Designers' Note: This is an example of an embedded performance assessment, which means that students develop and demonstrate their mastery of the competencies and skills as they work toward completing the overall assessment. It does not rely on prior learning, per se, other than that students would have developed before grade 2 . A variety of learning experiences can prepare students for each checkpoint, and each checkpoint should be considered an opportunity for students to demonstrate mastery of essential skills of corresponding standards and competencies.

## TOPICS:

Measurement, plant life

## FINAL EVIDENCE OF STUDENT LEARNING:

Presentation

## INQUIRY FRAME:

How can we create a thriving garden for our school community to enjoy?
This performance assessment creates the opportunity for students to develop and demonstrate growing mastery in both mathematics and science. Students apply measurement and estimation skills, as well as financial literacy, as they simultaneously learn about how plants grow and interact within the immediate ecosystem.

As they plan the garden, students work in teams to think through decisions about which plants to include and how to spend within their budget. They also come together as a class to share their thinking and to creatively iterate on each other's ideas. Throughout the unit, students develop and test their understanding of how plants grow through classbased experiments so that they can think critically about what plants might be best for the garden and what it will take to help the plants grow. Students build on their prior knowledge of money and adding and subtracting doubledigit numbers to develop an understanding of budgeting.

The design of this project assumes that students have at least a basic knowledge of:

- measuring length using rulers, yardsticks, meter sticks and measuring tapes.
- measuring the length of an object twice, using length units of different lengths for the two measurements; describing how the two measurements relate to the size of the unit chosen.
- solving word problems involving dollar bills, quarters, dimes, nickels, and pennies, using \$ and C symbols appropriately.
- adding and subtracting within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

If implementing for students without those skills, incorporate additional explicit instruction and opportunities for student practice.

## COMPETENCIES \& TARGET SKILLS (LEVEL 1)

## Knowledge of Core Subjects

1.1 Choose and apply learning strategies

- I can use text/media features to look for information (e.g., turn pages, identify visuals and text).
- With guidance, I can ask and answer questions about a topic or text.
- With guidance, I can learn and try strategies to help me understand new things.


## STANDARDS

## Math Standards:

Measurement and Data - 2.MD: Measure and estimate lengths in standard units.

1. Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
2. Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two

- With guidance, I can try a new strategy when I get stuck.


## Critical Thinking/Creative Problem Solving

2.2 Solve mathematical problems

- I can rephrase a problem in my own words, and ask questions about the problem that help me break it down into smaller parts.
- I can state my answer to the problem.
- I can show the steps that I took to come to my answer.


## Oral/Written Communications

3.2 Engage in academic discussion with others

- When it's my turn, I can share what I think about the topic or question asked.
- I can respectfully listen without interrupting when others are speaking.


### 3.4 Deliver presentations

- I can say what I will talk about (my main idea).
- I can say something to clearly end my presentation.
- I can speak loudly and clearly so my audience can hear me.


## Teamwork/Collaboration

4.1 Build Collaborative Relationships

- With guidance, I can work with my team to say what we are going to do and when we are going to do it
measurements relate to the size of the unit chosen.

3. Estimate lengths using units of inches, feet, centimeters, and meters.
4. Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit. Relate addition and subtraction to length.
5. Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.
6. Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using \$ and $\%$ symbols appropriately. Example: If you have 2 dimes and 3 pennies, how many cents do you have?

## Number and Operations in Base Ten - 2.NBT

5. Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
6. Add up to four two-digit numbers using strategies based on place value and properties of operations.

## Science Standards:

LS1-2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow.

## STUDENT-FACING DESCRIPTION OF PERFORMANCE ASSESSMENT

We have been asked by the school principal to create our very own school garden. In order to take on this exciting task, we will have to consider many factors using our growing knowledge of math and science. We will need to use our science skills to choose plants that will grow best in our garden. We will need to use our math skills to decide how many plants we can have in our garden based on the measurements of the garden beds we have available. The principal is going to provide us a budget and so we will need to use our addition and subtraction skills we have been developing throughout the year. Finally, we will present our garden proposal and our work to the principal in a class presentation where we all participate. We will each have speaking roles to share what we learn. Let's get started!

## FORMATIVE PROCESS (SCAFFOLDING TO PERFORMANCE ASSESSMENT)

|  | CHECKPOINT | COMPETENCY AND STANDARD | EVIDENCE OF MASTERY |
| :---: | :---: | :---: | :---: |
| \#0 | PERFORMANCE ASSESSMENT LAUNCH MAKE MEANING: What do we already know about plants and how they grow? <br> The goal of this formative task is to launch the performance assessment. First, review the student-facing performance assessment description with students so they understand the goals of the assessment. <br> The purpose of the launch is to create an opportunity for students to access their prior knowledge about what they currently know about plants and how they grow. Students can respond to questions such as: <br> - What do plants need to grow? How do you know? Why might they need these things to grow? <br> - Are plants alive? How do you know? <br> - How do you think plants grow best, in lots of sunlight or with less sunlight? <br> - Do you have plants or a garden at home? What do you do to take care of the plants? <br> What are some examples of different kinds of plants that you might like to grow? | The purpose of the project launch is to introduce the performance assessment and create interest in the work and, as such, it is not a formal opportunity for students to demonstrate the target competencies and standards. |  |
| \#1 | MAKE MEANING: How do I read a seed packet? <br> The goal of this checkpoint is for students to be able to "read" the basic information about a plant that is provided on the back of a seed packet. Students learn to recognize basic vocabulary and match it to commonly used symbols (such as sun, planting depth, and water). They should also be able to also use the vocabulary and symbols to gather information about the size and spacing of the plant. Students use | Knowledge of Core Subjects <br> 1.1 Choose and apply learning strategies <br> - I can use text/media features to look for information (e.g., turn pages, identify visuals and text). <br> - With guidance, I can ask and answer questions about a topic or text/ <br> - With guidance, I can learn and try strategies to help | Project journal entry about the information provided by the seed packets <br> Academic conference <br> Observation of student participation, including oral language skills |

this information to make and record decisions about which plants they might include in their garden.

Consider modeling for students how to "read" several different kinds of seed packets and record notes about the important information. Key information to note should include plant type, planting depth, whether or not it needs sun and/or shade, height, time of year it blooms, etc. Students may need guidance in learning this key vocabulary through their use of questioning, use of resources like dictionaries, or peer discussion.

MAKE MEANING: What do my plants need to thrive?

The goal of this checkpoint is for students to be able to collaboratively generate a list of criteria for matching a garden location with the plants that will grow in it. Students will later use this criteria to choose a location for the garden and to finalize a list of plants to grow. Students can begin by counting and totaling in small groups the number of plants in their project journal that have specific requirements, such as full sun or partial sun. The small groups then can record the numbers from other small groups to arrive at a total for the whole class. From this, students can then determine what type of spot would be best for the garden based on the requirements of the plants they chose (e.g. sunny or partially sunny, needs more or less water, average plant height, when to sow, etc.).

MAKE MEANING: How much space do we have for our school garden?

The goal of this checkpoint is for students to practice and apply estimating and measuring skills, using different tools to measure different potential sites for the garden. For example, students can first estimate using foot length, stride length,
me understand new things.

- With guidance, I can try a new strategy when I get stuck.

Oral/Written Communications 3.2 Engage in academic discussion with others

- When it's my turn, I can share what I think about the topic or question asked.
- I can respectfully listen without interrupting when others are speaking.

Teamwork/Collaboration 4.1 Build Collaborative Relationships With guidance, I can work with my team to say what we are going to do and when we are going to do it.

Critical Thinking/Creative Problem Solving
2.2 Solve mathematical problems

- I can rephrase a problem in my own words, and ask questions about the problem that help me break it down into smaller

Criteria anchor chart
Project journal entry of the criteria

Academic conference
Observation of student participation, including oral language skills

Project journal entry of the measurements and mathematical calculations

Academic conference

Observation of student participation, including oral language skills
arm span, and body length. They can then use different tools, such as a ruler, yard or meter stick, tape measure, and an open reel measuring tape. Students can then discuss which methods gave the most accurate measures and which tools were most appropriate for the task.

It will be important to have selected different possible sites for the garden so students can practice their measurement skills. Again, if necessary, consider modeling how to measure with different tools as well as how to add and subtract to determine length before students move into an independent investigation.

INVESTIGATE: What happens if plants do not get what they need to grow?

The goal of this checkpoint is for students to plan an investigation to see if plants do need sunlight and water to grow. Since this is the main part of the standard you are focusing on, it will be important to design an experiment to test out the student's conclusions based on the previous discussions. Even just growing a few plants in the classroom could substantiate the students' claims about the plants needing sunlight and water to grow. This can be expanded upon to predict and measure
parts.

- I can state my answer to the problem.
- I can show the steps that I took to come to my answer.

Measurement and Data 2.MD

1. Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
2. Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen
3. Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit. Relate addition and subtraction to length.

LS1-2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow.

Project journal entry of the oral and written explanation of what plants need to grow and how they know

Academic conference
Observation of student participation, including oral language skills
results of plants with different needs growing under different conditions (i.e., full sun vs. part shade).

Throughout this checkpoint, it will be important for students to record their observations and inferences in their project journals.

INVESTIGATE: How tall are our plants?
The goal of this checkpoint is for students to practice and apply estimating and measuring skills as the seedlings in the investigation above grow. As when they estimated and measured the potential garden sites, students can use a variety of methods and tools to estimate and measure the plants. If available, this can be an opportunity to introduce students to tools such as calipers and micrometers.
Additionally, students can make estimated guesses about how tall the plants might grow based on the information provided on the seed packets. Students can also be introduced to concepts such as creating a bar graph or other mathematical model to show how the plant grew over time, or using their measurements over multiple days to predict how much a plant will grow in the future.

## Critical Thinking/Creative Problem Solving

2.2 Solve mathematical problems

- I can rephrase a problem in my own words, and ask questions about the problem that help me break it down into smaller parts.
- I can state my answer to the problem.
- I can show the steps that I took to come to my answer.

Measurement and Data 2.MD

1. Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
2. Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen
3. Estimate lengths using units of inches, feet, centimeters, and meters.

Project journal entry of measurements and mathematical calculations

Academic conference

Observation of student participation, including oral language skills

INVESTIGATE: How many plants will fit into our garden?

The goal of this checkpoint is to have students, in their small teams, use the information they gathered from reading the seed packets and the measurements of potential garden sites to calculate the number of plants that will fit into a given site. This can be done using life-size cutouts of paper to represent the footprint of the plants or by using smaller manipulatives. Students practice and apply adding and subtracting skills by counting and adding the number of plants in rows and columns, as well as by calculating and comparing how the total number of plants changes when larger or smaller plants are used.

Again, if necessary, consider modeling how to add and subtract various kinds of plants for the possible garden sites before students move into an independent investigation.

Consider having the student teams create a plan for the work in this checkpoint and the roles each of them will play in executing the plan.
4. Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit. Relate addition and subtraction to length.

LS1-2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow.

Critical Thinking/Creative Problem Solving 2.2 Solve mathematical problems

- I can rephrase a problem in my own words, and ask questions about the problem that help me break it down into smaller parts.
- I can state my answer to the problem.
- I can show the steps that I took to come to my answer.

Teamwork/Collaboration
4.1 Build Collaborative

Relationships

- With guidance, I can work with my team to say what we are going to do and when we are going to do it

Measurement and Data 2.MD:
5. Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as

Drawings of the garden showing the location of each plant
A list of the plants in the garden with:

- number of each
- total number of plants

Team plans for completing the work

INVESTIGATE: Which is the best site for our garden?

The goal of this checkpoint is for the student teams to synthesize the information they have gathered about the needs of plants, the number of plants that will fit into a given space, and the qualities of the potential locations for the garden, which is provided by the teacher. Students use the information and refer back to the criteria generated in checkpoint \#2 to answer two questions about each potential site:

- Does this site have what my plants need (i.e. the right amount of sunlight, water, drainage, etc.)?
- How many plants will fit into this site depending on which ones I choose?

Student teams use their responses to those questions to justify their choice of site and the plants they will include in their garden.

Consider having the student teams create a plan for the work in this checkpoint and the roles each of them will play in executing the plan.
drawings of rulers) and equations with a symbol for the unknown number to represent the problem.

Number and Operations in Base Ten - 2.NBT
5. Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

Knowledge of Core Subjects
1.1 Choose and apply learning strategies

- I can use text/media features to look for information (e.g., turn pages, identify visuals and text).
- With guidance, I can ask and answer questions about a topic or text.
- With guidance, I can choose \& use strategies to help me understand new things.
- With guidance, I can try a new strategy when I get stuck.

Teamwork/Collaboration 4.1 Build Collaborative Relationships

- With guidance, I can work with my team to say what we are going to do and when we are going to do it

LS1-2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow.

An oral or written statement of which site was chosen for the garden with a justification for that choice

Team plans for completing the work

INVESTIGATE: Have we stayed in our budget?

The goal of this checkpoint is for the student teams to apply the skills of adding and subtracting to determine if they have stayed within their budget for the garden. The budget will be provided to the students. Based on which plants are being used in the garden, students will add and subtract the prices based on the number of plants they plan to use to determine if they stayed within that budget. Students can then use that information to make modifications to the number and type of plants they will include in their garden to ensure that they did not overspend.

Again, if necessary, consider modeling how to add and subtract the prices based on plant quantity before students move into an independent investigation.

Consider having the student teams create a plan for the work in this checkpoint and the roles each of them will play in executing the plan

CREATE: How does my team put together our work for our presentation?

The goal of this checkpoint is for the student teams to assemble the various pieces of their work and get them into presentation shape. This work can be

Critical Thinking/Creative Problem Solving
2.2 Solve mathematical problems

- I can rephrase a problem in my own words, and ask questions about the problem that help me break it down into smaller parts.
- I can state my answer to the problem.
- I can show the steps that I took to come to my answer.

Teamwork/Collaboration 4.1 Build Collaborative

## Relationships

- With guidance, I can work with my team to say what we are going to do and when we are going to do it

Measurement and Data 2.MD
8. Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using \$ and $¢$ symbols appropriately.

Number and Operations in Base Ten - 2.NBT
6. Add up to four two-digit numbers using strategies based on place value and properties of operations.

Each piece of work demonstrates the competencies and standards as described in the checkpoints above.

A list of the plants in their garden with:

- number of each
- cost of each
- total number of plants
- total cost

A written or oral explanation of how much money would be saved if one plant were removed

Team plans for completing the work
supported with models, rubrics, and checklists. Students should have the following:

- A drawing of the garden showing the location of each plant
- An explanation of what plants need to grow and how they know
- A statement of which site was chosen for the garden with a justification for that choice
- A list of the plants in their garden with:
- number of each
- cost of each
- total number of plants
- total cost

An explanation of how much money would be saved if one plant were removed
\#10 CREATE: How does my team prepare to deliver our presentation?

The goal of this checkpoint is to provide the student teams the opportunity to draft and practice delivering their presentations. It will be important to remind students that the audience for the presentation is the principal and other adults in the school. Guide the students in creating criteria for developing their presentations as they keep the audience in mind. Consider using the following questions to support students in creating criteria to develop their presentations:

- What should your presentation sound like?
- How should your body look during your presentation? What should you be doing with your voice, your hands, your eyes, etc?
- What is your main idea or what will you talk about?
- How will you share details or evidence about your main idea?
- How will you end your presentation?

Oral/Written Communications
3.4 Deliver presentations

- I can say what I will talk about (my main idea).
- I can say something to clearly end my presentation.
- I can speak loudly and clearly so my audience can hear me.

Teamwork/Collaboration
4.1 Build Collaborative

Relationships

- With guidance, I can work with my team to say what we are going to do and when we are going to do it

Oral presentation draft and practice

- What roles will each individual in the team play in the presentation? How will you divide up the speaking parts so that each part of your garden proposal is presented?

Consider using a simple frame to support students in putting their presentations together, such as: "My name is $\qquad$ . I am
going to talk about $\qquad$ . 1
know this because $\qquad$ .
Another example is $\qquad$ .
Thank you for coming to our class today."
CREATE: How can we give and receive feedback?

The goal of this checkpoint is for students to give each other feedback on their presentations. Students should use criteria that incorporates the academic language from the rubric when applicable. A specific peer conference protocol can be used to support the student teams as they give their peers specific and actionable feedback. The student teams should then have time to use the peer feedback to improve their work.

SHARE: How do we share our garden proposal with the principal and other adults?

The goal of this checkpoint is to have the

Oral/Written Communications 3.2 Engage in academic discussion with others

- When it's my turn, I can share what I think about the topic or question asked.
- I can respectfully listen without interrupting when others are speaking.
3.4 Deliver presentations
- I can say what I will talk about (my main idea).
- I can say something to clearly end my presentation.
- I can speak loudly and clearly so my audience can hear me.

Teamwork/Collaboration 4.1 Build Collaborative Relationships

- With guidance, I can work with my team to say what we are going to do and when we are going to do it

Oral/Written Communications
3.4 Deliver presentations

- I can say what I will talk about (my main idea).
- I can say something to

Academic conference

Observation of student participation, including oral language skills

Revisions to oral presentation

| student teams share their school garden <br> proposal with the principal and other <br> school-based adults. Each team will present <br> their garden proposal with each individual <br> student within the group participating. | clearly end my <br> presentation. <br> I can speak loudly and <br> clearly so my audience can <br> hear me. |  |
| :--- | :--- | :--- |

## RUBRIC (SKILLS + CONTENT)

|  | NOT YET | LEVEL 1 | LEVEL 2 |
| :---: | :---: | :---: | :---: |
| Knowledge of Core Subjects 1.1 Choose and apply learning strategies |  | I can use text/media features to look for information on a seed packet. <br> With guidance, I can ask and answer questions about how I know plants need sunlight and water to grow. <br> With guidance, I can learn and try strategies to help me understand new things about what plants need to grow and thrive. <br> With guidance, I can try a new strategy when I get stuck. | I can use text/media features to make connections and pose questions that help me understand information on a seed packet. <br> With guidance, I can learn and try comprehension strategies (e.g., questioning, inferring, connecting) to make meaning of how I know plants need sunlight and water to grow. <br> With guidance, I can use strategies (e.g. reread, use pictures/headings to help, look at words before/after for clues) to help me when I get stuck. |
| Critical <br> Thinking/ <br> Creative <br> Problem Solving <br> 2.2 Solve <br> mathematical <br> problems |  | I can rephrase a math measurement or addition/subtraction problem in my own words, and ask questions about the problem that help me break it down into smaller parts. <br> I can state my answer to math problems about measurement, addition/subtraction, and money. <br> I can show the steps that I took to come to my answer when measuring or estimating different objects with different lengths, adding and subtracting within 100, and adding up to four two-digit numbers. | I can organize the important information about a math measurement or addition/subtraction problem in a useful way and ask questions about the problem to help me identify a starting point for solving it. <br> With guidance, I can choose and apply at least one strategy (e.g. Math Habits of Mind, experimenting, pattern detection, visualizing, conjecture) to begin testing out a solution to measurement, addition/subtraction, and money problems. <br> I can determine if my answer does or does not make sense when doing math problems of measurement, |


|  |  | addition/subtraction or money. <br> I can state my answer to the problem using correct notation. <br> I can explain how I solved the problem when measuring or estimating different objects with different lengths, adding and subtracting within 100, and adding up to four two-digit numbers. |
| :---: | :---: | :---: |
| Oral/Written Communications 3.2 Engage in academic discussion with others | When it's my turn, I can share what I think about the topic or question asked. <br> I can respectfully listen without interrupting when others are speaking. | I can come prepared to the discussion. <br> I can follow the established norms, respectfully listening without interrupting when others are speaking, and making sure I don't talk too much or too little. <br> I can pose a question, or respond to a question or comment, in a way that shows my knowledge of the topic. |
| Teamwork/ <br> Collaboration <br> 4.1 Build <br> Collaborative <br> Relationships | With guidance, I can work with my team to say what we are going to do and when we are going to do it when putting together our school garden work and presentation. | I can learn about what my teammates like to do and share what I like to do. <br> With guidance, I can work with my team to create a goal for our project of creating a school garden. <br> With guidance, I can help create and implement a step-by-step plan for our project or task of putting together a school garden. |

