Kids Computing:
A Guide For Parents & Caregivers

Created by
Patricia A. Young and Deborah Kariuki

Dear Parents and Caregivers,

This guide introduces you and your child to the exciting world of computational thinking. These activities are called "unplugged" approaches to computer science, because you do not need a computer. Unplugged activities build computer science skills and knowledge.

We have included several activities to get you started. These activities can be repeated with other household items or inexpensive materials.

Our activities focus on several computational thinking concepts for young children:

1. Social and Emotional Learning

2. Patterns

3. Problem Solving

4. Algorithms

See definitions in glossary

This book belongs to: _____

Computational Thinking is a way of thinking. It helps to break down problems, understand solutions, find patterns and apply this knowledge in the real world.

With computational thinking, children can use:

- Logic to predict and analyze patterns.
- Evaluation to assess solutions and think about how they could be made better.
- Algorithms to plan out steps and create a system to solve problems.
- Patterns to know how to solve problems by looking at already solved problems.
- Decomposition to break problems into pieces in order to understand them better.
- Abstraction to filter out unnecessary details within problems and focus on the important parts.
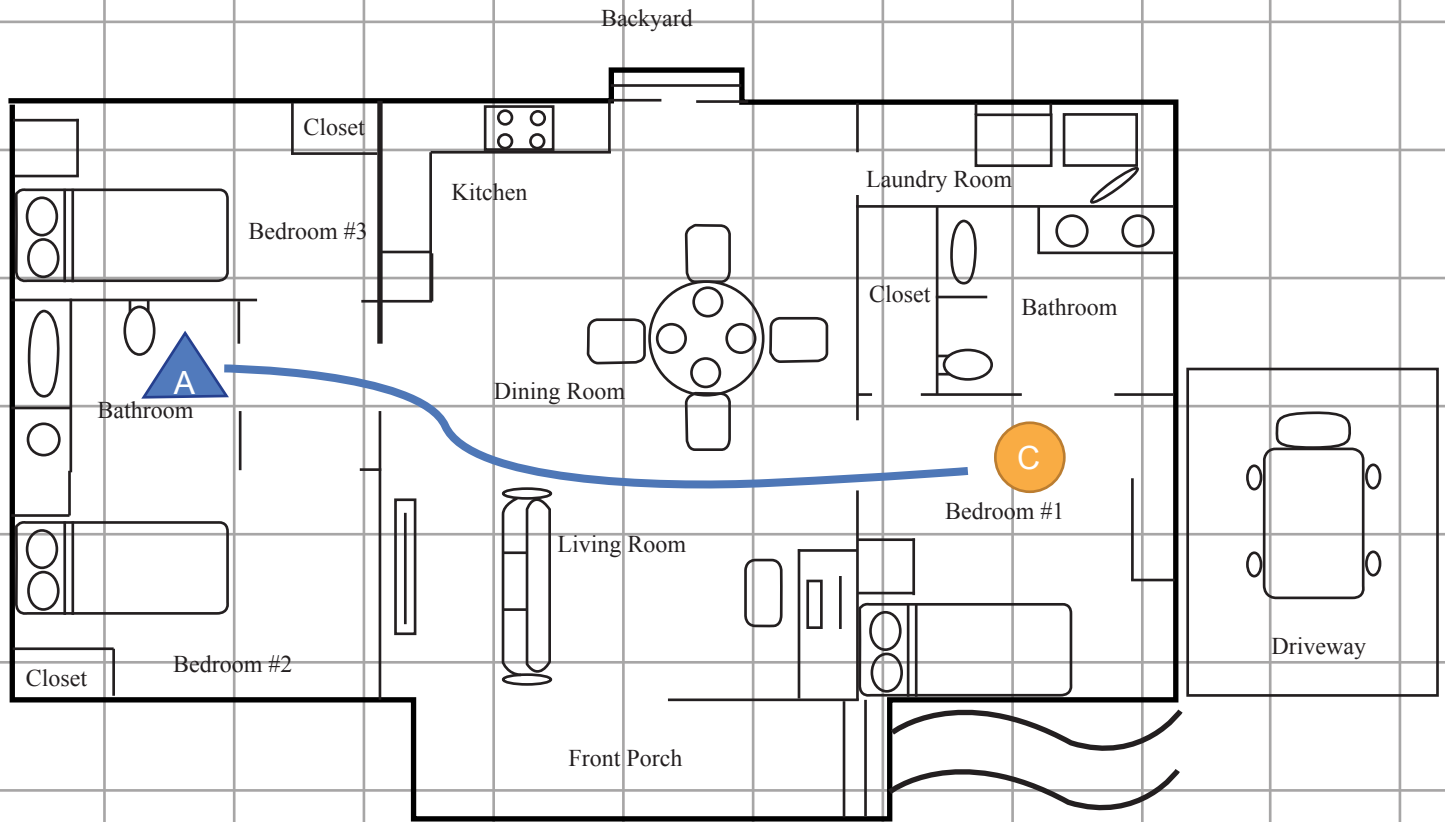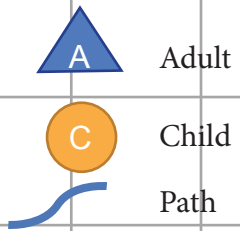
Where Is My Family

Goal: Children will identify a solution and create an algorithm to solve a problem.

Core Ideas: Algorithms and Problem Solving

Materials: Crayons or markers, paper, yarn

Activity Steps:

1. Draw a floor plan of your home or someone's home that your child knows. Use graph paper or make your own grid.

2. Choose a shape (square, circle) to represent one family member and the other shape your child.

3. Draw the family member's shape and your child's shape in different rooms on the floor plan or cut out shapes.

4. Draw the path between the family member and child. Or use yarn to build alternative paths.

5. Have your child describe in detail directions to the family member on the floor plan. Ask your child how many steps should we move on the floor plan? Or which direction should we go (up, down, left, right)? Use the grid to guide the direction discussion. For example, your child could say "go up one block, go right two blocks, then go up three blocks."

6. Draw an alternative path. Repeat #5.

Backyard

Adult

Child

Path

Closet

Kitchen

Bedroom #3

Laundry Room

Closet

Bathroom

A

Bathroom

Dining Room

C

Bedroom #1

Living Room

Driveway

Bedroom #2

Closet

Front Porch

Let's Make Bracelets

Goal: Children will use patterns to create bracelets based on their community.

Core Ideas: Patterns

Materials: Beads (large), string, camera

Activity Steps:

1. Discuss with your child the definition of a pattern. A pattern is something that repeats itself. In this picture, there are red and tan bricks. Locate the pattern where the bricks are in order of red, tan, red, tan. Example A on the next page illustrates a similar pattern.

2. Walk around your neighborhood and look for patterns.

3. Identify patterns with your child.

4. At home, let your child create a pattern using beads.

5. Let your child string the beads to make a bracelet.

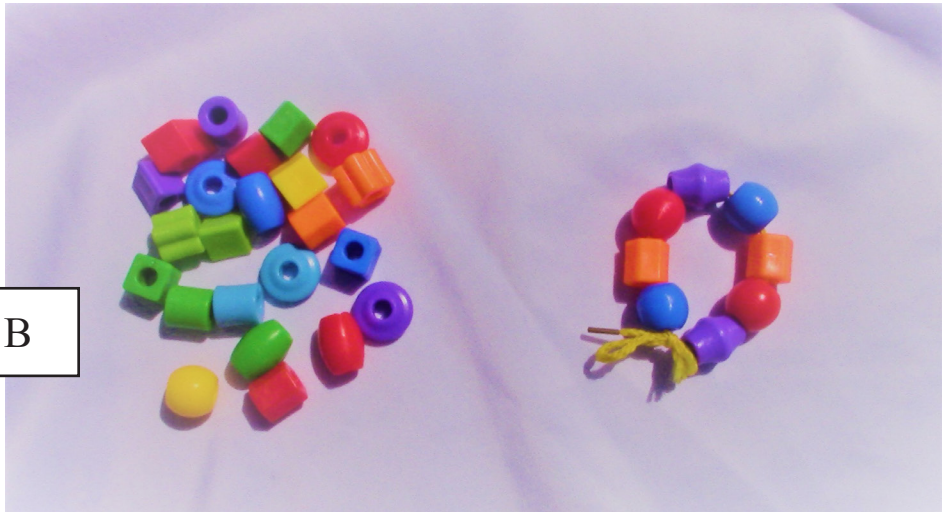6. Repeat with different beads and patterns from other cultures.

Example A

Example B

People I Know

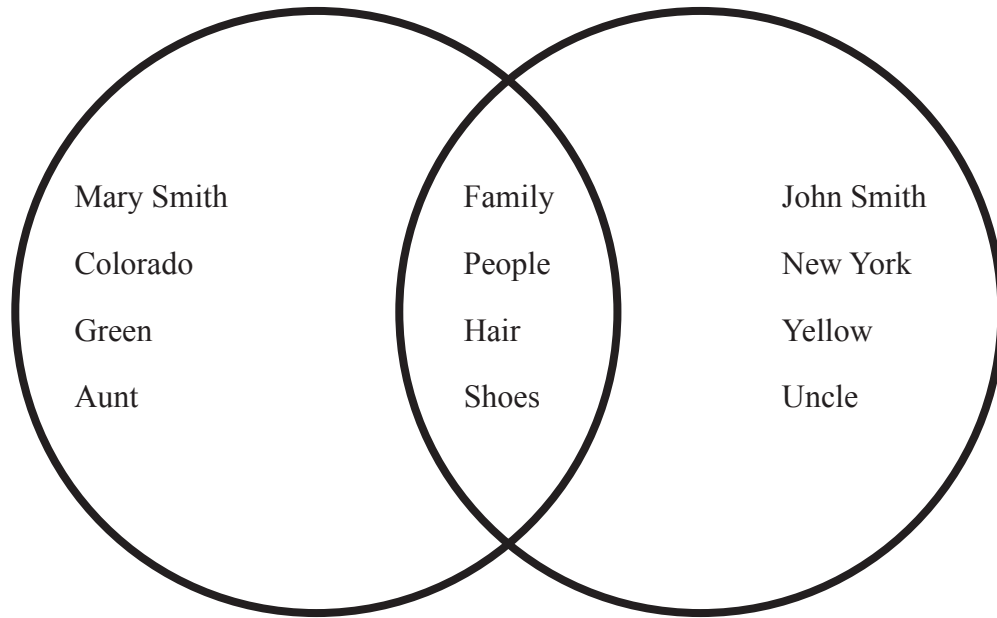**Goal:** Children will identify differences and similarities in a story.

Core Ideas: Social and emotional learning, data collection and categorization

Materials: Paper, pencil, crayon, camera

Activity Steps:

1. With your child, select a family member to interview.
2. Have your child interview the family member. The adult can write down the responses.
   Possible questions: What is your full name? Where were you born? What is your job?
   What is your favorite color?
3. Next, your child can take a picture or draw the family member they interviewed.
4. After collecting two stories have your child identify the similarities and differences in the family stories. Talk about those things that are similar. Then talk about those things that are different. Write down single words from the discussion.
5. Draw a circle. Then draw another circle to interlock. This is called a venn diagram.
   Group the similarities and then group the differences. Use single words or a short phase.
6. Repeat again with new questions, family, or friends.

Mary Smith	Family	John Smith
Colorado	People	New York
Green	Hair	Yellow
Aunt	Shoes	Uncle

Tally Fun

Goal: Children will create a tally chart to collect and analyze data.

Core Ideas: Exploring number concepts, size and quantity

Materials: Crayons or markers. Paper, marbles, skittles, jelly beans, coins or bubble gumballs. Plastic or a glass jar/bowl.

Activity Steps:

1. Fill a glass object with marbles, skittles, jelly beans, coins or bubble gumballs.
2. Have your child guess how many gumballs are in the glass. Enter that number in the total row under guess.
3. Have your child guess how many gumballs are in the glass that are different colors. For example, your child could guess: 8 red, 15 blue, 10 yellow. Record your child's guesses in the table by first writing the numerical number under the guess column.
4. Empty the glass of gumballs onto a surface.
5. Count out all the gumballs that are one color. Record the actual number in the table. Have your child record the tally marks in Column 4 and then another, until they are all counted.
6. Continue until all colors have been counted.
7. Discuss with your child how close or far they were from the actual total.
8. Repeat this activity with other fun objects.

Column 1	Column 2	Column 3	Column 4
Color	Guess	Actual	Tally of Actual Number
Red	8	9	卌 ||||
Blue	15		
Yellow	10		
Green			
Total			

Acknowledgments

The authors thank the following:

- Sherman Center for Early Learning in Urban Communities

- University of Maryland Baltimore County, Department of Education

- Jayden Rhodes, Graphic Designer, UMBC undergraduate student

- Amy Cruz, Graduate Assistant/Editor, UMBC graduate student

- Neena Paul, Computer Science Elementary Teacher

- Jennifer Smith, Computer Science Teacher

Glossary

Algorithms - are a set of steps to complete a task.

Patterns - allow children to simplify problems and ideas into organized parts and apply solutions.

Problem Solving - is the process of identifying a problem, evaluating and coming up with the best solution.

Social and Emotional Learning - is a process children go through to acquire knowledge and skills.

Children apply their knowledge, skills and attitudes to make positive relationships, goals and decisions.

Reference: K-12 Computer Science Framework. https://k12cs.org/

Materials: Please use larger materials for younger children because some items may cause choking if swallowed.