Numberland

Overview:

Students will play a game where they can move forward by 1 or stay still with 0.

Outcome:

Students will learn the value of 0 and 1 in binary systems and they will understand that all electronic information is made up of zeroes and ones.

Plan:

Introduce students to the game, Numberland (like Candyland). The object of the game is to get from Oil Sludge to Shiny City by moving one piece (any game token) at a time or staying still for that turn. A coin flip determines whether a student can move 1 square forward and go again (heads—or 1) or stay still and give up the turn (tails—or 0).

KINDERGARTEN MATH

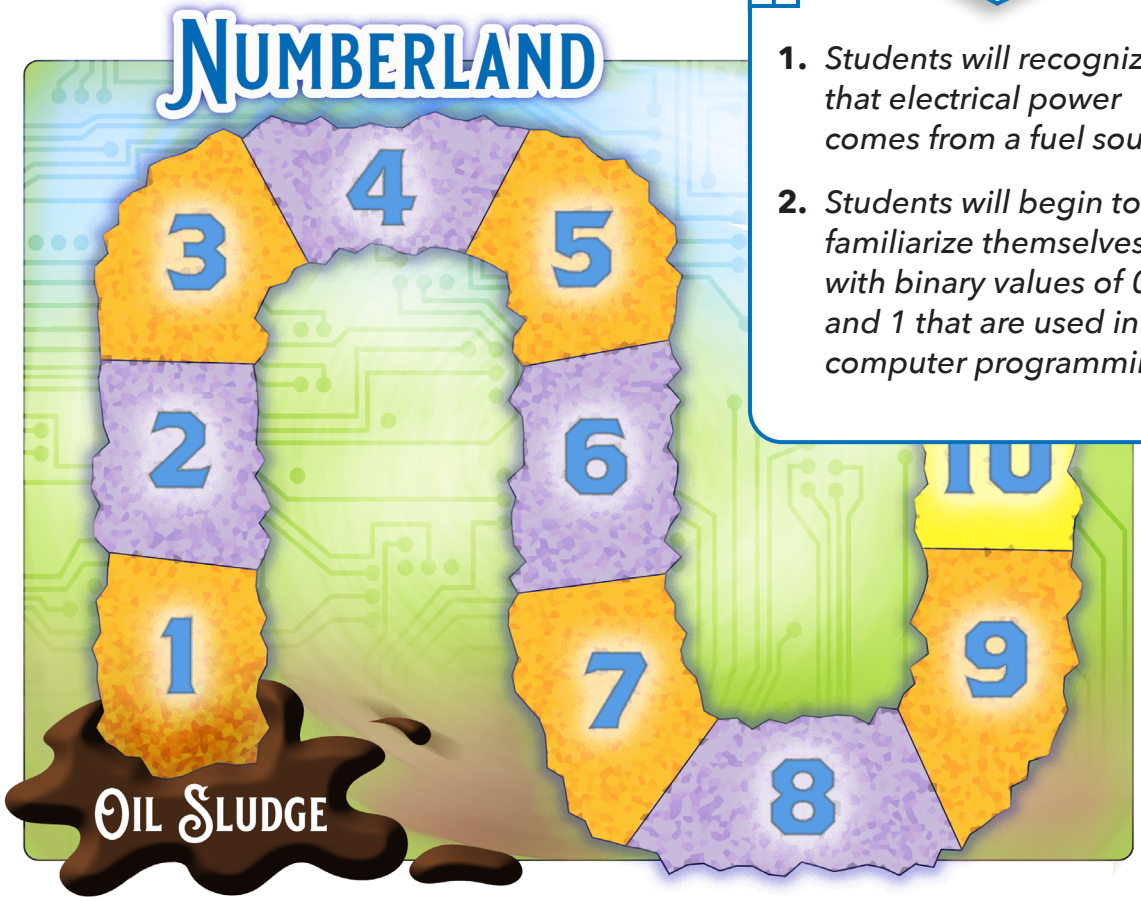
COUNTING AND CARDINALITY

Know number names and the count sequence.

Standards: K.CC.A.2 Count forward beginning from a given number within the known sequence (instead of having to begin at 1).

REAL WORLD CONNECTIONS

1. *Students will recognize that electrical power comes from a fuel source.*
2. *Students will begin to familiarize themselves with binary values of 0 and 1 that are used in computer programming.*



Sparky Needs a Charge

KINDERGARTEN MATH

COUNTING AND CARDINALITY: Know number names and the count sequence

Standards: K.CC.A.1 Count to 100 by ones and by tens.

Overview:

Students help Sparky to find a charge by counting all the outlets in the room and putting sticky notes on them.

Outcome:

Students will practice counting by adding up all the outlets in the room.

Plan:

- Explain to students that Sparky needs a place to recharge. Ask them where electrical appliances go to get a recharge.
- Ask students to go on a "treasure hunt" to find the outlets in the room and to count them.
- Have them put colored sticky paper on the outlets to make the counting easier.
- Hand out the worksheet with outlets on it. Have the students circle the correct number of outlets.

IMAGE TK

How Many Lightening Bolts?

KINDERGARTEN MATH

COUNTING AND CARDINALITY: Know number names and the count sequence

Standards: K.CC.A.3 Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).

Overview:

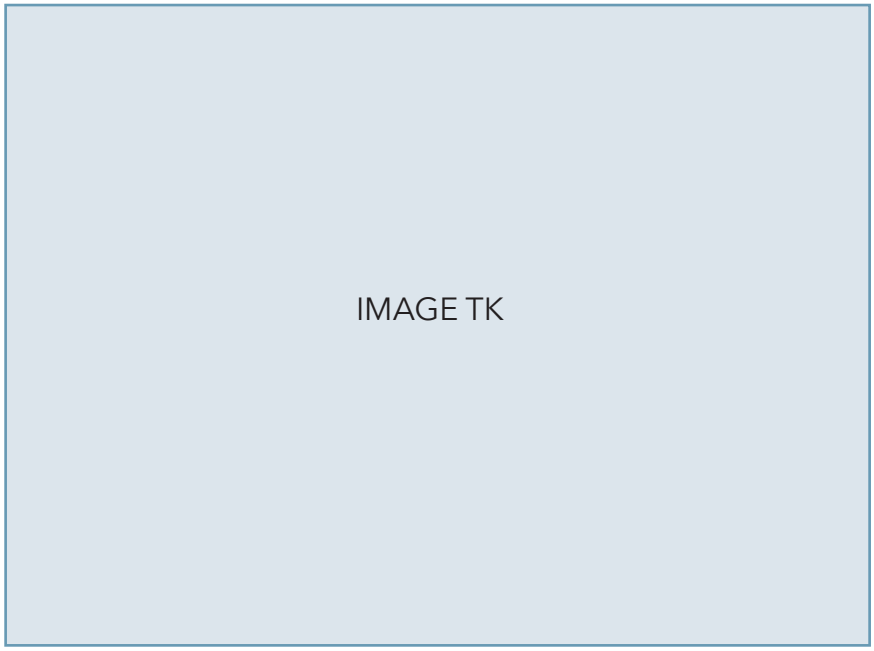
Students will count the number of lightning bolts in the four groupings on a page and determine the "value" of each group in colored order.

Outcome:

Students will connect numbers with values by coloring lightning bolts.

Plan:

- Hand out the worksheet and tell students that they're going to count lightning bolts.
- Assign colors to the "values" of the groupings of lightning bolts on the worksheet. The grouping with the most lightning bolts will be colored red, second-most blue, third-most yellow, and fourth-most green.
- Ask students which colored grouping is the first largest and to count the number of lightning bolts. Continue for all four groupings.



Lightening Bolts in a Cloud

Overview:

Students will add lightning bolts to a cloud and count them to determine value.

Outcome:

Students will connect numbers with their values.

Plan:

- Hand out the first worksheet with the drawn cloud, then the second worksheet with five drawn lightning bolts for students to cut out.
- Have students cut out the lightning bolts.
- Once each student has a pile of lightning bolts, have them place them in the cloud and count them out.

KINDERGARTEN MATH

COUNTING AND CARDINALITY: Count to tell the number of objects

Standards: CCSS.Math.Content.K.CC.B.4 Understand the relationship between numbers and quantities; connect counting to cardinality. CCSS.Math.Content.K.CC.B.4.a When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. CCSS.Math.Content.K.CC.B.4.b Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted. CCSS.Math.Content.K.CC.B.4.c Understand that each successive number name refers to a quantity that is one larger.

IMAGE TK

Finding Appliances

Overview:

Students will demonstrate counting skills by adding up home appliances.

Outcome:

Students will identify, color, and count 10 electronic appliances.

Plan:

- Distribute the Sparky's Home worksheet.
- Ask students to use different colors to color in every electrical appliance they find in the house—there will be a total of ten.

KINDERGARTEN MATH

COUNTING AND CARDINALITY

Standards: CCSS.Math.Content.K.CC.B.5 Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1-20, count out that many objects.

Count the Batteries

KINDERGARTEN MATH

COUNTING AND CARDINALITY
Compare Numbers

Standards: CCSS.Math.Content.K.CC.C.6 Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.

Overview:

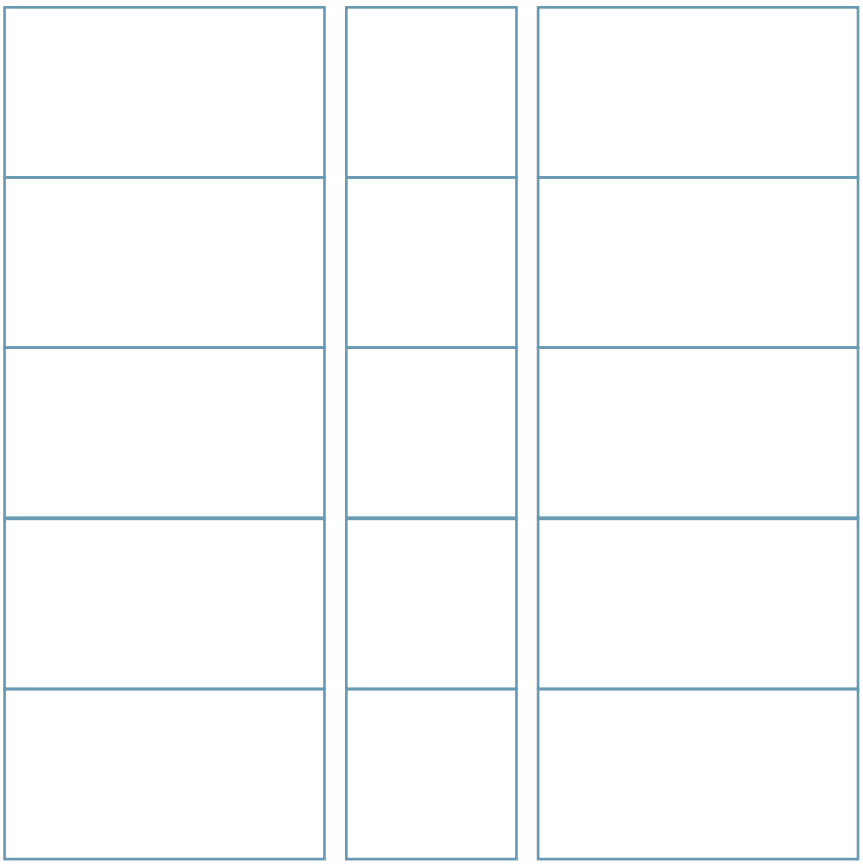
Students will use >, <, and = symbols to compare number sets.

Outcome:

Students will compare sets to determine greater, lesser, or equal values.

Plan:

- Explain the value symbols, <, =, > to students.
- Hand out the worksheets with the value symbols on the top row.
- Have students draw the correct symbol in the middle column between the two columns of battery images.



IMAGES TK

Our Robots Need Batteries

KINDERGARTEN MATH

OPERATIONS AND ALGEBRAIC THINKING

Understand addition as putting together and adding to and understand subtraction as taking apart and taking from.

Standards: CCSS.Math.Content.K.OA.A.1 Represent addition and subtraction with objects, fingers, mental images, drawings1, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.

Overview:

Students will paste the right number of batteries into the right robot.

Outcome:

Students will understand addition skills by "filling" batteries into robots.

Plan:

- Explain to students that different size machines need different amounts of battery power.
- Distribute the Robot worksheet and the Batteries worksheet.
- Have students color in and add on to the small, medium, and large robots.
- Have students cut out the batteries and place the right number of batteries onto the small, medium, and large robots.

IMAGES TK

Blackout

Overview:

Students will have to avoid an electrical blackout by "unplugging," or crossing out, electrical appliances that aren't necessary.

Outcome:

Students will understand subtraction skills by adjusting values.

Plan:

- Explain to students that there is a limit to energy being used inside a house or a schoolroom. Using too many appliances at once could cause a blackout, a temporary stop to the flow of energy.
- Hand out the worksheet that depicts a room with eight appliances all getting power from a power cord in one outlet.
- Explain that this is too much of a drain on the power source and students must decide to unplug items by X-ing out a number of plugs.
- Ask students to figure out how many appliances remain plugged in if three are unplugged, then if four are unplugged.

KINDERGARTEN MATH

OPERATIONS AND ALGEBRAIC THINKING

Standards: CCSS.Math.Content.K.OA.A.2 Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.

IMAGES TK

Phone Number

Overview:

Students will use a 7-digit "phone number" and choose between two sets of decomposed pairs for each digit.

Outcome:

Students will understand how to decompose several numbers under 10.

Plan:

- Explain to students that there are many ways for numbers to add up to another number. For example, there are nine pairs of numbers that add up to 10.
- Hand out the worksheet. Tell students that there is a 7-digit phone number on the page and that they must choose which among two pairs of numbers that will add up to each digit.

KINDERGARTEN MATH

OPERATIONS AND ALGEBRAIC THINKING

Standards: CCSS.Math.Content.K.OA.A.3 Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).
CCSS.Math.Content.K.OA.A.4 For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.
CCSS.Math.Content.K.OA.A.5 Fluently add and subtract within 5.

8	**4 + 4**	**or**	**4 + 6**
7	**5 + 2**	**or**	**2 + 3**
4	**1 + 2**	**or**	**2 + 2**
9	**3 + 6**	**or**	**4 + 6**
2	**2 + 2**	**or**	**1 + 1**
5	**3 + 1**	**or**	**3 + 2**
6	**3 + 3**	**or**	**2 + 2**

More Power

Overview:

Students will use a 7-digit "phone number" and choose between two sets of decomposed pairs for each digit.

Outcome:

Students will analyze the difference between more and less.

Plan:

- Explain to students that electronic machines depend on power and that there are indicator lights on most machines that display the amount of power.
- Hand out the worksheets. Tell the students that they must circle the computer that has less power, according to the indicator panel.

KINDERGARTEN MATH

MEASUREMENT AND DATA
Describe and compare measurable attributes

Standards: CCSS.Math.Content.K.MD.A.2 Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. For example, directly compare the heights of two children and describe one child as taller/shorter.

IMAGE TK

Pattern Coding

Overview:

Students will evaluate a pattern and determine the next digit in the sequence.

Outcome:

Students will evaluate number patterns using zeros and ones as in computer coding.

Plan:

- Explain to students that computers can only read from a 2-number alphabet called "binomial." Computers "read" based on sequences of those two numbers, which are 1 and 0.
- Distribute the worksheets and tell students to find the last digit missing in the pattern of 1s and 0s. For example, the next digit in the pattern 0101 would be 0.

KINDERGARTEN MATH

MEASUREMENT AND DATA
Classify objects and count the number of objects in each category.

Standards: CCSS.Math.Content.K.MD.B.3 Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.

0101	0
0000	0
1111	1
1101	1
0010	0
0110	1
1010	1

Motherboard Maze

Overview:

Students will be given a diagram of a computer motherboard and an answer key of shapes and "directionals" such as above, below, etc., to send Sparky from "battery" to "export dock" matching the answer key shapes and directionals to the corresponding shapes and spaces on the motherboard.

Outcome:

Students will identify two- and three-dimensional shapes and understand their place in space using directional terms.

Plan:

- Explain that the "brain" of a computer is called a "motherboard." The motherboard is made up of shapes and electrical impulses. Sparky is an electrical impulse and has to go from the battery to the export dock.
- Have students cut out the prepositional word/images that show Sparky posing to demonstrate each prepositional phrase.
- Have students place the "directional" phrases on the maze to help Sparky get from the battery to the export dock.

KINDERGARTEN MATH

GEOMETRY
Identify and describe shapes

Standards: CCSS.Math.Content.K.G.A.1 Describe objects in the environment using names of shapes and describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to.
CCSS.Math.Content.K.G.A.2 Correctly name shapes regardless of their orientations or overall size.
CCSS.Math.Content.K.G.A.3 Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").
CCSS.Math.Content.K.G.B.4 Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/"corners") and other attributes (e.g., having sides of equal length).

IMAGE TK

Sparky is Above the Cone	Sparky is Next to the Square	Sparky is Below the Circle	Sparky is in Front of the Cube	Sparky is Beside the Rectangle

Tangram Sparky

Overview:

Students will enjoy cutting out and pasting together various shapes to fit into a rendering of Sparky.

Outcome:

Students will evaluate geometrical shapes by following a pattern to construct a figure.

Plan:

- Tell students that they can build their very own Sparky.
- Distribute the Tangram sheet and have them color in the pieces before taping them together by following the edges of the cutouts.

KINDERGARTEN MATH

GEOMETRY

Analyze, compare, create, and compose shapes.

Standards: CCSS.Math.Content.K.G.B.5 Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.
CCSS.Math.Content.K.G.B.6 Compose simple shapes to form larger shapes. For example, "Can you join these two triangles with full sides touching to make a rectangle?"