K-2 Favorite Fruit Case Cards

| **Lesson Overview** |
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| **Description** | The purpose of this lesson is to teach students how to collect, organize, and analyze data using multiple attributes through the creation of "case cards." Students will explore fruit preferences while learning to categorize data using various criteria and make comparisons across different characteristics. |
| **Subject Area(s)** | Mathematics |
| **Grade Band(s)** | K-2 |

| **Learning Progression Alignment** |
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| **Strand** | A - Data Literacy and Responsibility |
| **Substrand** | A1 - Nature of Data |
| **Concept** | A.1.1 Data types and forms |
| **Competency** | K-2.A.1.1a - Recognize that data can exist as quantitative, ordinal, categorical, and other values. Data also can be "nontraditional" forms such as graphical or other media. |
| **Strand** | A - Data Literacy and Responsibility |
| **Substrand** | A3 - Investigative Dispositions |
| **Concept** | A.3.1 The investigative process |
| **Competency** | K-2.A.3.1a - Recognize there is an investigative process for exploring questions about the world. |
| **Strand** | B - Creation and Curation |
| **Substrand** | B1 - Organization and Processing |
| **Concept** | B.1.2 Organizing and structure |
| **Competency** | K-2.B.1.2a - Collect and record data on case cards, wherein each card represents a single case. |
| **Strand** | B - Creation and Curation |
| **Substrand** | B3 - Measurement and Datafication |
| **Concept** | K-2.B.3.1b - Begin to coordinate multiple attributes of the same case. |
| **Competency** | K-2.B.3.1c - Plan and conduct measurements by identifying measurable characteristics and collecting both categorical and numerical attributes of objects/events. |
| **Strand** | C - Analysis and Modeling Techniques |
| **Substrand** | C1 - Summarizing Data |
| **Concept** | C.1.4 Frequency tables |
| **Competency** | K-2.C.1.4a - Sort objects into a frequency table based on shared characteristics. |
| **Strand** | C - Analysis and Modeling Techniques |
| **Substrand** | C2 - Identifying Patterns and Relationships in Data |
| **Concept** | C.2.1 Comparing variables |
| **Competency** | K-2.C.2.1a - Describe similarities or differences across two variables. |
| **Strand** | E - Visualizations and Communication |
| **Substrand** | E1 - Representations and Dynamic Visualizations |
| **Concept** | E.1.1 Sense-making with visualizations |
| **Competency** | K-2.E.1.1a - Create data visualizations to represent an aspect of the student's daily life. |

| **Tool(s)** |
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| **Type** | No-Code |
| **Tool** | None |
| **Dataset** | Created by surveys |
| **Materials Needed** | * Blank "Fruit Case Cards" (provided below or can use blank paper)
* Colored pencils/markers
* Chart paper
* Sticky notes or manipulatives
* Various fruit pictures or plastic fruits (optional)
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| **Lesson Plan** |
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| **Lesson Focus** | *This lesson teaches students to work with multi-attribute data through the creation and analysis of case cards. Students will learn that single objects (fruits) can be described using multiple characteristics, and that data can be sorted and analyzed using different criteria to reveal various patterns and relationships.* |
| **Content Objective(s)** | By the end of this lesson, students will be able to:* Identify and record at least 5 different attributes for a single fruit (color, size, taste, seeds, growing location)
* Create accurate case cards containing multiple pieces of categorical data
* Sort case cards by different criteria and count items in each category
* Use comparison vocabulary (more, less, equal, most, least) to describe data patterns
* Explain how the same dataset can reveal different information when sorted by different attributes
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| **Prerequisite Knowledge & Skills** | * Basic understanding of attributes and characteristics
* Ability to categorize objects by single attributes
* Familiarity with fruits and their basic properties
* Counting skills and use of tally marks
* Understanding of comparative language
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| **Lesson Details** |
| **Lesson Hook & Warm-up****5 mins** | **Student Facing**Students view various fruit pictures or real fruits and share their favorite fruit with a partner, explaining why they like it. |
| **Teacher Facing*** Display variety of fruits to generate interest and discussion
* Listen for natural attributes students mention (color, taste, size)
* Note vocabulary students use to describe fruits
* Begin informal list of fruit characteristics on board
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| **Activity 1 - Data Collection and Criteria Development****25 mins** | **Student Facing**  - Students select their favorite fruit and participate in developing class criteria for describing fruits. They watch as their responses are recorded using tally marks and help create a list of attributes to use for case cards. |
| **Teacher Facing****Data Collection (10 mins):*** Survey students for favorite fruits, recording with tally marks
* Encourage variety by suggesting fruits if everyone chooses the same few
* Count totals together and discuss initial patterns

**Criteria Development (15 mins):*** Guide students to suggest ways to describe fruits:
	+ Color (red, yellow, green, orange, purple, etc.)
	+ Size (small, medium, large)
	+ Taste (sweet, sour, both)
	+ Seeds (none, few, many)
	+ Where it grows (tree, bush, vine, ground)
* Record agreed-upon criteria on chart paper
* Explain that these will be used to make "case cards"
* Save criteria chart for Day 2
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| **Activity 2 - Case Card Creation****25 mins** | **Student Facing**Students receive blank case cards and complete them for their favorite fruits using the class-developed criteria. They draw pictures and fill in information about color, size, taste, seeds, and growing location. |
| **Teacher Facing****Review (5 mins):*** Review previous day's data and criteria
* Show sample completed case card

**Case Card Creation (20 mins):*** Distribute blank case cards
* Model completion process using one fruit as example
* Circulate to assist with card completion
* Encourage students to think carefully about each attribute
* Support students who need help with drawing or writing

**Gallery Walk (5 mins):*** Have students display completed cards
* Brief walk for students to observe others' work
* Note interesting patterns or differences for discussion
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| **Activity 3 - Data Analysis through Sorting****30 mins** | **Student Facing**Students participate in physical sorting activities, moving to different areas of the room based on fruit attributes. They help count groups, make bar graphs with their bodies, and answer analysis questions about the patterns they observe. |
| **Teacher Facing****Sorting Activity (15 mins):*** Demonstrate sorting process using case cards
* Conduct multiple sorts:
	+ "If your fruit is sweet, go to my right; if sour, go to my left"
	+ "Small fruits by the window, medium by the door, large by my desk"
	+ "Tree fruits here, vine fruits there, bush fruits over here"
* Count students in each group after each sort
* Create quick visual representations (human bar graphs)
* Use descriptive language for group sizes

**Analysis Questions (5 mins):*** Which fruit color do most students prefer?
* Which size of fruit is least popular?
* Are there more fruits with seeds or without?
* How do the patterns change when we sort by different criteria?
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| **Lesson Synthesis - Creating Class Data****10 mins** | **Student Facing**Students discuss what they learned about using different criteria to sort data and how the same information can tell different stories depending on how it's organized. |
| **Teacher Facing*** Facilitate reflection on the sorting process
* Emphasize how same data reveals different patterns with different criteria
* Introduce vocabulary: case, attribute, criteria, sort, pattern
* Connect to real-world examples of multi-attribute data
* Preview potential extensions and follow-up activities
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| **Student Follow Up & Practice** | * Create case cards for other objects (toys, pets, books)
* Compare fruit preferences between different classes
* Create Venn diagrams comparing two fruit attributes
* Start a "Fruit Facts" book using the case cards
* Survey family members using the same criteria
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| **References** | * National Council of Teachers of Mathematics (NCTM) Data Analysis Standards
* Computer Science Teachers Association K-12 Standards
* Data Science Learning Progressions Framework
* Common Core Mathematics Standards for Data Representation
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### **Lesson Procedure**

#### **Day 1: Data Collection & Criteria Development (30 minutes)**

1. **Introduction (5 min)**
	* Show students various fruits and discuss their favorites
	* Explain that we will be collecting data about our favorite fruits
2. **Data Collection (10 min)**
	* Ask each student to select their favorite fruit (they do not need unique fruits, but it can be helpful if you go through a decent list of fruits so not everyone picks strawberries)
	* Record responses on the board with tally marks
3. **Criteria Development (15 min)**
	* Guide students to develop criteria for comparing fruits, here are some ideas:
		+ Color
		+ Size (small, medium, large)
		+ Taste (sweet, sour, both)
		+ Seeds (none, few, many)
		+ Where it grows (tree, bush, vine, ground)
	* Record the agreed-upon criteria on chart paper and save for Day #2

#### **Day 2: Creating Case Cards (30 minutes)**

1. **Review (5 min)**
	* Review the data collected and criteria developed
2. **Case Card Creation (20 min)**
	* Distribute blank case cards to students
	* Model how to complete a card using the agreed-upon criteria
	* Students complete cards for their favorite fruits
3. **Gallery Walk (5 min)**
	* Students place completed cards on display
	* Brief walk to observe other students' cards

#### **Day 3: Data Analysis (30 minutes)**

1. **Sorting Activity (15 min)**
	* Demonstrate how to sort cards by different criteria
	* In small groups or as a whole class, students sort cards by each criterion (have pre-made flip charts to make some graphs for at least a few of the criteria)
		1. Can have them walk to certain places in the room. For example: If your favorite fruit is sour go to my right and if it’s sweet go to my left
		2. Count how many cards are in each category
		3. Give them descriptive language to compare different sized groups, different numbers of groups, etc
		4. Make picture / bar graphs based on how students are standing
2. **Analysis Questions (5 min)**
	* Which fruit color do most students prefer?
	* Which size of fruit is least popular?
	* Are there more fruits with seeds or without?

### **Assessment**

* Observe student participation in sorting and counting
* Check completed case cards for accuracy
* Listen for use of comparison vocabulary

### **Extensions**

* Create a "Fruit Facts" book using the case cards
* Compare class preferences with another class
* Create a Venn diagram to compare two criteria

### **Case Card Example Template**

(modify depending on what your class decides it will record, but example is below)



Taste Icons: students decide what they want to draw (or can just write) for

* Sour
* Sweet
* Other flavors they determine

Grows Icons: students decide what they want to draw (or can just write) for

* Tree
* Vine
* Bush
* Ground

Seeds Icons: students decide what they want to draw (or can just write) for

* None
* Few
* Many