and readiness to learn
- [Gallery Walk](#)
- [Pass It On](#)
- [Jigsaw](#)

Use a [Jigsaw](#) to allow students to teach new concepts to each other, encouraging student agency and collaboration in the classroom.

### TRANSFORMATIVE SEL IN MATH K–2 LESSON SPARK:

## Representing Number Situations

Students practice representing a mathematical situation using a wide range of tools and strategies. Following individual think time to solve a problem, students engage in a think–pair–share routine to show and explain their strategy to a partner. Observing the individual and pair work allows time to observe the range of strategies students use.



[See the K–2 Lesson Spark in Appendix B](#) for a more detailed lesson activity.

## SIGNATURE PRACTICE: Intentional Close



Consider closing each learning experience by highlighting an individual or shared understanding of the lesson, reflecting on the process or the content, helping students identify next steps, or encouraging students to show appreciation for one another.

### Examples include:

- [Future Me](#)
- [One-minute Accolade](#)
- [My Next Step](#) — inviting students to commit to an action based on the lesson topic or experience
- [One Word Whip Around](#) — invite students to respond to a prompt or question with a one-word answer

Use [My Next Step](#) to connect students' conceptual understandings to their everyday lives by asking them how they observe fractions or percentages at home (e.g., cooking, budgeting, analyzing sports team performances).

### TRANSFORMATIVE SEL IN MATH 3–5 LESSON SPARK:

#### Sticky Note Reflection

After students collaborate to complete a lesson on rectangles, area, multiplication, and factoring, facilitate an Intentional Close in which students reflect on the learning and interpersonal experience of working on a collaborative mathematical task.



[See the 3–5 Lesson Spark in Appendix B](#) for a more detailed lesson activity.

## Additional Inspiration

The external links below provide inspiration as teachers work to incorporate Transformative SEL into their math lesson plans. Please note that these resources are neither affiliated with nor endorsed by the Oregon Department of Education.

| RESOURCE & DESCRIPTION  | K-5 | 6-8 | 9-12 |
|---|-----|-----|------|
| <p><b><u><a href="#">Institute of Educational Sciences (IES) Regional Education Lab (REL) Appalachia Webinar: SEL + Math = Integrated Instruction for the Whole Child</a></u></b></p> <p>This resource builds K–12 mathematics educators’ understanding of how to integrate SEL into mathematics instruction through planning tools and examples.</p> | ●   | ●   | ●    |
| <p><b><u><a href="#">CASEL Examples of Social and Emotional Learning in Elementary Mathematics Instruction</a></u></b></p> <p>This resource draws on evidence–based programs to identify and describe strategies to promote student SEL and how they enhance mathematics instruction for K–5 students. .</p>  | ●   |     |      |
| <p><b><u><a href="#">Equity Stride 3: A Pathway to Equitable Instruction: Creating Conditions to Thrive</a></u></b></p> <p>This integrated mathematics approach centers Black, Latinx, and multilingual students in grades 6–8. It addresses mathematical equity barriers to and aligns instruction to grade–level priority standards.</p>            | ●   | ●   | ●    |
| <p><b><u><a href="#">Achieve the Core Peers and Pedagogy: Solutions to Unfinished Learning in Math Must Go Beyond Academics</a></u></b></p> <p>This article describes the role of SEL in secondary students’ unfinished learning. It discusses strategies that middle and high school teachers can use to support struggling students.</p>            |     | ●   | ●    |
| <p><b><u><a href="#">Citizen Math: Why Do Concert Tickets Cost So Much?</a></u></b></p> <p>This sample middle school unit offers a student handout and a teacher’s guide on how to teach percentages using real–world concert ticket prices.</p>  |     | ●   |      |

## Conclusion

Having now seen a variety of integrated activities and model units or lesson plans, teachers can next use **Step 4 of the [Transformative SEL Lesson Spark Tool](#)** to plan Signature Practices that aim to move their instruction, student relationships, and the overall classroom culture and climate toward Transformative SEL.

As Transformative SEL is a process and approach rather than a discrete strategy or program, there is no singular, correct way to implement the approach in your classroom. Instead, Transformative SEL should be embedded throughout your content area learning and school day interactions. This guide and its accompanying tool are designed to demonstrate the several different entry points and strategies teachers can adapt to build a Transformative SEL ecosystem in their school. Transformative SEL invites adults in the educational ecosystem to see themselves as co-learners alongside youths by learning about and critically reflecting on their own social, emotional, and cultural competencies (Jagers et al., 2019). As co-learning is essential to Transformative SEL, teachers might consider who they would identify as the members of their learning community and invite them to collaboratively explore this guide and tool



**Step 4** of the [Transformative SEL Lesson Spark Tool](#) provides space for teachers to design their own Signature Practices

## References

Aguirre, J., Mayfield-Ingram, K., & Martin, D. B. (2013). *The impact of identity in K–8 mathematics learning and teaching: Rethinking equity-based practices*. National Council of Teachers of Mathematics, Incorporated.

CASEL. (n.d.) *SEL 3 signature practices playbook*. <https://signaturepractices.casel.org/>

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## APPENDIX A:

# Crosswalk of Oregon Mathematics and Transformative SEL Standards

This crosswalk includes examples of alignments between the Standards of Mathematical Practice and the Transformative SEL practices. The alignments depicted are not intended to be exhaustive; rather, they include areas that are likely to be natural instructional matches.

| STANDARDS OF MATHEMATICAL PRACTICE  | EXAMPLE ALIGNMENT WITH TSEL STANDARD  |
|---|---|
| <p><b>1 – Make sense of problems and persevere in solving them.</b></p> <p>Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, “Does this make sense?” They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.</p> | <p><b>Practice 1A:</b> Identify and label emotions, thoughts, strengths, and potential (both personal and cultural).</p> <p><b>Practice 2A:</b> Manage and express thoughts, emotions, impulses, and stressors in ways that affirm one’s identity.</p> <p><b>Practice 2B:</b> Use management strategies while recognizing various situations and environments may require different emotional approaches for achieving personal and collective goals and aspirations in ways that affirm one’s identity.</p> <p><b>Practice 2C:</b> Plan, evaluate, and achieve personal and collective goals and aspirations.</p> <p><b>Practice 2D:</b> Develop personal and collective agency by using various forms of communication to make choices and take initiative.</p> <p><b>Practice 3A:</b> Demonstrate awareness and understanding of the similarities and differences that define, influence, and affirm personal and collective identities.</p> <p><b>Practice 3C:</b> Foster a sense of belonging that cultivates acceptance, support, inclusion, and encouragement of others within a diverse community.</p> <p><b>Practice 4B:</b> Demonstrate empathy and affirm others’ perspectives during teamwork and collaborative problem-solving.</p> <p><b>Practice 5A:</b> Demonstrate curiosity and open-mindedness while using critical thinking skills.</p> |

| STANDARDS OF MATHEMATICAL PRACTICE   | EXAMPLE ALIGNMENT WITH TSEL STANDARD   |
|--|--|
| <p><b>2 – Reason abstractly and quantitatively.</b></p> <p>Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.</p> | <p><b>Practice 2A:</b> Manage and express thoughts, emotions, impulses, and stressors in ways that affirm one’s identity.</p> <p><b>Practice 2B:</b> Use management strategies while recognizing various situations and environments may require different emotional approaches for achieving personal and collective goals and aspirations in ways that affirm one’s identity.</p> <p><b>Practice 2D:</b> Develop personal and collective agency by using various forms of communication to make choices and take initiative.</p> <p><b>Practice 5A:</b> Demonstrate curiosity and open-mindedness while using critical thinking skills.</p> <p><b>Practice 5B:</b> Make informed choices and identify solutions for personal and social injustices after analyzing all types of information.</p> |



| STANDARDS OF MATHEMATICAL PRACTICE  | EXAMPLE ALIGNMENT WITH TSEL STANDARD  |
|---|---|
| <p><b>3 – Construct viable arguments and critique the reasoning of others.</b></p> <p>Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.</p> | <p><b>Practice 2A:</b> manage and express thoughts, emotions, impulses, and stressors in ways that affirm one’s identity.</p> <p><b>Practice 2B:</b> Use management strategies while recognizing various situations and environments may require different emotional approaches for achieving personal and collective goals and aspirations in ways that affirm one’s identity.</p> <p><b>Practice 2D:</b> Develop personal and collective agency by using various forms of communication to make choices and take initiative.</p> <p><b>Practice 3A:</b> Demonstrate awareness and understanding of the similarities and differences that define, influence, and affirm personal and collective identities.</p> <p><b>Practice 3C:</b> Foster a sense of belonging that cultivates acceptance, support, inclusion, and encouragement of others within a diverse community.</p> <p><b>Practice 4A:</b> Form authentic relationships that encourage autonomy while building cultural awareness and empathy through various forms of communication.</p> <p><b>Practice 4B:</b> Demonstrate empathy and affirm other’s perspectives during teamwork and collaborative problem solving.</p> <p><b>Practice 5A:</b> Demonstrate curiosity and open-mindedness while using critical thinking skills.</p> <p><b>Practice 5B:</b> Make informed choices and identify solutions for personal and social injustices after analyzing all types of information.</p> |

| STANDARDS OF MATHEMATICAL PRACTICE  | EXAMPLE ALIGNMENT WITH TSEL STANDARD   |
|---|--|
| <p><b>4 – Model with mathematics.</b></p> <p>Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.</p> | <p><b>Practice 1A:</b> Identify and label emotions, thoughts, strengths, and potential (personal and cultural).</p> <p><b>Practice 1C:</b> Reflect on and evaluate how one’s emotions, thoughts, and perspectives (including values, biases, and prejudices) can influence behavior.</p> <p><b>Practice 2A:</b> manage and express thoughts, emotions, impulses, and stressors in ways that affirm one’s identity.</p> <p><b>Practice 2B:</b> Use management strategies while recognizing various situations and environments may require different emotional approaches for achieving personal and collective goals and aspirations in ways that affirm one’s identity.</p> <p><b>Practice 2D:</b> Develop personal and collective agency by using various forms of communication to make choices and take initiative.</p> <p><b>Practice 3C:</b> Foster a sense of belonging that cultivates acceptance, support, inclusion, and encouragement of others within a diverse community.</p> <p><b>Practice 5A:</b> Demonstrate curiosity and open-mindedness while using critical thinking skills.</p> <p><b>Practice 5B:</b> Make informed choices and identify solutions for personal and social injustices after analyzing all types of information.</p> <p><b>Practice 5C:</b> Anticipate, reflect and evaluate the impacts of one’s choices and contributions in promoting personal, family, and community well-being.</p> |

| STANDARDS OF MATHEMATICAL PRACTICE   | EXAMPLE ALIGNMENT WITH TSEL STANDARD  |
|--|---|
| <p><b>5 – Use appropriate tools strategically.</b></p> <p>Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.</p> | <p><b>Practice 1A:</b> Identify and label emotions, thoughts, strengths, and potential (personal and cultural).</p> <p><b>Practice 1C:</b> Reflect on and evaluate how one’s emotions, thoughts, and perspectives (including values, biases, and prejudices) can influence behavior.</p> <p><b>Practice 2A:</b> manage and express thoughts, emotions, impulses, and stressors in ways that affirm one’s identity.</p> <p><b>Practice 2B:</b> Use management strategies while recognizing various situations and environments may require different emotional approaches for achieving personal and collective goals and aspirations in ways that affirm one’s identity.</p> <p><b>Practice 2D:</b> Develop personal and collective agency by using various forms of communication to make choices and take initiative.</p> <p><b>Practice 5A:</b> Demonstrate curiosity and open-mindedness while using critical thinking skills.</p> <p><b>Practice 5B:</b> Make informed choices and identify solutions for personal and social injustices after analyzing all types of information.</p> |

| STANDARDS OF MATHEMATICAL PRACTICE  | EXAMPLE ALIGNMENT WITH TSEL STANDARD  |
|---|---|
| <p><b>6 – Attend to precision.</b></p> <p>Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.</p> | <p><b>Practice 2A:</b> Manage and express thoughts, emotions, impulses, and stressors in ways that affirm one’s identity.</p> <p><b>Practice 2B:</b> Use management strategies while recognizing various situations and environments may require different emotional approaches for achieving personal and collective goals and aspirations in ways that affirm one’s identity.</p> <p><b>Practice 2D:</b> Develop personal and collective agency by using various forms of communication to make choices and take initiative.</p> <p><b>Practice 3A:</b> Demonstrate awareness and understanding of the similarities and differences that define, influence, and affirm personal and collective identities.</p> <p><b>Practice 3C:</b> Foster a sense of belonging that cultivates acceptance, support, inclusion, and encouragement of others within a diverse community.</p> <p><b>Practice 4B:</b> Form authentic relationships that encourage autonomy while building cultural awareness and empathy through various forms of communication.</p> |

| STANDARDS OF MATHEMATICAL PRACTICE  | EXAMPLE ALIGNMENT WITH TSEL STANDARD  |
|---|---|
| <p><b>7 – Look for and make use of structure.</b></p> <p>Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see <math>7 \times 8</math> equals the well remembered <math>7 \times 5 + 7 \times 3</math>, in preparation for learning about the distributive property. In the expression <math>x^2 + 9x + 14</math>, older students can see the 14 as <math>2 \times 7</math> and the 9 as <math>2 + 7</math>. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see <math>5 - 3(x - y)</math> 2 as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers <math>x</math> and <math>y</math>.</p> | <p><b>Practice 1A:</b> Identify and label emotions, thoughts, strengths and potential (personal and cultural).</p> <p><b>Practice 2A:</b> manage and express thoughts, emotions, impulses, and stressors in ways that affirm one’s identity.</p> <p><b>Practice 2B:</b> Use management strategies while recognizing various situations and environments may require different emotional approaches for achieving personal and collective goals and aspirations in ways that affirm one’s identity.</p> <p><b>Practice 2D:</b> Develop personal and collective agency by using various forms of communication to make choices and take initiative.</p> <p><b>Practice 3A:</b> Demonstrate awareness and understanding of the similarities and differences that define, influence, and affirm personal and collective identities.</p> <p><b>Practice 5A:</b> Demonstrate curiosity and open-mindedness while using critical thinking skills.</p> <p><b>Practice 5B:</b> Make informed choices and identify solutions for personal and social injustices after analyzing all types of information.</p> |

| STANDARDS OF MATHEMATICAL PRACTICE  | EXAMPLE ALIGNMENT WITH TSEL STANDARD   |
|---|--|
| <p><b>8 – Look for and express regularity in repeated reasoning.</b></p> <p>Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation <math>(y - 2)/(x - 1) = 3</math>. Noticing the regularity in the way terms cancel when expanding <math>(x - 1)(x + 1)</math>, <math>(x - 1)(x^2 + x + 1)</math>, and <math>(x - 1)(x^3 + x^2 + x + 1)</math> might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.</p> | <p><b>Practice 1C:</b> Reflect on and evaluate how one’s emotions, thoughts, and perspectives (including values, biases, and prejudices) can influence behavior.</p> <p><b>Practice 2B:</b> Use management strategies while recognizing various situations and environments may require different emotional approaches for achieving personal and collective goals and aspirations in ways that affirm one’s identity.</p> <p><b>Practice 5A:</b> Demonstrate curiosity and open-mindedness while using critical thinking skills.</p> <p><b>Practice 5B:</b> Make informed choices and identify solutions for personal and social injustices after analyzing all types of information.</p> |

# APPENDIX B:

## Math Lesson Sparks

### Grades K–2

#### SIGNATURE PRACTICE

#### Engaging Strategy: Representing Number Situations

#### Context

Students construct mathematical understanding by representing their mental sense-making visually, kinesthetically, and verbally. They also review others' methods and make mathematical connections between strategies.

#### Learning Outcome

Students practice using multiple representations to make sense of the mathematical situation and communicate their sense-making to peers.

#### Classroom Format

- Whole group
- Partners
- Individual

#### Time

15–25 minutes

#### Teacher Moves

- Ensure there is a variety of tools available to students to represent the mathematical situation. Decide ahead of time which strategies you will discuss during the whole-group time, and what key questions you will ask students in order to help them connect different mathematical representations. Actively look for examples of these strategies during individual and partner time.
- Post the problem stem on a smartboard or white board: Tanya made 18 chocolate cupcakes and 24 vanilla cupcakes. There are 32 students in her class.

#### Individual

- Invite students to spend 5 quiet minutes representing Tanya's situation using classroom materials (paper, color, counters, number lines, ten frames, etc.) Then, give students 5 minutes of independent think time.

#### Partners

- After 5 minutes, ask students to turn to their elbow partner and take 1 minute to explain their thinking. After 1 minute, have the partners switch.
- While partners share and talk, monitor different student ideas and approaches. Depending on time, select two to four students who used different strategies and share with the class.

### Whole group

- Gather students together and invite each student to show and explain their strategy. Record the student's strategy on the board or poster paper or have them demonstrate it if they have used a physical tool such as a rekenrek. Ask your pre-planned questions to help students see the mathematical connections between the different strategies and representations.
  - "How is Tanya's strategy similar to Luis's? How are they different?"
  - "How do you think Gene was showing the 32 students? How did Kenzie show it?"
  - "Why do you think Maria divided her 32 up like that? How might it be helpful?"

### Student Experiences & Identities

Draw on students' different interests in modes of representation by allowing students to choose which materials they use to represent the number situation. Adapt the number situation to represent a variety of experiences by asking students their favorite dessert, toy, etc.



### Content Connections

**1.OA.A.1:** Use addition and subtraction within 20 to solve and represent problems in authentic contexts involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions.

**1.OA.C.6:** Add and subtract within 20, demonstrating fluency for addition and subtraction within 10 with accurate, efficient, and flexible strategies.

**SMP 5:** Use appropriate tools strategically.

**SMP 7:** Look for and make use of structure.

### Transformative SEL Connections

**Practice 2D:** Develop personal and collective agency by using various forms of communication (i.e., verbal, body language, written, etc.) to make choices and take initiative.

**Practice 5A:** Demonstrate curiosity and open-mindedness while using critical thinking skills across various situations and environments.





- “It helped the group make sense of \_\_\_\_\_ when I \_\_\_\_\_.”
- What is one collaboration norm that you think you did a good job with today? How did it help you deepen your understanding of rectangles, area, and multiplication?
  - “Today, I did a good job \_\_\_\_\_, which helped me understand \_\_\_\_\_.”
  - “It helped me understand \_\_\_\_\_ better when I \_\_\_\_\_.”
- ◉ Give students 5 silent minutes to write or type their responses. If doing the analog version, have students put their sticky notes on designated spots in the classroom.

Optional extension: Use students’ responses as an Inclusive Welcome the next day. Gather students together with their science notebooks so everyone can see the images, hear the conversation, and easily see each other (such as in a close group or half-circle in the front of the room). Share a picture of a beach, ocean, or lake near your town, and ask students if they would like to share something about a time they have visited a natural body of water. Allow a couple of students to briefly share.

## Student Experiences & Identities

Draw on students’ experiences and identities by using an opening routine to give examples of different ways students can contribute mathematically to the task. Help students think ahead about how they contribute. Invite students to develop their own scripts or sentence starters to help them authentically communicate about the sociomathematical norms they used.



## Content Connections

**4.OA.A.1:** Interpret a multiplication equation as comparing quantities. Represent verbal statements of multiplicative comparisons as equations.

**4.OA.B.4:** Find all factor pairs for a whole number in the range 1–100. Determine whether a given whole number in the range of 1–100 is a multiple of a given one-digit number, and whether it is prime or composite.

**SMP 3:** Construct viable arguments and critique the arguments of others.

**SMP 7:** Look for and make use of structure.

**SMP 8:** Look for and express regularity in repeated reasoning.

## Transformative SEL Connections

**Practice 1A:** Identify and label emotions, thoughts, strengths, and potential (both personal and cultural).

**Practice 4B:** Demonstrate empathy and affirm other's perspectives during teamwork and collaborative problem solving.

## Grades 6–8

### SIGNATURE PRACTICE

### Inclusive Welcome: Mathematical Feels

#### Context

Students working with complex mathematical ideas such as fractions will reflect on the feelings and emotions that may come up.

#### Learning Outcome

Students practice developing their self-awareness by reflecting on their thoughts, feelings, and reactions about a challenging topic, such as problems with fractions, decimals, or negative numbers. Students also practice awareness of emotions in the classroom, learning strategies for stress management.

#### Classroom Format

- Whole group
- Individual

#### Time

3–5 minutes

#### Teacher Moves

##### Whole group

Let students know that they will be starting a new unit today that will involve working with fractions frequently. Acknowledge that many students in this grade have had negative experiences working with fractions, which may result in anxiety or stress when students see fractions in the problems. Tell students it is important to understand what their experience working on fraction problems has been, and how they are feeling about the new unit in order to set everyone up for success.

##### Individual

- Share the following prompts for students to individually respond to:
  - When I have used fractions in the past, I felt...
  - When I think about starting a new unit with fractions, I feel...
  - When I see a problem with a fraction, I feel...
- Tell students they will wad their papers and put them in a basket or bag, which the whole group will pull responses out and read from. Give students about 5 minutes to respond to the prompts and collect the wadded-up papers in the basket. After collecting them all, ask a few volunteers to randomly choose a paper wad, open and read it. Chart some key words from the first response that emphasize students' feelings and emotions. Ask students, "Does that response resonate with anyone else?" and have them use hand signals to agree.

- Validate that these are normal and understandable emotional responses to a mathematical topic like fractions and that many students in this grade level feel the same way. Let students know that you will be sharing strategies for managing these feelings as you go through the unit. Ask students who are feeling emotions like anxiety and stress as the unit begins to take a deep breath, notice how they feel, and remind themselves that it is normal and okay. Emphasize that the class will learn strategies for managing these feelings.
- Note: This strategy is content-agnostic but works best when the topics are particularly challenging for the grade level. For secondary students, that might be fractions, decimals, or negative numbers. It is a good way to start a unit that involves these topics and could elicit negative and unproductive feelings that get in the way of learning and developing positive mathematical identities.

## Student Experiences & Identities

Draw on students' past and current experiences working with complex mathematical ideas. Providing this anonymous, structured space for reflection can support students in sharing deficit-based thinking and language about their math experiences. Over the course of the year, teachers can offer prompts that invite students to bring their identities into their responses as well.



## Content Connections

There are many grade 6–8 standards related to fractions; while this activity is not specifically related to particular standards, two fraction-related seventh grade standards include:

**7.RP.A.1:** Solve problems in authentic contexts involving unit rates associated with ratios of fractions.

**7.NS.A.1:** Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. Interpret operations of rational numbers solving problems in authentic contexts.

## Transformative SEL Connections

**Practice 1A:** Identify and label emotions, thoughts, strengths, and potential (both personal and cultural).

**Practice 1B:** Understand the stress response system (regulation and dysregulation) and what environments and experiences activate those responses.

# Grades 9–12

## SIGNATURE PRACTICE

## Engaging Strategy: Making Mathematical Sense of Food Injustice

### Context

In a geometry class unit on modeling, students study and respond to the real world issue of food injustice in order to examine potential food injustice in their own communities.

### Learning Outcome

Students reflect on their own knowledge, ideas, and associations with the concept of natural selection and communicate that understanding in a way that builds relationships and adds to the collective learning of the classroom.

### Classroom Format

- Whole group
- Small groups
- Partners
- Individual

### Time

5–10 minutes

### Teacher Moves

#### Individual

- Pass out the [Democratizing Access to Healthy Foods](#) handout so that students read the Austin food insecurity facts and review the map included in the resource.

#### Whole group

- Engage students in reflective group discussion after they have read the handout. Consider questions such as “What do you notice?” and “What do you wonder?”
- Write the following quote (taken from the handout) on the board: “It’s a great deal of trouble just to feed a family”, and ask students to respond to this prompt:
  - “How do you characterize what trouble might look like when it comes to feeding a family?”
- Record responses on the board to engage the class discussion.
- Ask students to respond to the following privilege survey and then construct a dot plot together.
  - Have students divide the card in half and draw a line labeling one side + 1 and the other -1. Read the following prompt out loud: “Now that you know more about real food injustice in Austin, let’s examine how this injustice is present in our lives. I am about to read a series of statements, if the statement applies to you, please make a tally accordingly. Do not write your name on your notecard.”

- ◎ If this activity occurs in an affluent classroom where the statements may not apply, consider assigning half the class to imagine that they are individuals from the featured quote. Then they are to mark the tallies as they would think Rosa Flores and her family would. If you
  - Travel 10 miles or less to get to the nearest grocery store, mark a +1 tally.
  - Ever worry whether your food would run out before you got money to buy more, mark a -1 tally.
  - Have never used SNAP coupons or food stamps, mark a +1 tally.
  - Have more corner stores (bodegas) in your neighborhood than grocery stores, mark a -1 tally.
  - Have eaten more fresh food than processed food in the past week, mark a +1.
  - Have gone to school hungry because there was no food in your house, mark a -1 tally.
  - Ever had to choose to eat fast food over fresh fruits and vegetables because of price, mark a -1 tally.
- ◎ Tell students to write the total sum on the back of the notecard and think about what the sum means. Collect the notecards and make a dot plot using the notecards.
- ◎ Facilitate a discussion using the dot plot to connect different student experiences. Consider the following prompts:
  - “What would it feel like to be in different points of the dot plot?”
  - “How do you think the experience compares to the food insecurity reality that Latinxs face in east Austin?”
  - “Why do you think there is such a huge disparity in the number of grocery stores on the two sides of Interstate 35?”
  - “Are there multiple grocery stores to choose from in your neighborhood? How do you determine which one to go to?”
  - “Fighting for those who experience injustice means listening to their needs and acting with them on their behalf. How can you take a stand against injustice if you yourself have not experienced it?”

## Student Experiences & Identities

Draw on students’ past experiences to respond to the prompts and privilege survey. While this activity is excerpted from a lesson focusing on food deserts in Austin, the resources below may provide ideas to adapt the context for Oregon:

- ◎ [USDA Food Access Research Atlas \(formerly the Food Desert Locator\)](#)
- ◎ [Food Desert Mapping in Portland, Oregon](#)
- ◎ [Are There Food Deserts in Portland, Oregon?](#)



## Content Connections

**HS.GM.D.14:** Use the coordinate plane to determine parallel and perpendicular relationships, and the distance between points.

**HS.GM.C.10:** Use geometric shapes, their measures, and their properties to describe real world objects, and solve related authentic modeling and design problems.

**SMP 4:** Model with mathematics.

**SMP 5:** Use appropriate tools strategically.

## Transformative SEL Connections

**Practice 3C:** Foster a sense of belonging that cultivates acceptance, support, inclusion, and encouragement of others within a diverse community, while addressing the impact of systemic injustices across situations and environments.

**Practice 5A:** Demonstrate curiosity and open-mindedness while using critical thinking skills across various situations and environments.