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INTRODUCTION

The Primary mathematics toolkits are intended to assist teachers with instructional planning using the Belize National Curriculum for Primary Schools. They include advisory content examples and teaching points for every lower division mathematics learning outcome. These are presented in the order they should be taught. Material from the toolkits can be copied directly into instructional plans. Teachers can edit the material in any way and can add their own examples and teaching points.

The advice in the toolkits is based on the belief that knowledge in mathematics is best developed as students solve problems, explore and record results, analyze observations, make and test generalizations and reach new conclusions. The suggestions aim to provide practical, adaptable and real life content with a focus on helping students explore mathematics for themselves.

The toolkits present activities that should challenge students to complete active learning tasks, both independently and collaboratively. Instruction in new concepts proceeds from simple ideas that are familiar to the students to more complex, abstract ideas. Whenever possible, these concepts are initially presented with concrete and picture-based examples. They encourage the use of manipulatives as tools for allowing students to explore mathematical ideas for themselves. Furthermore, the content examples and teaching points encourage teachers to link mathematical concepts to the students’ experiences outside the classroom so that they see mathematics as useful and worthwhile. Instruction should also promote a positive attitude, encourage students to take intellectual risks, involve frequent word-based problem solving and allow students to learn from each other.

Long term success in mathematics depends on the ability to mentally perform routine calculations with fluency and accuracy. These skills, and the accompanying understanding of number concepts and quantities, can be developed through the frequent playing of games that require mental calculations. Fluency and accuracy in the performance of mental calculations should be consolidated through short, individualized, repetition and practice activities such as drills conducted on a daily basis. Whole class chanting and choral response of memorized procedures and tables is less effective and its use should be minimized.
### 1.1 Count groups of objects, initially to 10 and then beyond, using the counting principles of stable order, one-to-one correspondence and cardinality.

**Content Examples & Teaching Points**

The counting principles are taught orally. It is not necessary to introduce writing at this stage. Objects can be organized without numbers at first. These can be added later.

There are five counting principles. The first three, stable order, one-to-one correspondence and cardinality are usually taught first. They show how we count. These are important skills for students to master before they can carry out meaningful counting and higher calculations.

Using items of high interest to the students such as taps on a drum, toys, pages in a book and so on can maintain their attention and interest.

**Stable Order:** We count using a series of number names (one, two three and so on) and the order of these numbers names always stays the same when we count.

Count the chicks out loud

![Chicks](image)

**One-to-one correspondence** – Each object is counted once and only once.

Students can:
- touch each item as they count it;
- tag or move items out of the way while counting;
- create marks on a paper as they count.

**Cardinality**

The last number counted represents the total number of items in a group.

Encourage students to show you a group of items to match a specific number.

Ask students to count a group of items in a set. Then, explicitly ask them to show you how many objects in that group represent that amount.

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### 1.2 Demonstrate different ways of counting through oral exercises such as playing games, singing songs, and saying rhymes.

**Content Examples & Teaching Points**

Songs and rhymes reinforce counting principles:

- One, two, buckle my shoe....
- Five little ducklings went swimming that day . . .
- There are 10 green bottles hanging on the wall...

Games such as snakes and ladders, skipping and simple card games also encourage counting.

Adding songs to lessons helps to reinforce concepts and skills, while allowing students to have fun. The repetition and rhythm in songs and rhymes help students to grasp concepts better.
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<thead>
<tr>
<th>NUMBERS A</th>
<th>Content Examples &amp; Teaching Points</th>
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</thead>
<tbody>
<tr>
<td><strong>1.3 Match groups of up to ten objects to written numerical symbols.</strong></td>
<td>Match the number with the group having the same number of objects.</td>
</tr>
<tr>
<td></td>
<td>An understanding of quantity is necessary if matching objects to symbols is to have value for the students.</td>
</tr>
</tbody>
</table>
1.4 Count groups of objects, initially to 10 and then beyond, using the counting principles of abstraction and order irrelevance.

Abstraction and order irrelevance are closely linked and are usually developed at the same time.

**Abstraction:** How we count stays the same no matter what is being counted.

For example, the quantity of five large things is the same as the quantity of five small things or a mixed group of five small and large things. Students may be asked to count five pencils, then count five erasers—the quantity doesn't change, because the objects changed.

You do not have to be able to touch an object to count it. Things that are non-tangible, such as sounds and dreams can be counted. Repeated actions, such as steps taken to reach somewhere can also be counted.

Students understand abstraction if they count sets of different types of objects of the same amount as they same quantity.

**Order Irrelevance:**

The order in which items are counted does not change the quantity. The counting of objects can begin with any object in a set and the total will stay the same.

Activities include:

- counting a row of objects from left to right, then from right to left to see if the amount is the same.
- counting sets of unique items (different colour, shape, etc.) in a variety of orders.

1.5 State how many objects are in a group of up to 10 objects at a glance without having to count them one by one.

Students need to practice immediately knowing or seeing how many there are in a small amount of objects without counting. This practice should begin with 5 or fewer objects until, for example, they know there are 3 candies on a table without counting them.

Flash cards that have small quantities of symbols arranged in different ways can be used for reinforcement and practice.

This skill can be effectively taught through games that involve dice, dominoes or cards.

Knowing a dice shows 5 without counting the dots.

Knowing a domino shows 4 without counting the dots.
### 1.6 Identify an individual number, a sequence of numbers and the number before, after or between given numbers on a number line.

On the number line below, the number 7 comes before the number 8.

![Number Line](image)

Knowing the location of things is important in math. Students will need to answer questions about position and use their spatial reasoning skills.

### 1.7 Recite the numbers 1 to 30 in sequence with fluency and accuracy.

Students participate in automatic (rote) counting by reciting numbers from memory. A lot of repetition and a variety of hands-on approaches is required to effectively teach this skill.

Teachers should model orally counting aloud the numbers from one to thirty.

Activities may include tossing a ball from person to person while counting, clapping while reciting numbers, singing songs that include rote number series or counting blocks.

Whole class chanting should be minimized in favour of individual and small group recitation.
1.8 Compare numbers from 0 to 10 using the less than, greater than and equals signs.

If James has 5 apples and Suzy has 8 apples, who has more apples?

The picture below shows that Suzy has more apples.

James

Suzy

Using the symbols:

8 > 5 (8 is greater than 5)
5 < 8 (5 is less than 8)
5 = 5 (5 equals 5 or 5 is the same as 5)

1.9 Write the numeric symbols for numbers from 0 to 10.

The numeric symbols are:

0, 1, 2, 3, 4, 5, 6, 7, 8, 9.

This does not require students to read the written word (one, two, etc) but to match and then write the symbol to a number stated orally.

Learning to write numbers involves different techniques:

- Writing numbers in the air with a finger.
- Writing numbers in sand, sugar or salt using fingers or a paintbrush.
- Tracing numbers.
- Using rhymes that describe how the symbol is formed, for example, “making a straight line is fun, and now you have one.”

Progress in other areas of math should not be delayed as students learn to write.
### 1.10 Compose and decompose numbers from 1 - 10, grouping items into given numbers with no remainder.

When a number is made up of putting together other existing numbers, we are **composing**. For example, a group of 2 objects can be joined to a group of 4 objects to get a group of 6 objects.

**Decomposing** is when we break the number apart. For example, a group of 5 objects can be split into a group of 3 objects and a group of 2 objects.

Composing and decomposing numbers helps students when they move on to adding and subtracting. Dominoes can be a useful manipulative.

The number pairs that total ten are foundational for students’ ability to work fluently within base-ten numbers and operations. Different models, such as ten-frames, cubes, two-color counters, etc., assist students in visualizing these number pairs for ten.

Starting with the whole, students break numbers into parts and explore how many different ways a number can be partitioned.

### 1.11 Identify the position of an item in a group using ordinal numbers from first to tenth.

These students are waiting in a line to go into their classroom. Name the person in the 4th position.

Talk with students about the positions of each item by saying for example “The dog is first and the cat is second.” Begin with just a few words or images on the board and work your way up to give students practice using the first ten ordinal numbers. Introduce the word ‘last’ as well since this is a position related vocabulary word.

By simply talking about consistent, sequential daily activities, you are teaching ordinal numbers. For example, when I wake up in the morning, first I brush my teeth. The second thing I do is eat breakfast.

Ordinal numbers can also be taught to students when following Recipes. For example, “First, pour in the pudding mix. Second, pour in 2 cups of milk. Third, stir it all together.”
**7.1 Find examples of points, lines, squares, circles, rectangles and triangles in the classroom, school and wider environment.**

In the classroom, the edges of objects and shelves form lines. Squares and rectangles are visible as doors, windows, table tops, books and so on. The tops of cups and glasses form circles. In a park, a slide might form a triangle with the ground.

Before discussing shapes, begin at the basics by identifying what is a point and a line for students. Build on this to show students that a line begins at a point and basic shapes are created using lines that join at a point.

A strong understanding of shapes can help students better recognize the numbers and how they look. Learning the differences in shapes requires students to focus on the specific characteristics, use observational skills to identify the different shapes, know how to compare different shapes and group similar shapes together.

**7.2 Explore common shapes through play and the use of manipulatives.**

Students may explore common shapes through play with geoboards, play dough, sand or other manipulatives. They can also hunt for shapes in pictures.

Manipulative play in the early stages is about learning to use your hands. Fine motor skills develop through a number of different stages from sensory awareness to in-hand manipulation and tool-use.

**7.3 Describe the properties of triangles, squares and rectangles in terms of the number of sides and corners.**

Through discussion and questioning, teachers may elicit from students the different properties of shapes.

For example, how many sides does this shape have?

- I have 4 sides. I have 4 corners. I am a square.
- I have 4 sides-2 long and 2 short. I have 4 corners. I am a rectangle.
- I have 3 sides. I have 3 corners. I am a triangle.

Recognizing and naming 2D shapes in different orientations and being able to differentiate between them is important.

2D shapes are actually flat and so cannot be handled or picked up.
<table>
<thead>
<tr>
<th><strong>GEOMETRY A</strong></th>
<th><strong>7.4 Construct 2-D shapes using straws, sticks, clay, building blocks and other materials.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Students may be given hands-on activities to create 2D shapes using various manipulatives, after discussion about the properties of the shapes and looking at specific examples of them.</td>
<td>Encourage students to develop strategies for accurate counting of sides, such as by marking each side as it has been counted. Not all same-sided shapes look the same, such as with irregular 2D shapes.</td>
</tr>
</tbody>
</table>

![Diagram of a triangle made with straws](image-url)
### 2.1 Find examples of patterns in the classroom, school and wider environment.

Many classrooms and homes have floor coverings that have repeating patterns. They also occur in curtains, table cloths, clothing and on the covers of some exercise books.

The colours of traffic lights occur in a predictable sequence.

At this level, the focus should be on repeating patterns. However, another type of pattern occurs when there is a clear relationship between one item and the next, for example, when each object is bigger than the one next to it.

Patterns often exist in songs, rhymes and games that students are familiar with.

Instead of thinking math with numbers think about math with ‘things’. Patterns can be applied in many different situations, making them one of the powerful building blocks of mathematics.

### 2.2 Sort objects and shapes based on their colour, size, number of sides or another attribute.

Given a set of objects with different shapes, sizes and colours, ask students to sort them:

<table>
<thead>
<tr>
<th>sort</th>
<th>□ □ □ □</th>
<th>□ □ □ □</th>
<th>□ □ □ □</th>
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<tbody>
<tr>
<td>sort by size</td>
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<td>sort by shape</td>
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<tr>
<td>sort by colour</td>
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</tbody>
</table>

Sorting objects and shapes using specific attributes allows students to explore similarities and differences and then use these characteristics to create patterns for themselves. Sorting skills help other branches of mathematics, such as sets.

When teaching patterns, the teacher can review the counting principles.

### 2.3 Create patterns using objects, actions, shapes, colours, sounds or numbers.

Patterns can be formed in many ways, for example by repeating colours or actions.

Patterns can be created by organizing pictures, symbols, objects and so on so that they are predictably repeated in some way.
### 2.4 Group 10 or fewer objects into sets of 2’s, 3’s, 4’s and 5’s without remainders.

<table>
<thead>
<tr>
<th>PATTERNS</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many groups of 2’s can you get from the stars below?</td>
</tr>
<tr>
<td><img src="image1" alt="Stars" /></td>
</tr>
<tr>
<td>How many groups of 5 can you get from the apples below?</td>
</tr>
<tr>
<td><img src="image2" alt="Apples" /></td>
</tr>
</tbody>
</table>

### 2.5 Count objects, initially to 10 and then beyond, by 1s and 2s, forwards and backwards.

<table>
<thead>
<tr>
<th>PATTERNS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2.5 Count objects, initially to 10 and then beyond, by 1s and 2s, forwards and backwards.</strong></td>
</tr>
<tr>
<td>Counting by 2s, or another number, is also called skip counting. It helps students notice numerical patterns. The more patterns they see in numbers the more generalizations they can make about how numbers work.</td>
</tr>
<tr>
<td>Skip counting is often used for counting and grouping things – counting pairs of gloves, socks, and so on.</td>
</tr>
<tr>
<td>Ask students to give real world examples of counting backwards, for example, at the start of a race (three, two, one, GO!) or when a space rocket is launching.</td>
</tr>
<tr>
<td>A common error is for students to count objects as if they have the value of 2. In other words, when told to count by 2’s they count four objects as 2,4,6,8 instead of grouping them by 2’s.</td>
</tr>
<tr>
<td>The use of games such as jumping on a number line drawn on the floor, may also be very effective in helping students to visualize counting forwards and backwards.</td>
</tr>
<tr>
<td>Real objects such as bottle tops, counters or similar small objects as well as number lines can be used to teach both skip counting and counting backwards.</td>
</tr>
</tbody>
</table>
### 8.1 Compare the length, height, mass, temperature and capacity of two objects using words such as longer, taller, shorter, lighter, heavier, colder, hotter, more full or emptier.

Place a tick ✓ on the taller object and cross X out the shorter object.

To develop these understandings students need many opportunities to explore objects and their attributes and to discuss these experiences with others. They also need to be introduced to appropriate descriptive language: terms such as big, heavy, tall and empty.

### 8.2 Investigate the length of objects found in the classroom or wider environment, in non-standard units of measurement, such as finger lengths, pieces of string or lengths of a pencil.

How many crayons long is the paintbrush?

This paintbrush is __________ crayons long.

Encourage students to place units end to end as gaps or overlaps between the units will result in inaccurate measurements. Using a unit requires that students are able to count and understand that the last unit counted gives the measure of the object. It is useful to measure the same object with different units. This helps students understand that you need a smaller quantity of larger units to measure an object or vice versa.

Estimation is a useful skill to introduce alongside measuring with objects. This can be developed, for example, by asking students to guess how many cups of water will fit into the jug before they carry out their measurement.

### 8.3 Describe the position of two objects relative to each other in terms of distance and direction using phrases such as near to, far from, very far from, to the right of, below, above and so on.

Give the position of the chicken in relation to the worm.

Using phrases such as near to, before, after, far from introduces students to the concept of measurement in a basic form as they describe distance and the position of an object in relation to another.
8.4 Describe the passage of time using terms such as minute, hour, day, week, month and year.

The focus of this learning outcome is not for students to tell time using a clock but to develop a concept of time.

**Circle how long it takes to do each activity.**

1. I ride my bike to school in
   - 1 second
   - 1 hour
2. When I wave to a friend, it takes
   - 1 second
   - 1 hour
3. The time I spend eating my lunch is
   - 1 second
   - 10 minutes
4. I celebrate my birthday.
   - Every year
   - Every month
5. I go to school for
   - 1 month each year
   - 5 days each week

Concepts of time can be developed various ways. When students are doing a group task, tell them how much time they have at the beginning and tell them how much time they have left before the end.

Play one-minute games, for example: stack as many blocks as you can in one minute or pick up as many different objects as you can in one minute. As students play the game, call out the time left every 10 seconds.

Use a digital count down timer for group activities. Here the goal is not to pressure students or make them rush but to help them understand time’s passing. As they practice, students will get better at estimating the time it takes to do chores, homework, and other activities.

8.5 Correctly sequence the days of the week and months of the year using ordinal numbers.

There are many songs and rhymes that can be used to teach the order of the days of the week and months of the year.

What day is it?

**Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday.**

1. I am the 4th day of the week. There are 9 letters in my name. What day am I? __________
2. I am the 1st day of the week. The beginning of my name rhymes with fun. What day am I? __________
3. I am the last day of the week. I am often the favourite day! What day am I? _______________
4. I am the last day before the weekend. You’ll find me on the 6th day. What day am I? __________
5. I am the 2nd day of the week, but the first day of the school week. What day am I? __________
6. I am the 3rd day of the week. The beginning of my name rhymes with new. What day am I? ________
7. I am the fifth day of the week. What day am I?

8.6 Identify the current dates and days of the month on a calendar or weather chart using ordinal numbers.

The Calendar below shows days and dates for this month. What is today’s date?

Talk about the **pattern of forming ordinal numbers.** Make sure that students know that except for *eleventh*, *twelfth*, and *thirteenth*, numbers ending with one, two, or three are irregular and should be said *first*, *second*, and *third* respectively.

Days of the month can be shared daily with students as ordinal numbers when the date is discussed orally or placed on blackboard heading, for example Today is the 16th of September.
### 8.7 Tell time to the hour using an analogue clock.

**Tell the time that is shown in the clock below:**

- This clock shows 5 o’clock because the short hand is pointing to 5 and the long hand is pointing straight up.

**Draw the hands on the clock to show 3 o’clock**

Provide opportunities for students to manipulate times on 12-hour analogue clock. Students will need to understand that the short hand is the hour hand and the long hand is the minute hand. When the short hand points to a particular number and the long hand is on the 12 that is the time to the hour. The clock in the example is showing five o’clock.

### 3.1 Add sets of up to ten objects including with the use of zero when adding.

Mark bought 2 bags of chips at school. His mother went to the supermarket and bought 7 bags of chips. His dad did not buy any. How many bags of chips are there altogether?

- a) 12  
- b) 13  
- c) 9  
- d) 10

Zero is abstract and good understanding of “something that represents nothing” is critical for further success and deeper understanding, including place value.

The zero property states that when zero is added to any number, the sum is the same as the original number.

### 3.2 Solve problems involving addition of up to 10 objects, using real life situations.

If I have three bananas and my friend gives me two more bananas, how many bananas will I have altogether?

![Bananas](image)

Encourage students’ own reasoning strategies and use of different strategies to master addition and introduce subtraction when students are ready.
### 5.1 Explain that a whole object can be divided into parts of equal and different sizes.

Students can be shown how to divide objects, for example by taking a sheet of paper and folding or cutting it down the middle to get two halves.

Understanding fractions means understanding all the possible concepts that fractions can represent.

Get Hands On. The concept of a “fraction” is abstract and visualizing part vs. whole is a developmental skill. Manipulatives can help the concepts become more concrete.

Name a half as one of two equal parts of an object, shape or quantity.

### 5.2 Describe fractions in everyday situations by using language such as ‘1 out of 2’.

Fractions can be created by dividing things into equal parts. For example, dividing a tortilla in half.

A fraction should also be part of a group. One out of the two caps is green. Half the caps are green.

1/2 is a fraction. It can be written with a slanted slash or the 1 on top of the 2 with the slash between the two numbers. The 1 is the numerator, and the 2 is the denominator.

Fractions can also be explained to students by dividing objects into two, for example a pizza cut into two equal halves. Use language with students such as, James will get 1 out of the 2 slices of tortilla. James now has half of a tortilla.

### 5.3 Compose and decompose a region, shape or set of objects using halves and quarters, recognizing that the fractional parts are equal.

Composing a shape using objects.

Pattern blocks may be used as area models to compare fractional regions and explore how the regions change in relation to the whole.

Fraction manipulatives aid in the learning process by setting a strong foundation from which to build upon. They are excellent learning tools and can be broken down into four main types: fraction pies, fraction sticks, fraction cubes and virtual manipulatives.
5.4 Match pictures of halves and quarters and objects in parts with the symbols ½ and ¼.

This orange has been cut into two equal parts. Each part is one half of the orange.

\[
\frac{1}{2} \quad \frac{1}{2}
\]

Students can shade or colour paper to show fractions. For example, colour the circle in two equal parts to show half and four equal parts to show quarters. Write the symbol in each part.

Folding paper in halves and quarters will reinforce these concepts. When they fold the paper, students can write the symbols in the relevant parts.
7.5 Identify rays, angles and planes in the classroom, school and wider environment.

This learning outcome aims to introduce the vocabulary terms. It is not necessary to draw or measure the angles, planes and rays.

**Rays**

A ray has a clear starting point but not a clear end.

Another real life example of a ray is rays of the sun. The ray of light starts at the sun and could go on forever.

A light from a flashlight is a ray.

**Angles**

An angle has two rays that come together in a vertex. Angles can also be formed when two or more lines intersect each other.

Students can look for angles in real life objects such as the centre of a clock. They can make their own angles using pencils or tooth picks.

**Planes**

A plane is a flat surface.

The floor and the top of a desk are planes.

The corners of doors and windows form angles.
### 7.6 Find examples of 3-D objects such as spheres, cubes, cylinders and cones in the classroom, school and wider environment.

Students understand 3D objects better when they can see actual objects or pictures of these.

- **Spheres:** globe, football

  ![Spheres](image)

- **Cubes:** dice, building blocks

  ![Cubes](image)

- **Cylinders:** chalk, food can, toilet paper roll, water pipe.

  ![Cylinders](image)

- **Cones:** traffic cone, ice cream cone

  ![Cones](image)

### 7.7 Construct 3-D shapes and objects using straws, sticks, clay, building blocks and other materials.

The aim of this learning outcome is for students to explore the characteristics of 3-D shapes by making them.

Useful materials include straws, paletta sticks, play dough, tooth picks, and modelling clay. A fun activity is to construct shapes using spaghetti held together by pieces of marshmallow.
### 3.3 Subtract objects, including zero objects, from a set of up to ten.

Use a ten frame and counters to show subtraction:
10 – 0 = 10

![Ten frame with subtraction](image)

There are two rules for using zero in subtraction. Zero subtracted from any number is the original number (this is the counterpart of the zero property of addition), and any number subtracted from itself equals zero.

### 3.4 Solve problems involving subtraction of up to 10 objects, using real life situations.

Ten birds sat on a wire. Three birds flew away. How many were left?

- Total number of birds sat on a wire = 10
- Number of birds flew away = 3
- Therefore, number of birds left = 10 - 3 = 7

Use a variety of materials that students can manipulate to solve, act out and model the operation needed to solve the problem.

### 3.5 Add and subtract sets of up to ten objects with and without the use of concrete objects.

Tens-frames may be used with counters to illustrate the understanding that ten is 4 and 6 or 3 and 7 as shown:

![Tens-frames with addition](image)

Addition can be done using manipulatives and provide students with the basic knowledge that they will use later on for subtraction as students will use addition as a basis for subtraction facts.

### 3.6 Combine, rearrange and separate objects to show addition and subtraction, including with the use of +, - symbols.

Combining objects to show addition:
3 + 1 = 4

![Combining objects](image)

Help students develop operation sense to connect different meanings of addition and subtraction to each other.

Teacher formulates and assigns various addition and subtraction tasks.

Demonstrations of subtraction should include physically removing objects from a group, not just crossing them out on the board.
11.1 Gather data from environment through observation, counting, sorting and grouping of items such as objects and pictures.

Sort the caps by colour, then count how many of each color are present. Grouping and sorting can be done with or without using numbers, such as separating students or objects into distinct groups, such as the colour of their t-shirts, or their hair colour. Actual objects can be used as data and objects grouped into a data display.

11.2 Organize and display data using concrete materials in tally charts and on pictorial representations.

Make a picture graph by counting the number of animals. It is important that each object in a graph represents one object, except in cases where items are used in pairs, for example shoes. One object can also represent an idea, such as a person’s preference.

The first step in interpretation is to know what it represents or what is the information given by it.
11.3 Interpret information presented in pictographs using a variety of data sets.

Look at the pictograph below and answer the following questions:

1. Which zoo has the largest number of jaguars?
2. Which two zoos have the same number of jaguars?
3. How many more jaguars does zoo 1 have than zoo 2?

Create a picture graph by first creating a key with a symbol and giving it numerical value, and then by displaying the data in repeated symbols that correspond to the numbers, including half and quarter symbol images.

They use critical and creative thinking as they construct and interpret simple data displays and give reasons for their interpretations.