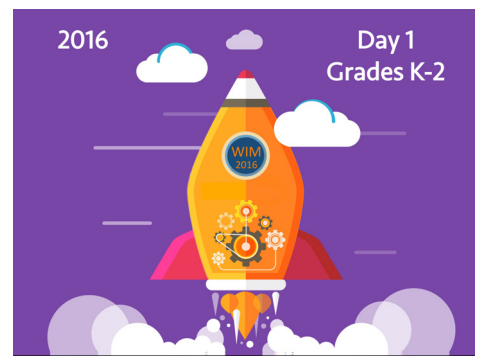


Introduction:

In this lesson students will be helped to see numbers through a dot card number talk and finger activities, both of which will help important brain connections.

Agenda for the day:

Activity	Time	Description/Prompt	Materials
Mindset Video	5 min	Play the mindset video, <i>Brains Grow and Change</i> https://www.youcubed.org/wim2-day-1/	Mindset Video day 1, <i>Brains Grow and Change</i>
Dot Card	15 min	1. Show the dot card visual to students. Put it away before they have time to count and ask them how many dots they saw and how they saw them. See this video for more detail. https://www.youcubed.org/jo-dot-card-number-talk/ 2. Draw as many examples of student representations as possible.	1 copy of the dot card visual for display, page 5
Finger Maze Activities	15 min	<ul style="list-style-type: none"> Have students place colored dot stickers on each finger nail Explore the Finger Maze 	<ul style="list-style-type: none"> Colored dot stickers (red, blue, green, purple, yellow) Finger mazes copied in color, pages 6, 7, 8
Finger Twister	10 min	<ul style="list-style-type: none"> Students work in pairs with one Finger Twister game board between them Teacher calls out player directions. For example,: "Player A put your right index finger on the blue square." "Player B put your left middle finger on the purple triangle." Continue play until players can no longer place their fingers on a colored shape. 	Color copy of Finger Twister, 1 for every pair of students, page 9
Closing	5 min	As the lesson closes remind students of the video messages they heard – that there is no such thing as a math brain or a math person and anyone can learn any level of math with hard work and effort.	

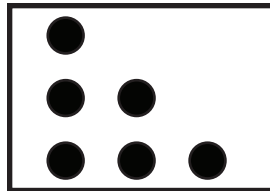


Activity: Dot Card

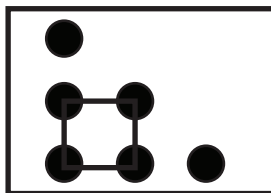
A dot card number talk is a really nice activity that people of all ages enjoy. It is a short but powerful teaching activity and it shows students:

- the creativity in math
- the visual nature of math and
- the many different ways people see math.

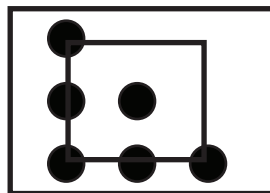
This lesson is based around this dot card:



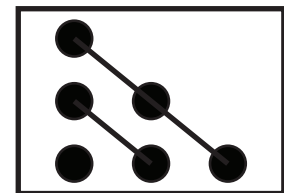
First show the dot card to students - but show it for a very short amount of time. The goal is for students to work out how many dots there are without counting. I usually hold the card or show it on a screen for a few seconds only, to stop students counting one by one. Ask students to tell you how many there are without counting one by one. This grouping of dots involves an important brain area. After they have seen the dots ask the whole class: "Does anyone want to tell me how many dots there are?" Then record the number of dots people saw on the board. Usually most students will see there are 6 dots. Then tell students the interesting part is how they see 6 dots, and ask individuals to tell you how they saw the 6. Record each way of seeing with the students name, as I do in this example from WiM 1 with a different dot card: - <https://www.youcubed.org/jo-dot-card-number-talk/> . I have also used dot cards with kindergarten students, high school students and undergraduates. When you record the different ways students see the collection of dots you can record visually, or also add numbers, For example:



$$4 + 2$$



$$9 - 3$$

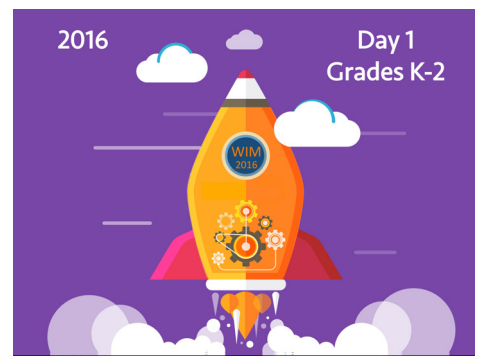


$$3 + 2 + 1$$

For more detail on teaching a dot card number talk or a regular number talk, see <https://www.youcubed.org/category/teaching-ideas/number-sense/>, Humphreys and Parker (2015), Parrish (2014).

References:

- Boaler, J. & Humphreys, C. (2005) Connecting Mathematical Ideas: Middle School Cases of Teaching & Learning. Heineman: Portsmouth.
- Humphreys, C. & Parker, R. (2015). Making Number Talks Matter: Developing Mathematical Practices and Deepening Understanding, Grades 4-10. Portland, ME: Stenhouse.
- Parish, S. (2014). Number Talks: Helping Children Build Mental Math and Computation Strategies, Grades K-5, Updated with Common Core Connections. Math Solutions.



Activity: Finger Activities

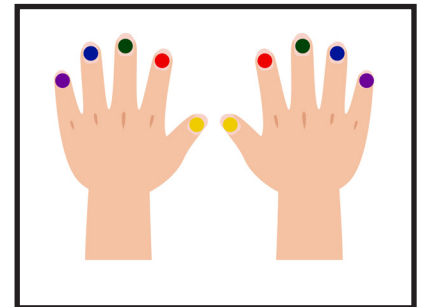
Introduction:

Research tells us that it is very important for students to develop ‘finger discrimination’ that is, for students to know their fingers really well. In this Atlantic article I share the importance of using fingers for the brain’s development of numbers, see <http://www.theatlantic.com/education/archive/2016/04/why-kids-should-use-their-fingers-in-math-class/478053/>. Evidence from both behavioral and neuroscience studies shows that when people receive training on ways to perceive and represent their own fingers, they develop better representations of their fingers, which leads to higher mathematics achievement.

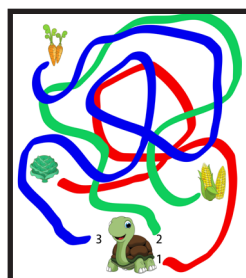
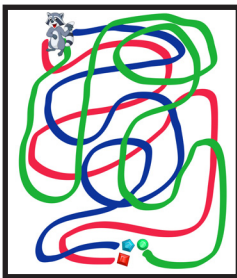
Activity: Finger Maze

Finger Maze activities help children build finger differentiation.

Have students put a colored dot sticker on each fingernail that matches the diagram. This might take some time to do. Show a diagram of the hands - projected or on poster paper in the front of the room and also have colored handouts in the middle of tables. Have students help each other as they are placing dot stickers on their fingernails. If students do not place the colored dots on the same fingers as each other they will experience the maze differently. If you plan to do both finger activities you might want to write numbers on the dot stickers before having students put them on their fingers, then they only have to put stickers on once to do both activities.



Start with the first maze. Have the child match their red index finger to the red path in the maze and slowly trace the path to the end. Each path should be traced slowly and take several seconds. Next trace the green path with the matching finger. After a child uses their dominant hand to solve all of the paths in the maze ask them to use their other hand.

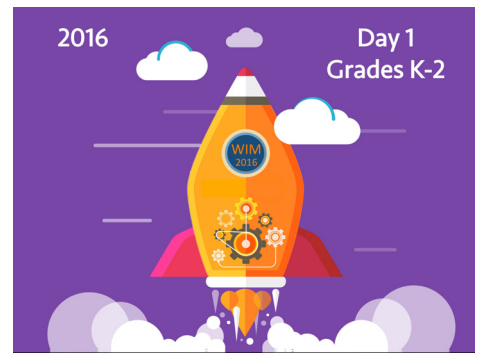


Finger Mazes, pages 6, 7, 8



This activity can be completed in pairs or individually. Make sure every child gets a chance to trace the finger mazes. When students have all had enough time to play bring them together as a class and ask them which maze they thought was the most challenging and why.

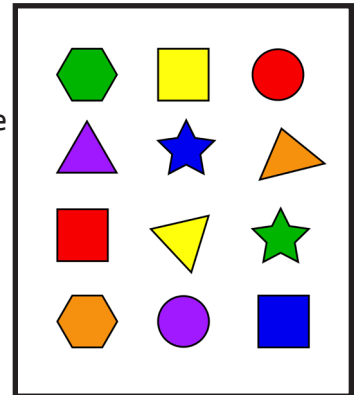
Adapted from Gracia-Bafalluy, M., & Noël, M. P. (2008). Does finger training increase young children’s numerical performance? *Cortex*, 44(4), 368-375.



Activity: Finger Twister

This activity is based on the popular game “Twister” when children have to place their arms and legs on different colored dots, which leads them to be twisted up in each other! This activity uses fingers instead of whole bodies.

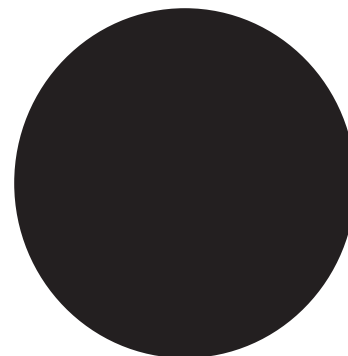
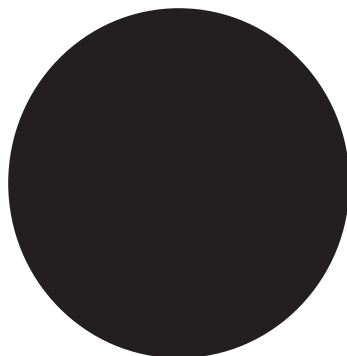
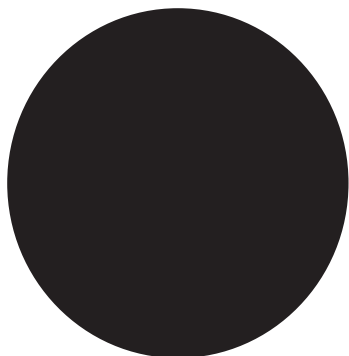
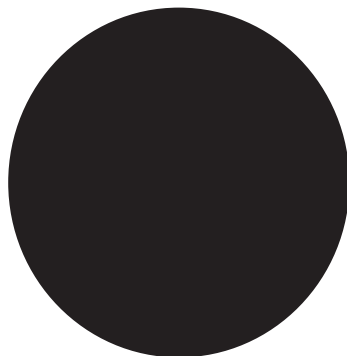
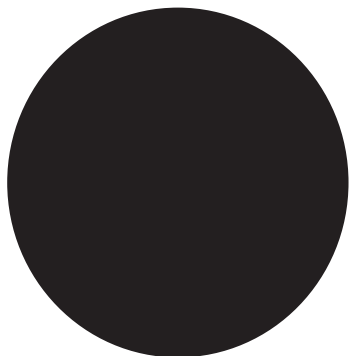
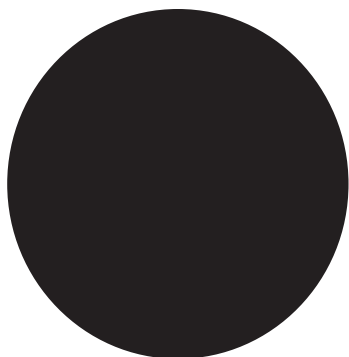
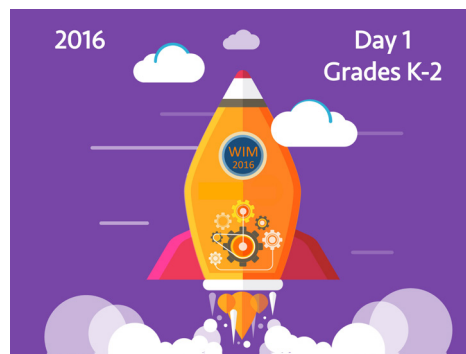
Students can work in pairs with one Finger Twister game board between them. Identify one student as A and the other as B. Ask student A to put their right pointer finger on a colored shape. For example, put your right index finger on the blue square. Ask student B to put their left middle finger on the purple triangle. Ask student A to put their right pinkie finger on the green star, etc. You can say hands off when you think they have enough fingers on the shapes. You can start the activity over at any time.

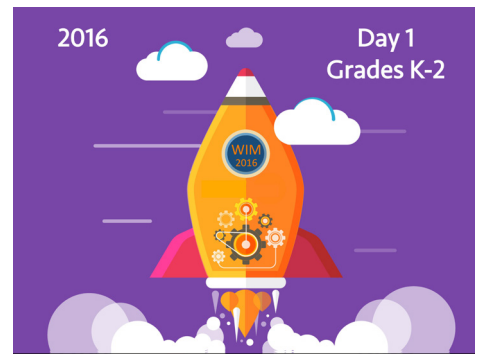


Finger Twister, page 9

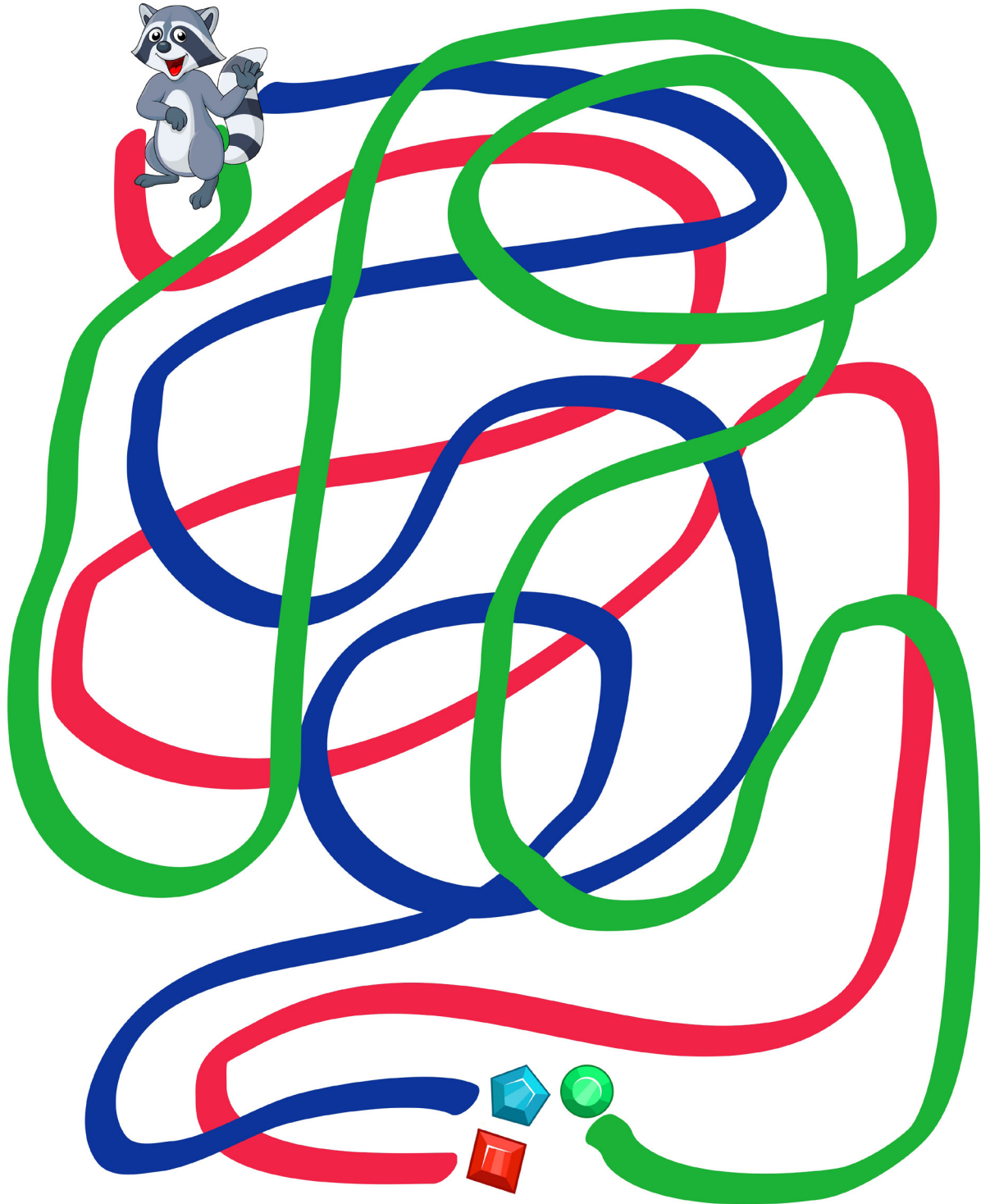
Extensions:

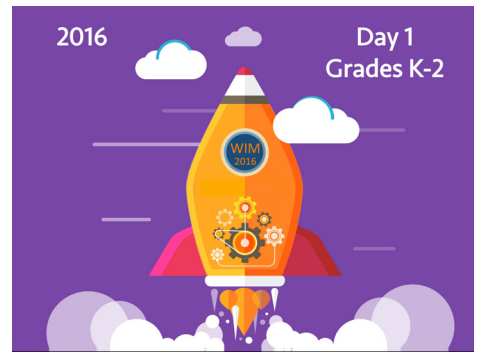
- Use different dot patterns for number talks. There are many examples available in the references listed on page 2.
- Make finger twister game boards using colored numbers or other shapes and pictures.
- Add finger discrimination practice to other activities.



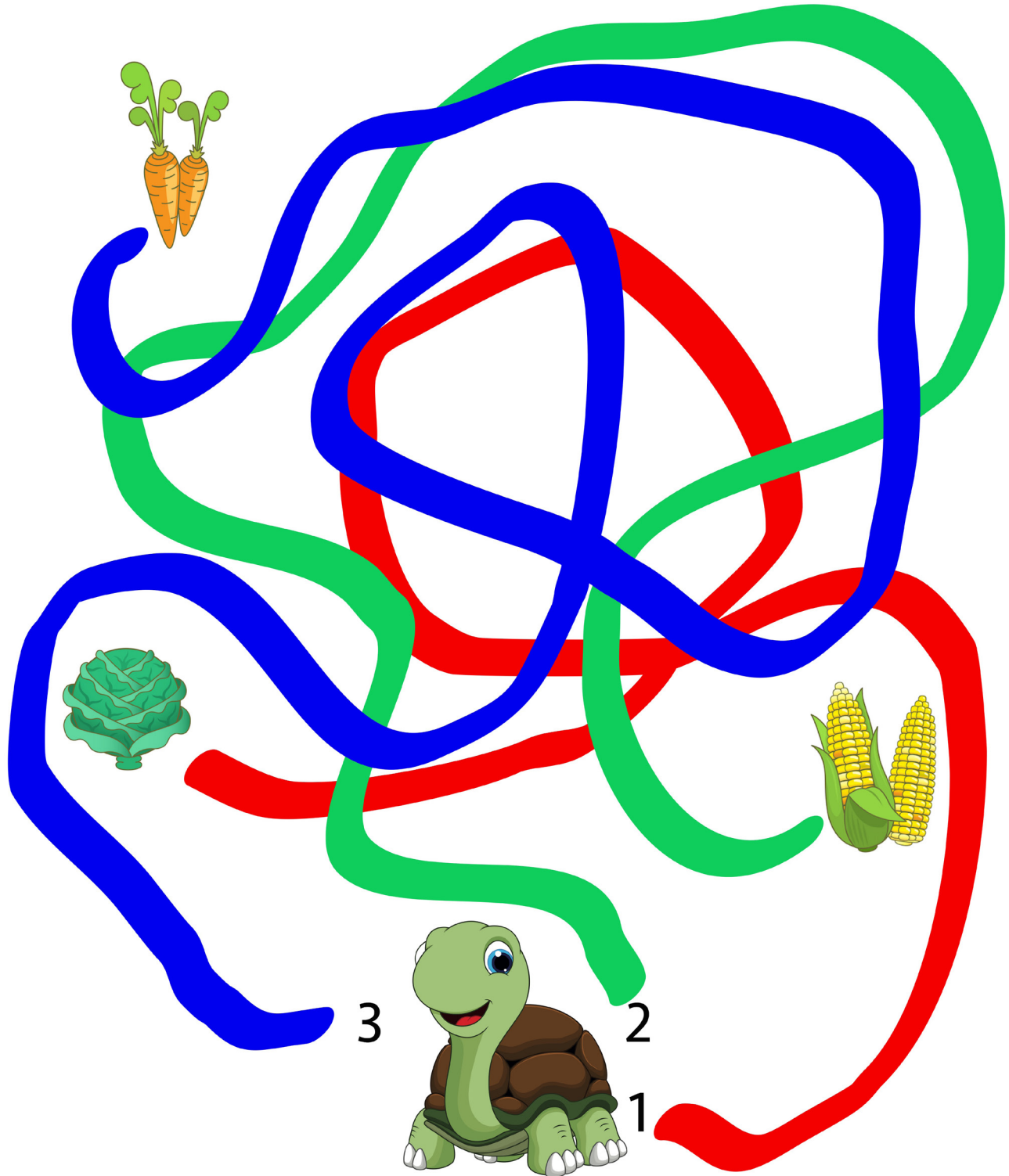


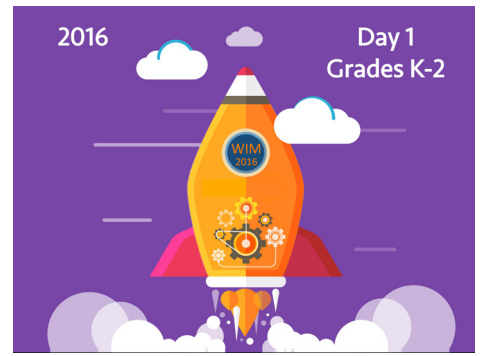
Help Jackdaw find his favorite gems!





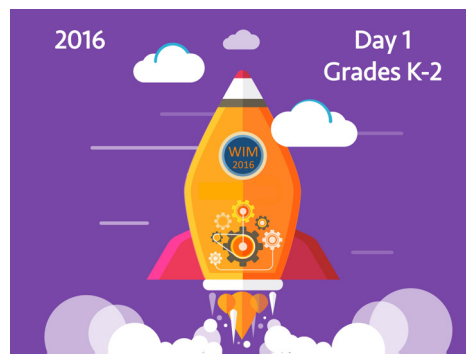
Lead Leonard to his favorite food!





Help Chezi find the cheese!





Finger Twister

