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Grade 3 Math Expectations

- D1.1 sort sets of data about people or things according to two and three attributes, using tables and logic diagrams, including Venn, Carroll, and tree diagrams, as appropriate.
- D1.2 collect data through observations, experiments, and interviews to answer questions of interest that focus on qualitative and quantitative data, and organize the data using frequency tables.
- D1.5 analyse different sets of data presented in various ways, including in frequency tables and in graphs with different scales, by asking and answering questions about the data and drawing conclusions, then make convincing arguments and informed decisions.
- A1.1 Identifying and managing emotions during problem-solving.

Mathematical Processes:

- Problem-solving
- Reasoning & proving
- Reflecting
- Selecting tools
- Connecting
- Communicating
- Representing

High Impact Instructional Practice

- Explicit instruction (modelling how to sort with two- and three-attribute diagrams)
- Use of representations (Venn, Carroll, tree diagram, frequency table)
- Feedback (during group work & consolidation)
- Small-group instruction (supporting learners who need more guidance)
- Cross-curricular integration to strengthen relevance
- Student talk & collaborative learning

Transferable Skills

- Critical thinking
- Collaboration
- Problem-solving
- Communication
- Using evidence to justify decisions

Number Routine / Mental Math

Activity: Which One Doesn't Belong – Soil Edition

Show students four images:

1. Sandy soil
2. Clay soil
3. Soil with worms

4. Dark rich garden soil

Prompt:
"Which one doesn't belong? There is no wrong answer—justify your reasoning."

Purpose:
- Activates descriptive language
- Encourages observation
- Boosts confidence and explanation skills
- Warm-up for sorting and data attributes

Outcome(s):

- Collect qualitative and quantitative data through observations and experiments (such as soil testing) and record it accurately.
- Sort and classify data using two or three attributes, representing their findings using Venn diagrams, Carroll diagrams, or tables.
- Organize data into frequency tables and simple graphs to show patterns and trends.
- Analyze data to draw conclusions and justify decisions, making connections to land and resource use in Grade 3 Social Studies.

LEARNING TARGET(S)

By the end of this lesson, students will be able to:
1. Collect and record soil sample data based on observable attributes.
2. Sort their soil data using two attributes in a Venn or Carroll diagram.
3. Create a simple frequency table to show how many samples share each attribute.
4. Interpret their data and explain conclusions using evidence from their diagrams or table.

This math lesson directly supports the Social Studies expectations related to:
- Understanding land use
- Environmental impacts of soil quality
- Observing changes in the natural environment
- Making informed decisions about caring for local land

Before/ Minds On
Getting Started /Time to Teach

Social Studies Connection: Students previously collected soil samples from different schoolyard locations (garden, field, shady area, edge of playground).

Teacher Actions:
- Display all the soil samples at tables.
- Ask:
  "What differences do you notice between these samples?"
  "How might measuring and sorting this soil help us understand our school environment?"

Students:
- Observe soil with tools (magnifying glasses, fingers, smell, colour comparison).

Materials:
- Soil samples (at least 3–4 types: sand, clay, loam, gravel)
- Small containers or cups for samples
- Magnifying glasses
- Soil observation sheets
- Clipboards and pencils

- Share attributes they notice: colour, texture, clumps, presence of roots/rocks, moisture.

Transition:
"These attributes will help us create data that we can sort, organize, and use to understand what kind of soil our school has and what that means for plants and the environment."

During/ Action
Working On It /Time to Explore

Students will sort soil sample data using different diagrams and create a frequency table.

Step 1 – Attribute Sorting (Small Groups)
Each group chooses 2–3 attributes, such as:

- Dark vs. light
- Dry vs. moist
- Has organic matter vs. no organic matter
- Big pieces vs. small grains
- Has rocks vs. no rocks

Students create:

- Venn Diagram (e.g., "dark soil," "soil with organic matter")
- Carroll Diagram (e.g., dark/light; dry/wet)
- Tree Diagram (e.g., moist → has roots → doesn't have roots)

Step 2 – Frequency Table
Students record how many samples fit each attribute combination.

Example:

Attribute	Number of Samples
Dark + moist	4
Dark + dry	2
Light + moist	1
Light + dry	3

Step 3 – Data Analysis Questions
Students answer:

- "Which type of soil showed up most often?"
- "What patterns did you notice?"
- "What might this soil be good for (garden? drainage? plants?)"
- "Is there anything that surprised you?"

Teacher Role:

- Circulate and provide feedback
- Ask prompting questions
- Support with vocabulary and organization
- Encourage perseverance

After/ Consolidation
Reflecting & Connecting /Time to Reflect

Teacher:

- Display several completed diagrams and tables.

- Venn diagram and Carroll diagram templates
- Frequency table template
- Chart paper and markers
- Sticky notes
- Digital camera or tablet (optional, for documenting observations)
- Gloves (optional)
- Paper towels for cleanup

Vocabulary:

- Data
- Qualitative data
- Quantitative data
- Attribute
- Sort / Classify
- Venn diagram
- Carroll diagram
- Tree diagram
- Frequency table
- Observation
- Conclusion
- Evidence
- Texture (e.g., rough, smooth, grainy)
- Moisture
- Sample

• Facilitate a discussion:
  • "How did your group decide which attributes to compare?"
  • "What did your diagrams help you notice about our school's soil?"
  • "What conclusions can we draw about the land around our school?"
  • "If we were to plant a school garden, what decisions should we make based on our data?"
Students:
• Share results
• Compare diagrams between groups
• Discuss different conclusions and defend their reasoning
• Connect findings to environmental impacts (e.g., erosion, water flow)
 	
Exit Ticket:
Students write or draw:
"One conclusion I can make from our soil data is…"	

Instructional Strategies	
<u>Learning Styles/tools Approaches</u> Visual • Anchor charts • Graphic organizers • Pictorial representations (diagrams, charts) • Digital imagery • Exemplars Kinesthetic • Movement • Hands-on • Learning Stations Auditory/Verbal/Musical • Time to talk • Time to share Reason/Logic • Problem-based • Open-ended prompting • Logic/deductive reasoning focus	<u>Engagement Approaches</u> • Learning target w/success criteria • Personal Relevance • Critical Connections • Multiple entry points • Differentiation • Collaborative (learning coaches, helping trio, heads together) • Story-based learning • Technology • Extension/enhancement activities
<u>Linguistic Approaches</u> • Social talk • Academic talk • Home/Community language connections • Vocabulary wall • Vocabulary acquisition	<u>Instructional/Assessment Approaches</u> Explicit • Exploration • Guided • Inquiry based • Chunk-Apply-Review

	• Self-assessment • Formative assessment (w/feedback) • Peer- assessment