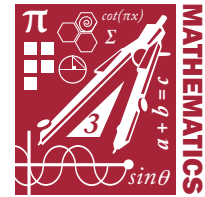


TREND-SPOTTING



This guide links the *Trend-spotting* unit to the Texas Essential Knowledge and Skills (TEKS) for kindergarteners. *Trend-spotting* is a mathematics unit that allows students to observe trends in their everyday environments. *Trend-spotting* also has interdisciplinary connections to English Language Arts, Social Studies, and Fine Arts disciplines. For example, students will compose original texts, as outlined in the English Language Arts and Reading TEKS, and understand physical and human characteristics of the environment, as described in the Social Studies TEKS. Also, students will sharpen their perceptual and creative expression skills as indicated by the Fine Arts TEKS. The following document includes the applicable TEKS and the details of the *Trend-spotting* unit. The final section of this document presents the applicable Texas College and Career Readiness Standards adopted by the Texas Higher Education Coordinating Board (THECB) on January 24, 2008.

Description of Unit

In this task, students will use the basic mathematical skills of counting, grouping, and comparing to observe patterns and spot trends in their everyday environments. Students observe how quantities of items counted vary over time and how they might make predictions based on increasing or decreasing numbers. Students keep a trend-spotting journal, counting a self-selected item either in the classroom or at home for a period of two weeks. Then, students illustrate their findings by creating a series of posters for data analysis. Each poster indicates the quantity of the item counted on a certain day, a visual representation of that number, and a graphical image depicting the object being studied. Teachers guide the students in sequencing the posters chronologically in preparation for analysis. Finally, students adopt the role of a product designer and apply their learning to the creation of an original design for the item being studied. In the final presentation, they pitch their design idea to the class alongside their data. Will they follow the observed trends or deviate from them in their own designs? How will they explain their creative decisions?

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Goals

Students will meet these goals in their explorations:

- Become familiar with using mathematics as a way to observe patterns in everyday life
- Collect and analyze data, make predictions and inferences, and draw conclusions using quantitative data
- Create and use representations to organize, record, and communicate mathematical ideas
- Ask questions and explore theories
- Have opportunities to design original works informed by previous learning
- Develop the essential skills of communicating, creative problem solving, and logical thinking

Phase I. Learning Experiences

1. Introduce students to the concept of using counting with numbers as a way to observe patterns in their environment. You may wish to show the class a book such as *More, Fewer, Less* by Tana Hoban or send home an activity such as [Counting Around the House](#).
2. Introduce the [definition of trend\(s\)](#) to the students. Complete a graphic organizer with the students with the definitions and examples of trends.
 - a. <http://www.merriam-webster.com/dictionary/trend>
 - b. <http://dictionary.reference.com/browse/Trends>
 - c. <http://www.visuwords.com/fullscreen/>
3. Ask the students to line up according to shoe color. How many students are wearing black shoes? How many students are wearing white shoes? How many students are wearing brown shoes? How many students are wearing multi-colored shoes? As students count the results, write the answers on the board. You may also wish to depict the number with shapes. Make the connections with the students on the type of trend that the class was counting.
4. Introduce the concept of a measurable trend as something that can be observed by counting and where the quantity either increases or decreases over time. As in the book, *More, Fewer, Less*, observing and counting objects in real life is like a photographic snapshot—things may be different before we “take the picture” —before we count and after. Ask students to divide up by the color of shirts they are wearing (or other appropriate option). Write the answers on the board and explain to students that we will count the colors of shirts tomorrow.
5. Ask the class how many students they think will wear the same color shirt tomorrow? Introduce this concept as the students’ prediction and write the number down on the board.
6. Keep a trend-spotting journal in which students record observations about patterns, consult with others about what has been observed, and theorize about those patterns. Ask students

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to identify at least one object or event in their environment to count over the course of two weeks. Students may consider the following questions to guide their selections:

- What are some of the most popular colors of cars in my area?
- How many students prefer lighter colored (white, pastels, neutrals) clothing to darker colors (navy, black, brown)?
- How often are the same lunch meals served in the cafeteria?

Students will depict their data in a series of posters presented to the class. (See the lessons below on graphing.) <http://illuminations.nctm.org/lessons/GridPaper-Large.pdf>

Phase II. Independent Research

A. Research process

1. Selecting a topic. Form small groups to brainstorm items to count through their journals. Students should consider items where change occurs with at least daily frequency such as clothing, observed automobiles during commutes, or app usage. For example, students would not likely want to count the number of people or pets in their household as these numbers should remain stable during the two-week period. Students might count events or activities, but again these should change. For example, if the student plays video games everyday, he/she may not want to count the game, if it is the same game, but rather the number of hours he/she plays with the game, which may vary.
2. Asking guiding questions. Each group selects an item to count over the two-week period. Students will collect the data individually in their journals. Teachers can use this opportunity to show how each student may arrive at different results depending upon whether he/she does the counting in a different or similar environment to the other students (i.e., the home versus the classroom). Guiding questions for students to ask include:
 - At what time of day will I count these items?
 - How might the time of day that I count influence my results?
 - What items can I count every day without forgetting?
 - How might I predict these items changing each day?
 - Will the item I select to count keep my interest over the journal-writing period?
 - How will I ensure that I count and record my data each day?
3. Creating a research proposal. Guide students in completing a topic selection and/or research plan proposal such as those in the [Sample Forms](#) section of this website. If the observation and data collection (counting) will occur outside of school hours, be sure to send the forms home to parents so they are aware of the project and can provide guidance to the student as he/she conducts the research.
4. Conducting the research. Count the item each day, preferably at the same time. Record the quantity counted in your journal. What changes are you observing as you turn the

pages backwards and forwards? How are the numbers from the days before more or less than the numbers from the current counting? Explain how you know.

5. Sharing findings. Each student takes on the role of a product designer and creates a new version of the item being counted. Students turn their journal into a sequence of posters to help their classmates observe the trends and then create a final poster that serves as an advertisement for the student's original design.

B. The product

Each student should create an 8.5 x 11 inch poster series that illustrates the data they captured in their journal. For example, students who are collecting information on T-shirt colors may choose to collage images of T-shirts from magazines on each poster, and write in numbers, as well as depict with colored shapes, the quantities counted each day.

Once the posters are complete depicting the trend, students assume the role of a product designer or marketer and create one poster for their own version of the object. This final poster might resemble an advertisement, with features and benefits of the new design captured. The student will pitch his/her ideas for the new product during the poster presentation and will discuss how the trend-spotting activity informed his/her choices.

C. Communication

Teachers should help students hang their posters in chronological order along a wall for discussion and analysis. Students will present posters to the class and the group will identify any increasing or decreasing trends by viewing the posters in sequence on the wall.

D. A completed project consists of:

1. Trend-spotting journal
2. Poster series depicting observed patterns
3. Product design poster
4. Videotape or audiotape of the poster presentation, including the Q&A session

Resources

More, Fewer, Less by Tana Hoban

Anno's Math Games by Mitsumasa Anno

Anno's Hat Tricks by Mitsumasa Anno

12 Ways to Get to 11 by Eve Merriam

Patterns Around Us – Recognizing Patterns by Tony Hyland

<http://pbskids.org/lab/activity/countingaroundthehouse/>

<http://pbskids.org/lab/games/>

<http://illuminations.nctm.org/LessonDetail.aspx?id=U64>

<http://illuminations.nctm.org/LessonDetail.aspx?id=L42>

<http://illuminations.nctm.org/LessonDetail.aspx?id=L79>

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Texas Essential Knowledge and Skills

The unit may address the following TEKS:

English Language Arts and Reading:

- K.4 Comprehends a variety of texts drawing on useful strategies as needed
- K.5 Understands new vocabulary and uses it correctly when reading and writing
- K.10 Analyzes, makes inferences and draws conclusions about expository text, and provides evidence from text to support their understanding
- K.11 Understands how to glean and use information in procedural texts and documents
- K.13 Uses elements of the writing process (planning, drafting, revising, editing, and publishing) to compose text
- K.14 Writes literary texts to express their ideas and feelings about real or imagined people, events, and ideas
- K.15 Writes expository and procedural or work-related texts to communicate ideas and information to specific audiences for specific purposes
- K.16 Understands the function of and uses the conventions of academic language when speaking and writing and continue to apply earlier standards with greater complexity
- K.17 Writes legibly and uses appropriate capitalization and punctuation conventions in their compositions
- K.18 Spells correctly
- K.19 Asks open-ended research questions and develops a plan for answering them
- K.20 Determines, locates, and explores the full range of relevant sources addressing a research question and systematically records the information they gather
- K.21 Uses comprehension skills to listen attentively to others in formal and informal settings
- K.22 Speaks clearly and to the point, using the conventions of language
- K.23 Works productively with others in teams

Mathematics:

- K.1 Uses mathematical processes to acquire and demonstrate mathematical understanding
- K.2 Applies mathematical process standards to understand how to represent and compare whole numbers, the relative position and magnitude of whole numbers, and relationships within the numeration system
- K.6 Applies mathematical process standards to analyze attributes of two-dimensional shapes and three-dimensional solids to develop generalizations about their properties
- K.7 Applies mathematical process standards to directly compare measurable attributes
- K.8 Applies mathematical process standards to collect and organize data to make it useful for interpreting information

Science:

- K.2 Develops abilities to ask questions and seek answers in classroom and outdoor investigations
- K.3 Knows that information and critical thinking are used in scientific problem solving

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- K.4 Uses age-appropriate tools and models to investigate the natural world
- K.5 Knows that objects have properties and patterns
- K.8 Knows that there are recognizable patterns in the natural world and among objects in the sky

Social Studies:

- K.3 Understands the concept of chronology
- K.14 Applies critical-thinking skills to organize and use information acquired from a variety of valid sources, including electronic technology
- K.15 Communicates in oral and visual forms
- K.16 Uses problem-solving and decision-making skills, working independently and with others, in a variety of settings

Fine Arts:**Art**

- K.1 Develop and organize ideas from the environment
- K.2 Express ideas through original artworks, using a variety of media with appropriate skill
- K.3 Demonstrate an understanding of art history and culture as records of human achievement
- K.4 Make informed judgments about personal artworks and the artworks of others

Texas College and Career Readiness Standards

This unit may address the following Texas College and Career Readiness Standards:

English Language Arts:

- I.A.1 Determines effective approaches, forms, and rhetorical techniques that demonstrate understanding of the writer's purpose and audience
- I.A.2 Generates ideas and gathers information relevant to the topic and purpose, keeping careful records of outside sources
- I.A.3 Evaluates relevance, quality, sufficiency, and depth of preliminary ideas and information, organizes material generated, and formulates thesis
- I.A.4 Recognizes the importance of revision as the key to effective writing
- I.A.5 Edits writing for proper voice, tense, and syntax, assuring that it conforms to standard English, when appropriate
- III.A.2 Adjusts presentation (delivery, vocabulary, length) to particular audiences and purposes
- III.B.1 Participates actively and effectively in one-on-one oral communication situations
- III.B.2 Participates actively and effectively in group discussions
- IV.B.1 Listens critically and respond appropriately to presentations
- IV.B.2 Listens actively and effectively in one-on-one communication situations
- IV.B.3 Listens actively and effectively in group discussions
- V.A.1 Formulates research questions

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- V.A.2 Explores a research topic
- V.A.3 Refines research topic and devise a timeline for completing work
- V.B.1 Gathers relevant sources
- V.B.2 Evaluates the validity and reliability of sources
- V.B.3 Synthesizes and organize information effectively
- V.C.1 Designs and presents an effective product
- V.C.2 Uses source material ethically

Mathematics:

- II.C.2 Explains the difference between the solution set of an equation and the solution set of an inequality
- II.D.1 Interprets multiple representations of equations and relationships
- II.D.2 Translates among multiple representations of equations and relationships
- III.A.2 Makes, tests, and uses conjectures about one-, two-, and three-dimensional figures and their properties
- III.A.3 Recognizes and applies right triangle relationships including basic trigonometry
- III.B.1 Identifies and applies transformations to figure
- III.B.2 Identifies the symmetries of a plane figure
- III.B.3 Uses congruence transformations and dilations to investigate congruence, similarity, and symmetries of plane figure
- III.C.1 Makes connections between geometry and algebra
- III.C.2 Makes connections between geometry, statistics, and probability
- VI.B.1 Determines types of data
- VI.B.2 Selects and applies appropriate visual representations of data
- VI.B.3 Computes and describes summary statistics of data
- VI.B.4 Describes patterns and departure from patterns in a set of data
- VI.C.1 Makes predictions and draws inferences using summary statistics
- VI.C.2 Analyzes data sets using graphs and summary statistics
- VIII.B.2 Uses various types of reasoning
- VIII.C.1 Formulates a solution to a real world situation based on the solution to a mathematic problem
- VIII.C.2 Uses a function to model a real-world situation
- VIII.C.3 Evaluates the problem solving process
- IX.A.3 Uses mathematics as a language for reasoning, problem solving, making connections, and generalizing
- IX.B.1 Models and interprets mathematical ideas and concepts using multiple representations
- IX.B.2 Summarizes and interprets mathematical information provided orally, visually, or in written form within the given context
- IX.C.1 Communicates mathematical ideas, reasoning, and their implications using symbols, diagrams, graphs, and words

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- IX.C.2 Creates and uses representations to organize, record, and communicate mathematical ideas
- X.A.2 Connects mathematics to the study of other disciplines
- X.B.1 Uses multiple representations to demonstrate links between mathematical and real-world situations
- X.B.2 Understands and uses appropriate mathematical models in the natural, physical, and social sciences

Science:

- I.C.1 Collaborates on joint projects
- I.E.1 Uses several modes of expression to describe or characterize natural patterns and phenomena. These modes of expression include narrative, numerical, graphical, pictorial, symbolic, and kinesthetic
- I.E.2 Uses essential vocabulary of the discipline being studied
- III.C.1 Prepares and represents scientific/technical information in appropriate formats for various audiences
- III.D.1 Uses search engines, databases, and other digital electronic tools effectively to locate information
- III.D.2 Evaluates quality, accuracy, completeness, reliability, and currency of information from any source
- V.C.1 Recognizes patterns of change

Social Studies:

- IV.A.6 Reads research data critically
- IV.B.1 Uses established research methodologies
- IV.B.3 Gathers, organizes, and displays the results of data and research
- IV.B.4 Identifies and collects sources
- IV.C.1 Understands/interprets presentations critically
- V.A.1 Uses appropriate oral communication techniques depending on the context or nature of the interaction
- V.A.2 Uses conventions of standard written English
- V.B.1 Attributes ideas and information to source materials and authors

Cross-Disciplinary Standards:

- I.A.1 Engages in scholarly inquiry and dialogue
- I.C.1 Analyzes a situation to identify a problem to be solved
- I.C.2 Develops and applies multiple strategies to solving a problem
- I.C.3 Collects evidence and data systematically and directly relates to solving a problem
- I.D.1 Self-monitors learning needs and seeks assistance when needed
- I.D.2 Uses study habits necessary to manage academic pursuits and requirements
- I.D.3 Strives for accuracy and precision
- I.D.4 Perseveres to complete and master tasks

- I.E.1 Works independently
- I.E.2 Works collaboratively
- II.A.3 Identifies the intended purpose and audience of the text
- II.A.4 Identifies the key information and supporting details
- II.C.1 Understands which topics or questions are to be investigated
- II.C.2 Explores a research topic
- II.C.3 Refines research topic based on preliminary research and devises a timeline for completing work
- II.C.6 Designs and present an effective product
- II.C.7 Integrates source material
- II.C.8 Presents final product
- II.D.3 Presents analyzed data and communicate findings in a variety of formats
- II.E.1 Uses technology to gather information