

Speak Up!
Promoting Interactions During Shared Reading Activities

A Senior Project submitted in partial fulfillment of the requirements for the
Bachelor of Science Degree in Child Development

by

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TABLE OF CONTENTS

Chapter 1: Introduction

Chapter 2: Review of Literature

Chapter 3: Methodology

Chapter 4: Findings

Chapter 5: Conclusions and Recommendations

References

Appendices

Appendix A: Sample Coding Sheet

Appendix B: Book Transcript

CHAPTER 1

INTRODUCTION

Children's literacy receives a substantial amount of attention from researchers and parents alike; it is at the heart of education in most Western societies. What can often be overlooked is the interaction that occurs during shared reading between an adult and child. The current literature finds evidence that such interactions benefit a child's expressive vocabulary, receptive vocabulary, and literacy development. Research has identified a number of variables that influence the quality, frequency, and type of interactions that occur during shared reading. Among these variables are book qualities such as genre, medium, and use of manipulative features, family characteristics such as socioeconomic status, maternal education level, and cultural beliefs, and forms of extra textual talk such as comments, questions, and feedback. While intervention programs have been developed to address such variables, it is possible that a book may be able to scaffold adult-child interactions if its construction is informed by this research.

To promote interactions between the adult and child reader, I have written and illustrated a children's book that accounts for as many of these variables as possible. I incorporated features that were shown in prior work to improve the quantity and quality of interactions, and deliberately avoided the features that were shown to be a distraction or barrier to interactions. For example, research indicates that information books and storybooks have differing abilities to promote interaction, so I have combined the two by using a narrative to pace the factual

information being given about animals at the zoo. I focused on how types of extra textual talk, such as questions and comments, can become an internal quality of the book by being woven into the storyline. In the final book, the introduction of new vocabulary, such as “tentacles” of an octopus, is accompanied by a comment using the new word in an appropriate context. This format, when used as extra textual talk, is effective at improving receptive and expressive vocabulary in children (Ard & Beverley, 2004). Questions are also posed to the children in which they are invited to offer their own explanations for a variety of animal properties. Manipulative features, such as pop-ups, have been found to be a distraction, rather than a tool for facilitating interaction (Tare, Chiong, Ganea, & DeLoache, 2010). For this reason, I did not incorporate manipulative feature into my book designed to promote interaction.

The book was created using Adobe Illustrator and was printed by a third-party company. The result was a 56 page children’s book titled “Why? Why? Why?” The book follows a group of students on a class field trip to the zoo. The zookeeper introduces the students to the animals, pointing out the unique features of each one. The students in the book offer their own theories about why each animal is the way it is, followed by the zookeeper asking the reader to participate by offering his or her own theory. The book can then physically be flipped over and read from the opposite direction. This version uses the same storyline, but incorporates the leading scientific theories about the animals instead of the students’ naïve theories. The first side of the book, version A, incorporated in-text questions and comments as the primary way to facilitate interaction. The backside of the book, version B, primarily incorporated an expository style of writing as a way to facilitate interaction.

A pilot test was completed to evaluate the effectiveness of the book’s ability to promote interactions between the adult and child readers. Four dyads participated, each reading either an

expository book or storybook, followed by both versions of the “Why? Why? Why?” book. Each dyad was video taped reading the three stories. Their interactions were coded for frequency of interactions and type of interactions. Each book was anticipated to foster interactions between the participating adult and child in different ways. Results showed that the “Why? Why? Why?” book that incorporated the students’ theories and the questions directed at the reader was most successful in engaging parents and children in interactions. It was also found that in version A, the most frequent types of interactions were adult comments about illustrations, adult asking for explanation from child, adult feedback/praise, child comments about illustrations, and child offering own explanation. Each of these interactions occurred on average, four times during each dyad’s reading. Positive correlations were found between the frequency of adult interactions and the frequency of child interactions in both versions of “Why? Why? Why?” although the correlation was stronger for version A. The two types of interactions that occurred consistently in all dyads were the adult asking for an explanation from the child and the child offering an explanation.

There are a number of variables that may have affected the outcome of the pilot tests. For example, the order in which the books were read could explain the decline in the frequency of interactions in version A to version B. The number of words and pictures in each of the books was not held constant and could help explain the differences in the number of frequencies during the reading of “Why? Why? Why?” and either the expository or storybook. In future work, pilot testing of the book should address these concerns. The outcome of such testing is expected to inform ways to improve the overall design and construction of the book. Such testing is a critical next step prior to broader distribution of this text or development of similar products.

CHAPTER 2

REVIEW OF LITERATURE

Everyday in America, 47.8% of children under the age of five are read to by their parents or other family members (Reach Out and Read National Center, 2007). Shared reading has been the focus of many studies that aim to define the potential benefits of parents reading with their children. Hargrave and Sénéchal (2000) found that children who lagged behind their peers in receptive and expressive vocabulary were able to improve their scores for expressive vocabulary by participating in shared reading with an adult. A longitudinal study of 130 preschool aged children produced similar results, revealing that shared reading both at home and in a preschool classroom helped to improve the literacy and language growth of the participating children (Hindman, Connor, Jewkes, & Morrison, 2008). Other studies corroborate these findings. Sénéchal, Pagan, Lever, and Ouellette (2008) indicated a positive correlation between children's expressive vocabulary and the frequency of shared reading activities. Given the demonstrated importance of shared reading, it is important to investigate how various factors may influence such activity, such as characteristics of books themselves and demographic characteristics of families. Further, research suggests that all forms of shared reading are not equivalent in their promotion of literacy development; a style of talk known as "extra textual talk" may be particularly effective in fostering literacy and language growth. As a result, researchers and practitioners have explored a number of avenues for facilitating shared reading that includes this discourse element.

Factors Influencing Shared Reading

The results of such studies highlight the benefits of shared reading and, consequently, raise important questions about how to engage families in effective shared reading activities. Various factors influence the frequency and quality of the interactions that occur during shared reading. Some factors are based on the inherent characteristics of the book, such as genre and medium, while other factors are external and can be socially defined, such as socioeconomic status and maternal education level of those engaged in shared reading. The following sections identify influential characteristics of books themselves that promote interaction during reading, relevant characteristics of the individuals and families involved in shared reading that influence the quality and frequency of interactions, the implications of the different types of interaction, and strategies for promoting shared reading amongst families who may need extra support.

Book Characteristics

The genre, the medium, and the use of manipulative features can have an impact on the types of interactions that occur during shared reading. Because most children's books are storybooks, this genre has received a great deal of research attention. Researchers, however, are also interested in the type and frequency of the interactions that occur during the shared reading of other genres, such as expository or alphabet books. Similarly, because most children's books are print books, this medium receives substantial research attention. Recently, however, researchers have begun to explore the implications of electronic books (e-books) on shared reading. Lastly, a small number of studies have examined how manipulative features, such as pop-ups, impact children's shared reading experiences.

Genre. Price et al. (2009) found that families in their study, comprised mainly of middle and upper class European Americans, owned an average of 156 children's books. The parents' self-reports showed book collections that contained a variety of genres: 50% storybooks, 14% rhyming books, 14% nonfiction books, 11% alphabet books, and 10% counting books. Elementary school teachers also reported a preference for storybooks; they reportedly engage children with expository texts only 25% of the time (Anderson, Anderson, Lynch, & Shapiro, 2004).

With storybooks being the preferred genre of children's books, it is necessary to examine their role in fostering interactions during shared reading. Price and her colleagues (2009) examined the interactions of 62 parent-child dyads sharing a set of four unfamiliar books, two storybooks and two expository books. All families read all four books. The researchers described storybooks as those books containing a fictional narrative, whereas expository books were defined as information or non-fiction books. The storybooks and expository texts contained roughly the same amount of text, although the complexity of the vocabulary and the number of illustrations differed. Results indicated that compared to the shared reading of storybooks, the shared reading within the expository book condition was significantly longer in duration, elicited a greater number of extra textual utterances at higher levels of cognitive demand from the adults, and offered a greater diversity of vocabulary from the adults. Extra textual utterances refer to utterances that use the book as the starting point to talk about something unrelated to the book. The researchers point out that the use of complex language, found more frequently in the text of expository books, is beneficial for child's vocabulary development. Further, parents are likely to match the level of complexity of the text during their interactions, exposing the child to additional complex vocabulary (Price et al., 2009).

Similar to the results of Price et al. (2009), Anderson and his colleagues (2004) found that parent-child dyads sharing an expository text engaged in nearly double the number of extra-textual interactions than they did when sharing narrative (storybook) text dyads. The researchers interpreted the results using Pellegrini's hypothesis that narrative books' unifying theme is adequate to maintain the child's engagement without extra interactions, whereas expository books are fragmented and need to be strung together by an adult to make it cohesive and to keep the child engaged (as cited in Anderson, 2004).

Medium. The innovations of the 21st century touch on virtually every aspect of modern life. Children's literature is not exempt from this trend. The novelty of electronic books, or e-books, captures the attention of both parents and children alike. Devices such as iPads and Kindles are providing an endless library of books at the touch of a finger. With their growing popularity, it is important to investigate whether the technology allows for the same benefits of shared reading of traditional print books. Further examination of e-books ability to scaffold without parental involvement is merited.

In an effort to address these questions, Moody et al. (2010) observed 25 parent-child dyads engaging in one of three reading activities: adult led e-book, child led e-book, or adult led traditional book. The adult led conditions involved a participating adult there to scaffold the reading experience. The child led condition allowed for the child to independently explore with the e-book. The intent was to examine the child's engagement, persistence, enthusiasm and extra textual talk in each of the conditions. Findings indicated that despite a significant difference supporting the adult led e-book condition for persistence, few other differences were apparent. For example, there was no difference in enthusiasm, story comprehension, or external references.

Thus, this study suggests that e-books do not offer more benefits than traditional print books, aside from higher levels of persistence when an adult is participating.

The involvement of an adult during e-book reading is an area of interest for a number of researchers. Previous research by Trushell, Burrell, and Maitland (2003) suggests that while e-books can provide children with an opportunity for independent read aloud practice; they can also be used as a lethargic approach to reading without parental involvement. Moody et al. (2010) explored whether there are differences in adult led versus child led e-book reading. The comparison of adult led versus child led e-book reading found no differences in child engagement, yet children were found to label more often in the adult led condition, and rated higher on scores of comprehension. Comprehension was measured by the child's ability to retell the story and answer questions about the story's events (Moody et al., 2010). Thus, although reading e-books independently may be equally engaging for children as when they read an e-book with an adult, e-books are not a substitute for parent led reading.

Findings by Wood, Pillinger, and Jackson (2010) also emphasized the importance of adult involvement in e-book reading. Wood et al. (2010) examined 80 children engaging in either shared print book reading with an adult or independent e-book reading. The researchers introduce the term "bookbinding," which they define as the way that children are "introduced to the nature of stories, reading and text," (Wood et al., 2010, p.193) through shared reading activities. The term also implies that all, or the majority, of the reading is done by the adult or, in this case, the computer. The primary intent was to determine if e-books are capable of bookbinding as effectively as adults can, similar to the Moody et al. study (2010). Wood and his colleagues (2010) hypothesized that the technology of the e-book would not allow for the same levels of scaffolding that the adult-led condition does due to children's resistance to chime in or

participate in dialogue without another person there to engage them. The results of the study revealed that children spent significantly more time engaging in bookbinding with the e-book than did the children in the print, shared reading condition. This means that children allowed the e-book to do most of the work, showing little effort to chime in or engage in dialogue. The children were relying entirely on the computer to convey the meaning of the story. Children were more likely to chime in and attempt to contribute to the reading in the adult led print condition than in the independent e-book condition (Wood et al., 2010).

However, these findings contrast with research by Fisch, Shulman, and Akerman (2002) that suggests that e-books are capable of increasing child's engagement, comprehension, vocabulary and extra textual talk. In their study, seven parent-child dyads read two interactive online e-books, in which their choices influenced the course of the story. In light of the other research that offers limited support for e-books over traditional books, it is important to note the differences between the e-books used. The term e-books is loosely defined and can include everything from a digital copy of a book to an interactive book, such as the ones used in the Fisch et al. study (2002). The literature on e-books will have difficulty keeping pace with the ever-changing technology, but it will be necessary to continue to evaluate their effectiveness to ensure that they belong in the hands of our children. While the current research highlights some potential benefits of e-books and their ability to promote independent reading, the preponderance of results reveal benefits of the parent-led conditions.

Manipulative features. In an attempt to keep young children engaged in reading, some children's books include manipulative features. Tare, Chiong, Ganea, and DeLoache (2010) identify common manipulative features in children's book, such as pop-ups, tabs, and textures. Tare et al. (2010) hypothesized that such manipulative features are actually a distraction from

learning, despite their goal of holding the child's attention. Experimenters read to 54 toddlers independently. They either read a book that had manipulative features such as pop-ups, or one that had only two-dimensional illustrations. The children who were read the book without manipulative features were able to identify new vocabulary words more often than the children who were read the manipulative book (Tare et al., 2010). A similar study by Chiong (2008) found that parent-child dyads reading a plain text, without manipulative features, were more focused on the information being presented. However, it was found that the adults used more explanation for new concepts introduced in the manipulative condition as compared to the plain text condition (Chiong, 2008). In the Tare et al. (2010) study, the extent to which the manipulative features influenced the adult-child interaction was also examined. It was found that children who were read the book with manipulative features were less likely to retain the extra textual talk the adults used. The children who were read the book without manipulative features were more likely to recall the facts the adult said (Tare et al., 2010). These findings suggest that while manipulative features may be able to enhance the amount of extra textual talk used by the adult, the children may not retain the information as well when manipulative features are present.

Family Characteristics

As demonstrated above, the characteristics of the book play a role in the type of interactions that are fostered during shared reading. However, the characteristics of the participating individuals are also relevant to the types of interactions that occur. For example, a parent questionnaire revealed that middle-income parents read more frequently to their children than did parents from the low-income families (Vandermaas-Peeler et al., 2009). Frequency of shared-reading may be a reflection of the socioeconomic status, cultural beliefs, and maternal education level of the adult reading. With the mounting literature expressing the benefits of

shared book reading, many researchers have made efforts to identify social factors that promote effective interactions, as well as those that limit such interactions.

It is impossible to study the individual without taking into account the social context within which they live (Rogoff, 2003). Socioeconomic status, cultural beliefs, and maternal education level have all been areas of interest to researchers examining the dynamics of parent-child shared reading activities. In the United States, the frequency of shared reading has been shown to vary by race and ethnicity, as well as by socioeconomic status (Reach Out and Read National Center, 2007). Research on these topics informs the development of intervention and enrichment programs to reach those who would benefit the most from such instruction. The research also illustrates a need for books themselves to be written and illustrated in such a manner to promote interactions during shared reading.

Socioeconomic status. Vandermaas-Peeler, Nelson, Bumpass, and Sassine (2009) set out to determine what, if any, differences there are between low- and middle-income families in shared reading activities. Parents from 13 low-income families and 24 middle-income families were instructed to read two books as they normally would with their children. Findings demonstrated that middle-income families engaged in almost twice as much “teaching” as did low-income families. Teaching a type of extra textual talk involved asking questions and prompting the child to make predictions about what was going to happen (Vandermaas-Peeler et al., 2009). The families also differed in the type and frequency of extra-textual talk. Middle-income families also used significantly more praising, whereas low-income families used more commands. Enjoyment and engagement were also measured. Enjoyment was measured by asking the children to select which of the five different smiley/frowning faces represented how they felt when reading, whereas engagement was measured by the amount of active participation

they showed throughout the reading. Children from both income levels indicated high levels of enjoyment, yet middle-income children were rated higher in terms of engagement than were low-income children.

Cultural beliefs. Rogoff (2003) alludes to the fact that many cultures value formal schooling as a means to success. What is overlooked is that there are many aspects of schooling that can be the main target of socialization for different cultures. For example, some cultures may value mathematics, while others value literacy. Wu and Honig (2010) were interested to see if differing cultural values influenced parents' interactions during shared reading. They used the Parent Reading Belief Inventory (PRBI) to examine the beliefs that 731 upper-to-middle class Taiwanese mothers had about reading with their children. The PRBI measures beliefs about teaching efficacy, verbal participation, and reading instruction. They then contrasted the results with American mothers' beliefs. Findings from the PRBI revealed a clear distinction in regard to the goal of shared reading. While many American mothers value the relationship and bond that forms during shared reading, Taiwanese mothers place more value on moral and practical lessons that children are exposed to during shared reading (Wu & Honig, 2010). The different cultural perspectives may allow for different preferences for the type of extra textual talk, such as using questioning instead of commenting, or frequency of praise.

The results of a separate questionnaire revealed that the overall frequency of storybook reading was less prevalent in the Taiwanese households than in the American households, with 25% of the Taiwanese mothers reporting that they rarely or never read with their child as part of a bedtime routine. The results of Price et al. (2009) survey found that 74% of the American parents surveyed reported reading to their child daily or more than once a day. Further, a positive relationship between scores on the PRBI and the number of books owned by the family was

revealed. While Price et al. (2009) found that Americans own an average of 156 children's books, the questionnaire found that only 41% of the Taiwanese participants owned more than 60 children's books, while 19% indicated that they owned between one and 20 books. This effect however, was mediated by a positive relationship between maternal education level and the number of children's books owned, as explained below (Wu & Honig, 2010).

Maternal education level. Maternal education, although often used as an indicator of socioeconomic status, has been a variable of interest when it comes to shared reading. While studying cultural differences, Wu and Honig (2010) stumbled across a number of results that were more closely linked to maternal education level than to culture. With regard to maternal education level, Wu and Honig (2010) found that highly educated mothers were more likely to read themselves and serve as a model for appropriate reading behavior.

Korat's (2009) study of 88 Israeli mothers of varying education levels found correlations between maternal education level and type of extra textual talk. Korat hypothesized that mothers with more years of education would utilize the concept of distancing more than less educated mothers. Distancing refers to going beyond the text or illustrations from the book. Distancing is comparable to the term "teaching talk" used in previously mentioned studies. Korat (2009) also hypothesized that the use of distancing would be related to higher levels of literacy for the child. Children's literacy levels were based on word recognition, print concept, receptive vocabulary, emergent word writing, and emergent book reading (Korat, 2009). Korat (2009) found significantly higher levels of teaching talk by the highly educated mothers, similar to the Vandermaas-Peeler et al. (2009) study on socioeconomic status that found nearly double the amount of teaching talk by the high income parents. Although cause and effect cannot be

determined from the study, there was a strong positive correlation between maternal talk level, reading style and the children's literacy levels (Korat, 2009).

Forms and Outcomes of Extra Textual Talk

Extra textual talk is the conversation that occurs during shared reading that is not part of the text of the book (Price et al., 2009). Extra textual talk can come in the form of questions, comments, and feedback. The current research clearly identifies variables such as socioeconomic status and maternal education that can have an impact on the preferred forms of extra textual talk. The following research examines the impact each different type of feedback has on the participating child. The age and developmental level of the child plays a role. For non-readers, talk often involves questions and comments about what is happening in the book and ways that the book relates to things in real life (Ard & Beverly, 2004). For beginning readers, parents develop different feedback styles to use when their child is struggling with a word or concept. The type of feedback, such as correcting the child or encouraging them to sound the word out, can have significant impacts on what the child gains from the experience (Davis, Evans, Reynolds, 2010).

Questions and Comments

Ard and Beverly (2004) examined the expressive and receptive vocabulary for nonsense words after shared book reading between an adult and a preschooler. The adults were instructed to either make comments about the nonsense words, ask questions, or just read the book as it was written. The researchers expected adult questions to lead to more production (expressive vocabulary) and identification (receptive vocabulary) of the nonsense words. Results showed that children who were asked questions or heard comments had similar scores on the receptive vocabulary task. However, adult comments were related to higher scores on the expressive

vocabulary task than were questions. This unexpected finding led the researchers to propose that in the process of learning new words, children need to hear the word used in context before they can use it themselves in response to a question. It is not surprising then that children who were read the story as it was written, with no extra textual talk, had the lowest scores on both the receptive and expressive vocabulary tasks (Ard & Beverly, 2004).

Feedback

Alphabet books are often used as an introduction to reading and letter awareness. Reading such materials provides an opportunity for children to practice their skills and for parents to give feedback in ways that help their child develop a better understanding of letters and sounds. A previous study by Justice and Ezelle (2002, as cited in Davis, Evans, Reynolds, 2010) found that parents who had been trained to give children feedback in the form of directing the child to the text had children with greater print awareness and print recognition than children whose parents received no training.

Davis, Evans, and Reynolds (2010) examined 52 parent-child dyads as they read alphabet books in order to determine the effectiveness of different types of feedback in helping children learn. The researchers identified six different types of feedback that were offered when a child made a mistake or was confused: 1) the parents encouraged them to try again, 2) the parent directed the child to look at the printed text, 3) the parent offered a letter or sound detail of the troubling word, 4) the parent gave context to the word, 5) the parent supplied the word, or 6) the parent ignored the mistake. The researchers then compared the frequency of each type of feedback with the child's knowledge of different literacy skills. The most common form of feedback involved emphasizing a letter's sound, followed by providing a contextual clue for the word. These frequencies are found at similar rates when parent-child dyads read storybooks

(Davis, Evans, Reynolds, 2010). Parents who emphasized letter sounds had children who knew more letter names than children of parents who supplied the word. It was found that only 4% of mistakes were ignored. Supplying the word was the second least used method. Both of these forms of feedback were found to be negatively associated with children's knowledge of letter sounds and letter names. While encouraging the child to look at the text and try again is positively associated with letter name knowledge, it was the third least used method of feedback.

Promoting Interactions During Shared Reading

This research establishes a need for parental education of strategies that elicit parent-child interactions during shared reading activities. One method of providing this is through intervention and enrichment programs that promote the use of a highly interactive shared reading style deemed dialogic reading (Price et al., 2009). Dialogic reading is a style of reading in which both the parent and child are expected to play an active role in the process of reading the story. Such interventions have been shown to have significant and lasting effects on children's literacy and vocabulary (Huebner & Payne, 2010). Another means of promoting parent-child interactions during shared reading is to design a book that takes into account the different factors that have been shown to encourage interaction. Each of these approaches may provide an opportunity for scaffolding to occur.

Interventions

Research has clearly identified multiple factors that influence the interactions that occur during shared reading activities, as well as the effectiveness of the different types of interactions in promoting literacy and language development. One strategy is to develop intervention and enrichment programs that can use this research to identify who would most benefit from their services, as well as to identify what types of interactions the program should encourage. The

focus of many intervention programs is the use of dialogic reading, which refers to encouraging the child to take an active role through the use of open-ended prompts, questions, and distancing (Huebner & Payne, 2010). A study by Whitehurst, Epstein, Angell, Payne, Crone and Fischel (1994) was done to assess children's gains in language and literacy after their parents completed instruction to promote dialogic reading. The Whitehurst et al. (1994) study found intervention programs targeted primarily at low-education parents, a demographic that typically uses little dialogic reading (Korat, 2009), were successful in promoting educational gains for children.

Huebner and Payne (2010) proposed that while the results of these studies are optimistic, there needs to be research on whether these behaviors are enduring. Huubner and Payne (2010) observed the behaviors of parents who had participated in an intervention program two years earlier, and compared them with the behaviors of parents who never received any instruction. They found that parents who had participated in the intervention program used 90% more dialogic reading behaviors than parents who did not participate in the intervention. The use of dialogic reading was positively associated with children's expressive and receptive vocabulary. This finding mirrors the results found by Ard and Beverly (2004), although their research suggests a greater benefit of comments rather than questions to expand children's expressive and receptive vocabulary. The results provide the researchers with confidence that participation in a program as short as four to six week can have both short and long term gains (Huebner & Payne, 2010).

Book Structure

An alternative way to enhance dialogic reading without requiring explicit training is to write and illustrate books that naturally encourage the type of interactions that are often seen in dialogic reading. Providing a structure that promotes interaction between parent and child during

shared reading could serve as a model when reading other books. Using the current research, a series of books written to foster interactions might be more accessible to a wider audience than an intervention or enrichment program might be. Based on the research, an ideal book would combine the features from each study that were shown to foster interactions.

While it might be easy to assume that an expository book would be the best selection over a storybook, it is important to address the factors of the expository book that separate it from the storybook. Expository books were successful in fostering interactions in the Price et al. (2009) study due to ability to break up the narrative and introduce more complex vocabulary. It might be possible to use a narrative style that still provides points to allow for extra textual talk. In addition, complex vocabulary can be weaved into the storyline of both narrative and expository books. The research on e-books is still not completely clear about the ideal book medium. While there were favorable results for both print books and e-books (Moody et al., 2010, Trushell et al., 2003, Wood, et al., 2010), the only way to guarantee that a non-reader will have the story read to them by an adult is by having a book in print, that is incapable of “reading itself.” Manipulative features should not be included in a book meant to foster interactions (Tare et al., 2010), as they have been found to be more of a distraction than an asset. Prompts to promote extra textual talk can be integrated into the text of the book. Ard and Beverly (2004) found that comments about new vocabulary words help children’s expressive vocabulary. Thus, introducing a new vocabulary word, and then using it in context prior to including it in a question, may be a technique that provides the reader with the confidence to discuss the new vocabulary words.

The social factors that research has found to have an impact on the frequency and type of interactions during shared reading are difficult to address in the design of a children’s book. An

indirect way of accounting for these factors is by designing a book that follows the same guidelines as the intervention programs designed for such a population. Guidelines for promoting dialogic reading in intervention studies include asking “what” questions, asking attribute questions, repeating the child, labeling, prompts to say more, connecting to experiences, praise, open-ended questions, and expansions (Price et al., 2009).

In sum, the goal of this senior project was to create an ideal book that incorporates these guidelines whenever possible. In addition to creating such a book, the project included an exploratory analysis of the effectiveness with which the book promotes dialogic reading among parent-child pairs from varying backgrounds.

CHAPTER 3

METHODOLOGY

Book Construction

The book created for this project is titled “Why? Why? Why?” I created it using Adobe Illustrator CS4. The characters were composed of overlapping shapes, stretched and twisted to create the desired effect. I then exported the illustrations as JPEGs and printed them. The first draft of the book was read by a parent-child dyad to address any compositional issues. I made corrections based on this trial run. The second draft of the book was imported to Aperture to be printed by a third-party company.

The idea for the book came from a personal curiosity about certain animal features. After determining a number of animals with unique features, I created preliminary illustrations. I brought the illustrations to a group of six children and asked them about the unique features. The children ranged from three to eleven years in age. The children’s answers were creative and insightful. All of the children’s explanations in the books are actual answers given to me from the children in my informal focus group.

The book was constructed to be read in two directions. The first side of the book has the children’s imaginative explanations for why the animals are the way they are. This side of the book primarily utilizes in-text questions and comments to promote interactions. From the other direction, the book has Zoey the zookeeper’s scientific explanations for why the animals are the

way they are. This side of the book primarily utilizes concepts from expository books, such as providing factual statements. The motivation for having two separate, but parallel, stories is to encourage the reader to come up with their own explanation. If the reader comes up with a theory, but is then told on the next page the real answer, the reader will not be as inclined to offer up another theory for the following animals. At the same time, it is important to avoid presenting the fictional children's theories as fact. Separation of the two stories encourages imagination without inadvertently endorsing erroneous explanations. The two separate stories also served as a point of comparison to determine if questions and comments were more effective at facilitating interactions, or if following an expository format was more effective.

Pilot Testing

The primary goal of this book was to promote interaction between the adult and child during the shared reading activity. In order to assess the extent to which the book encourages interaction, a pilot test involving 4 adult-child dyads was used. The participating children ranged in age from 4 years old to 5 years old. This was a sample of convenience, utilizing the Cal Poly Preschool Lab children and their "special buddies" (undergraduate students) or parents. Two dyads read the storybook, "Cool Dog, School Dog" by Deborah Heiligman, followed by both versions of my book, "Why? Why? Why?" The two other dyads read the expository book, "The Zoo Book: A Child's Word of Animals," by Robert Allen, followed by "Why? Why? Why?" in both versions. It was anticipated that both versions of "Why? Why? Why?" would promote more adult-child interaction than either the storybook or the expository book. The readings were recorded on video and coded. The type and frequency of interactions were coded using the following measures (see Appendix A for coding sheet):

Adult measures: questions about illustrations, questions about vocabulary, general questions, distancing questions, comments about illustrations, comments about vocabulary, general comments, distancing comments, endorsing text explanations, offering own explanation, asking child for explanation, answering questions, offering feedback/praise, asking for elaboration, and prompting reading participation.

Child measures: questions about illustrations, questions about vocabulary, general questions, distancing questions, comments about illustrations, comments about vocabulary, general comments, distancing comments, endorsing text explanations, offering own explanation, answering questions, imitating animal, and reading participation.

CHAPTER 4

PROJECT DESCRIPTION AND FINDINGS

Book Construction

The completed book is 56 pages in length. The book is an 8.5x11 hardcover with a book jacket. The story follows three students on a field trip to the zoo. Zoey the Zookeeper guides Leeanne, Devin, and Sydney through the zoo. Zoey welcomes the students to the zoo and presents them with a map to preview the animals they will be seeing that day. The students in the book will meet Gabriella the giraffe, Olivia the octopus, and Frank the flamingo. Each of these animals has a unique feature that distinguishes them from other animals. Gabriella's neck is over six feet long, Olivia has eight tentacles, and Frank stands on one foot. In version A, Zoey presents each animal to the students, pointing out the unique feature. She asks the students why they think each animal is the way it is. Leeanne suggests that Gabriella's neck is so long because zebras would crowd the watering hole and Gabriella could never get any water. Her neck had to grow extra long so she could reach over the Zebras to get to the water. Zoey responds, "I had never thought of that before, Leeanne. Why do *you* think Gabriella's neck is so long?" This last statement is directed at the reader, prompting them to provide their own explanation for Gabriella's long neck. The storyline continues to follow this same pattern for Olivia and Frank. The last page of version A says, "Isn't it fun to use your imagination to come up with hypotheses

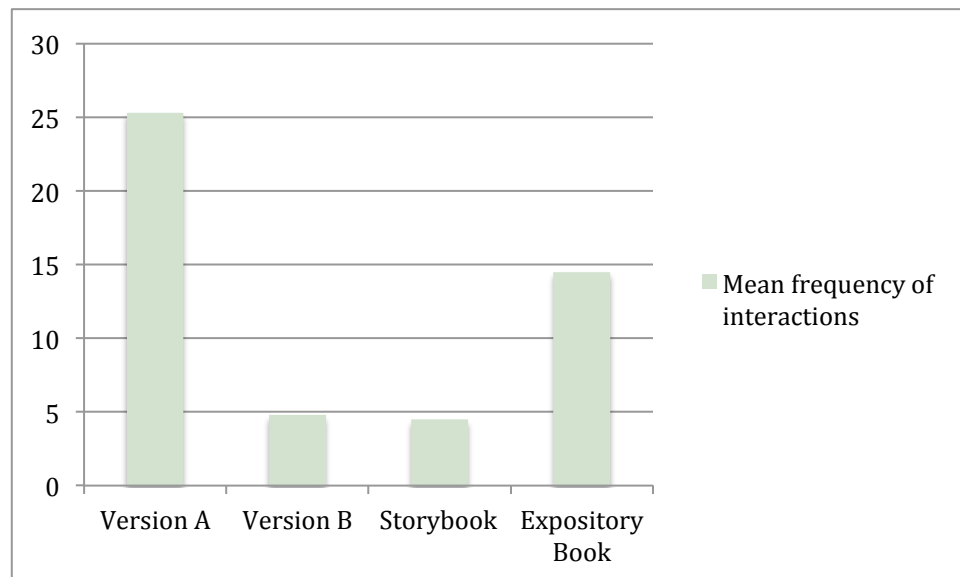
about why animals are the way they are? Flip the book over to hear Zoey’s scientific explanation of why these animals are the way they are.”

Version B physically flips over and reads in the opposite direction. The book goes through the same animals, using the same storyline, just explaining the animals’ unique features with leading scientific theories in place of the students’ naïve theories. The last page of this version says, “Isn’t it fun to hear from real scientists about why animals are the way they are/ They are learning new things about animals everyday. Flip the book over to hear the students from Mr. Garcia’s class explanations about why animals are the way they are.” For a complete transcript of the book, see Appendix B. A PDF of the entire book is available digitally through Cal Poly’s Robert E. Kennedy Library.

Pilot Testing

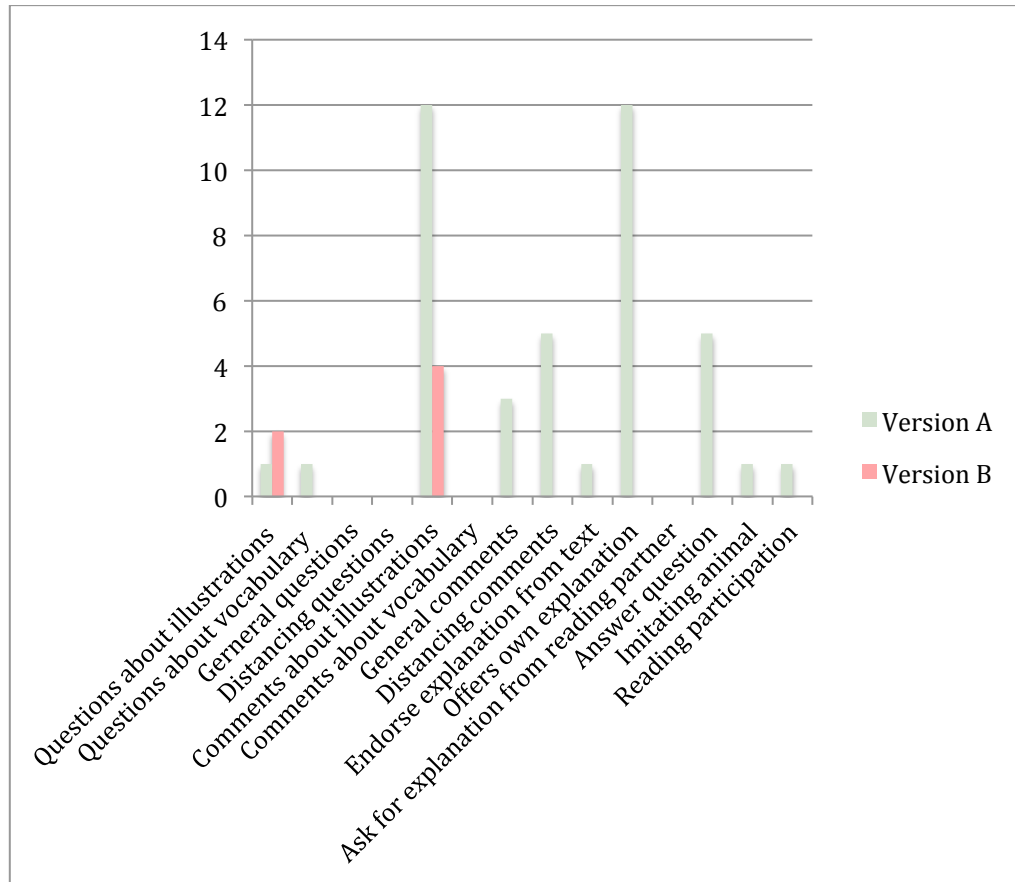
With a small sample size ($n=4$ adult-child dyads), the following results are not statistically significant and should only be viewed as descriptive findings that illustrate these dyads book reading strategies. The results of the pilot test revealed that “Why? Why? Why?” version A facilitated the most interaction between the adult-child dyads, with a mean frequency of 25.3 interactions throughout the course of the reading. This was followed by the expository book “The Zoo Book: A Child’s World of Animals” with a mean frequency of 14.5 interactions. Version B of “Why? Why? Why?” facilitated a mean frequency of 4.8 interactions, while “Cool Dog, School Dog” averaged 4.5 interactions during the course of reading. The following graph illustrates the mean frequency of interactions that occurred during the reading of each of the four books (version A and version B of “Why? Why? Why?” are considered to be separate books for our comparison).

Graph 1: Mean Frequency of Interactions for Each Book

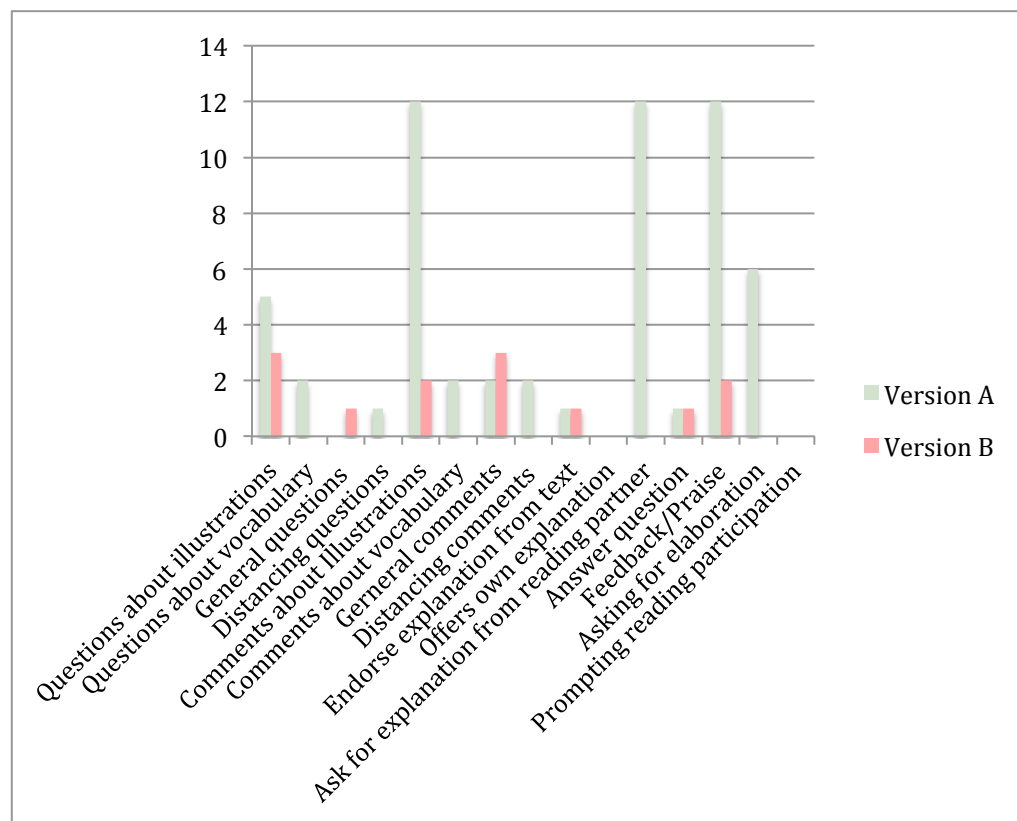


In version A, the most frequent types of interactions were adult comments about illustrations, adult asking for explanation from child, adult feedback/praise, child comments about illustrations, and child offering own explanation. Each of these interactions occurred, on average, four times during each dyad's reading. In version B, the most frequent type of interaction was child comments about illustrations. This type of interaction occurred, on average, one time during each dyad's reading. The following two graphs illustrate the combined frequency of interactions that occurred in all four dyads in the pilot test.

Graph 2: Frequency of Child Interactions During Readings of Version A and Version B



Graph 3: Frequency of Adult Interactions During Readings of Version A and Version B



The interactions were both initiated by the adults and children. While causation cannot be determined, there does appear to be a positive relationship between the frequency of adult interactions and the frequency of child interactions. In version A, the correlation coefficient (r) is .95, suggesting a strong positive correlation. In version B, $r=.61$ suggesting a weaker, yet still positive correlation. Again, these results are not statistically significant due to a small sample size, however the correlations might represent a trend that more adult interactions correlates with more child interactions, particularly in version A.

Two types of interactions consistently occurred in each dyad's reading of version A. Adult asking for explanation from the child about the animals' unique characteristics occurred at least once in each dyad, as many as five times in one dyad. The child offered at least two

explanations in each dyad, as many as six explanations in one dyad. The frequency of these two types of interactions combined make up 23.8% of the total number of interactions during the reading of version A.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

The results of the pilot test highlighted areas of strength and weakness in the book design and construction. It was encouraging to find version A of “Why? Why? Why?” had the highest overall number of interactions compared to the other three books. The results for version B were unexpected; the frequency of interactions was anticipated to be at similar levels for both version A and version B. One explanation for this finding is that the difference in overall interactions when reading versions A and B was due to book qualities. The major difference between version A and version B of “Why? Why? Why?” was the incorporation of questions, with version A primarily asking for the reader to provide a theory or explanation about an animal’s unique feature. The incorporation of such questions seemed to facilitate interaction for both the adult readers who maintained high levels of interaction during the reading activities and adults who primarily stuck to the text and showed minimal levels of interaction. This can be interpreted to mean that for an adult who would otherwise not interact with the child during a shared reading activity, the in-text questions encouraged them to move away from the text and engage in conversation with the child. It also showed that for adults who were already interacting, and had often already asked the question themselves, the in-text questions allowed for the adult to ask the child to restate or elaborate on their theory.

As noted above, the interactions that stemmed from those questions in the text accounted for 23.8% of the total number of interactions. However, this alone does not explain the

lopsidedness of the frequency of interactions that occurred in the two versions. Another explanation may be that the order in which the books were read had an effect on the frequency of interactions. Since there is a lot of overlap between the two versions, what might have captured the child's attention in version A was no longer a new concept when it was read in version B. If version B were read first, it is possible that some of the interactions that were previously coded as part of version A would be reassigned to version B. While the book was technically designed to be read in either direction, the most practical way for it to be read is to start with version A. The logic behind version A being read first is that the reader might be less intimidated to offer their own explanation when the children in the book are giving their theories. If the question, "Why do *you* think Gabriella's neck is so long?" is posed after the scientific theories presented in version B, the reader might have already accepted the scientific theories and be unwilling to offer their own theory. For that reason, I instructed the dyads to read version A first. Had version B been read first, I would anticipate the frequency of comments about illustrations and general comments to be higher during version B and lower in version A. I would also anticipate the frequency of asking for an explanation from reading partner and offering own explanation would decline in version A when read after version B. This prediction should be explored in future testing.

It is also important to note that the reading of "Why? Why? Why?" always followed either the expository or storybook reading. Version B followed, on average, roughly nine minutes of reading. It might have been too long to expect 4 and 5 year olds to maintain high levels of interaction. With more dyads, it would have been possible to rearrange the order the books were read in to avoid an order effect. It might also have been advantageous to have the

dyads read the two books at different times as to not expect the child to maintain a high frequency of interactions for such an extended period of time.

Another variable that may have affected the results was an inconsistency in the number of words read. The storybook had 183 words and is 29 pages. The dyads that read the expository book were instructed to pick five animals to read about, with each animal containing one picture and one page of text. One of the expository dyads picked three animals, giving them 274 words and six pages. The other expository dyad picked four animals, giving them 297 words and eight pages. Version A of my book contains 448 words and is 30 pages, while version B contains 404 words and is 24 pages. To better understand what helps foster interactions, it would have been necessary to have both an expository and storybook similar in length, number of words, and number of illustrations/pictures. Given the length of “Why? Why? Why?”, it would have been impractical with this within-subjects pilot testing to match the length of the other books to this book. However, it is intriguing to anticipate what might have changed had there been more consistency between the three books. Initially, it would seem logical to assume that the longer the book, the more opportunities there are for interaction. If the storybook had been twice as long, there would have twice as many opportunities for interaction. However, that assumption does not consider the practicality of the adult, who might recognize there are a lot of pages to get through, speeding up their reading to ensure the child does not lose interest. It seems possible that a short book, with limited text, might encourage the adult to become more interactive as a way to supplement the book. Whereas a longer book, that requires more time, may encourage the adult to stick to the text with hopes of just getting to the end of it. In another printing of “Why? Why? Why” it would be interesting to see if combining more illustration and text onto fewer pages

would acquire fewer, more, or the same number of interactions than the current version with 56 pages.

In retrospect, there are a number of specific things I would have changed about the way the pilot testing was done and how the book was constructed. To really understand the influence my book had on the readers' interactions, I would have been more formal in my methods of assessment. As noted above, I would have strategically determined the order in which the books were read, including both the order of my book compared to the other story or expository book, as well as the order that participants encountered version A compared to version B of my book. This would have required a larger sample size to be able to interpret the results. In addition, it would have been better to have the dyads read each book at a different time to ensure that they would not lose attention toward the end of the second book. I would have also spent more time ensuring the amount of text in the expository and storybooks were roughly equal to that of my book. This would have allowed for a better comparison.

The goal of the pilot test was to use quantitative data to assess whether my book was successful in promoting interactions. However, what seemed more beneficial for me was to observe the quality of the shared reading activity. Watching and re-watching the videos of the four dyads provided me with some insight as to how to improve my book. One of the first things I noticed was that the pages I added to transition from one animal to the next were too repetitive. Given the relative success of the scripted questions, I would have adjusted those pages to read, "Who will we meet today?" instead of "Today we will meet..." I would also change the text on the following page to read "Let's use the map to help us find Gabriella," instead of "Let's stop by and see Gabriella now." These minor changes could have potentially allowed for 12 more interactions, given that those two pages are in each version three times. I felt there were missed

opportunities for the adult to encourage the child to participate on these pages; the child could have identified the animals, attempted reading the words, and practiced reading a simple map. It seemed that the repetitiveness of these pages, as they currently are, only encouraged the adult to flip quickly through them without an attempt at interaction.

Similarly, it seemed that when the book was flipped to the second version, the first few pages were rushed through because they had already seen them in the other version. To address this, I would have changed the first page that shows Mr. Garcia's class heading to the zoo on a field trip to be Zoey anxiously awaiting the arrival of Mr. Garcia's class to the zoo. Perhaps this change would encourage the adult to slow down to fully absorb the new content and consider this new perspective, instead of skimming over the pages, trying to quickly get to new content. In another attempt to slow the reader down, I would change the information and illustration in the circular picture windows to differentiate the two versions.

In sum, despite the limitations of the text itself and the pilot testing procedures, I found that it is possible to design a book that is capable of encouraging interactions between the adult and child reader. Observation of the dyads reading of "Why? Why? Why?" has informed me on ways to further improve the book by incorporating more of the elements that were successful in promoting interactions, such as the in-text questions. With research that suggests interactions during shared reading can increase the child's expressive vocabulary, receptive vocabulary, and literacy development, it becomes evident that promoting interactions, whether through intervention programs or book design, warrants further development.

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APPENDIX A SAMPLE CODING SHEET

	Expository	Why A	Why B
Adult			
Questions			
Questions about illustrations (ex. What kind of bird is that?)		xxx	
Questions about vocabulary (ex. Do you know what an excursion is?)		x	
General questions (ex. Isn't that what you said?)			
Distancing questions (ex. Do you remember your field trip to the zoo?)	xx		
Comments			
Comments about illustrations (ex. Wow, her neck is really long!)	xx	xxxxxxx	x
Comments about vocabulary (ex. An excursion is like an adventure.)		x	
General comments	x	xx	xxx
Distancing comments (ex. That bus looks like the one that takes you to school.)		xx	
Explanations			
Endorse explanation from text (ex. So that's why flamingos stand on one foot.)			x
Offers own explanation (ex. I wonder if octopus have 8 tentacles because...)			
Ask for explanation from reading partner (ex. Why do you think that is?)		xxxxx	
Other			
Answer question			
Feedback/Praise (ex. That sounds like a great reason.)		xxxxxxx	xx
Asking for elaboration	x	xx	
Prompting reading participation (ex. What animal are we going to see next?)			
Adult Total	6	31	7
Child			
Questions			
Questions about illustrations (ex. Why is that octopus eating popcorn?)		x	
Questions about vocabulary (ex. What is a hypothesis?)			
General questions			
Distancing questions (ex. Can we go to the zoo and see the flamingos?)			
Comments			
Comments about illustrations (ex. Those alligators might eat Frank.)		xxxxxxx	xx
Comments about vocabulary (ex. Octopus don't have arms, they have tentacles.)			
General comments (about book content)	xxx	xxx	
Distancing comments (ex. I've seen a giraffe at the Zoo before.)	xxx	xx	
Explanations			
Endorse explanation from text (ex. So that's why flamingos stand on one foot.)			
Offers own explanation (ex. I wonder if octopus have 8 tentacles because...)		xxxxxx	
Ask for explanation from reading partner (ex. Why do you think that is?)			
Other			
Answer question (ex. answer to a distancing question)	xx	xxxx	
Imitating animal	x	x	
Reading participation			
Child Total	8	24	2
Combined Total:	14	55	9
64			

APPENDIX B
BOOK TRANSCRIPT

Version A

Why? Why? Why?

Why our pals at the Zoo are the way they are?

Mr. Garcia's class is going on an excursion. They are on their way to the Zoo to learn about animals.

Welcome to the Zoo. I'm Zoey the zookeeper. I'm going to show you all around. All of our animals here at the zoo are unique. No two animals are exactly alike.

Today we will meet...Gabriella the giraffe, Olivia the octopus, Frank the flamingo. Let's stop by and see Gabriella first.

Gabriella is our tallest giraffe here at the zoo. Her neck is over 6 feet long. Gabriella likes to eat leaves from the Acacia tree. Gabriella grabs the Acacia leaves with her sticky tongue. Do any of you have an idea about why Gabriella's neck is so long? Leeanne thinks and raises her hand...

I bet the zebras would crowd the watering hole....and poor Gabriella could never reach the water. Her neck must have grown extra long so she could reach the watering hole.

I had never thought of that before, Leeanne! Why do YOU think Gabriella's neck is so long?

Today we will meet...Gabriella the giraffe, Olivia the octopus, Frank the flamingo. Let's stop by and see Olivia now.

This is Olivia the octopus. Olivia has 8 arms. We call them tentacles. Olivia's tentacles are lined with suction cups to grab things. Do any of you have an idea about why Olivia has 8 tentacles? Sydney has an idea?

I bet Olivia loves food...so much that she dreams about it all day long. She needs all 8 tentacles to carry her food so she will never be hungry.

I had never thought of that before, Sydney! Why do YOU think Olivia has 8 tentacles?

Today we will meet...Gabriella the giraffe, Olivia the octopus, Frank the flamingo. Let's stop by and see Frank now.

Meet Frank the flamingo. Frank usually only stands on one foot. He loves to eat crustaceans. Shrimp are a type of crustacean. Do any of you have an idea about why Frank stands on one foot? Devin thinks of a reason...

I bet there are tons of alligators in the water with Frank...so Frank is scared to put both of his feet in the water. He tip-toes around so he doesn't disturb the alligators!

I had never thought of that before, Devin! Why do YOU think Frank stands on one foot?

Isn't it fun to use your imagination to come up with hypotheses about why animals are the way they are? Hypothesis: a tentative theory about the natural world: a concept that is not yet verified but that, if true, would explain certain facts or phenomena. Flip the book over to hear Zoey's explanation of why these animals are the way they are.

Version B

Why? Why? Why?

Why our pals at the Zoo are the way they are?

Mr. Garcia's class is going on an excursion. They are on their way to the Zoo to learn about animals.

Welcome to the Zoo. I'm Zoey the zookeeper. I'm going to show you all around. All of our animals here at the zoo are unique. No two animals are exactly alike.

Today we will meet...Gabriella the giraffe, Olivia the octopus, Frank the flamingo. Let's stop by and see Gabriella first.

Gabriella is our tallest giraffe here at the zoo. Her neck is over 6 feet long. Gabriella likes to eat leaves from the Acacia tree. Gabriella grabs the Acacia leaves with her sticky tongue. Scientists still aren't entirely sure why giraffe necks grow so long. They have a few theories...

Some scientists believe giraffe necks became so long so they could reach the leaves of the Acacia tree...but other scientists think their extra long necks grew so they would be able to fight each other!

Today we will meet...Gabriella the giraffe, Olivia the octopus, Frank the flamingo. Let's stop by and see Olivia now.

This is Olivia the octopus. Olivia has 8 arms. We call them tentacles. Olivia's tentacles are lined with suction cups to grab things. Scientists can't explain why an octopus has 8 tentacles instead of 12 or 4, but they do know what the tentacles are used for.

Scientists believe the front two tentacles are used as arms. An octopus can use its “arms” to pry open clams! The remaining six tentacles are more like legs. An octopus uses its “legs” to propel itself forward.

Today we will meet...Gabriella the giraffe, Olivia the octopus, Frank the flamingo. Let's stop by and see Frank now.

Meet Frank the flamingo. Frank usually only stands on one foot. He loves to eat crustaceans. Shrimp are a type of crustacean. Scientists also aren't sure why flamingos like Frank prefer to stand on 1 foot. There are a few theories...

Some scientists believe that flamingos stand on one foot because the water can make them too cold. Frank's body temperature drops when both feet are kept in the water. While other scientists think standing on 1 foot allows them to quickly take off flying!

Isn't it fun to hear from real scientists? They are always learning new things about animals. Flip the book over to hear Mr. Garcia's student's explanations of why these animals are the way they are!

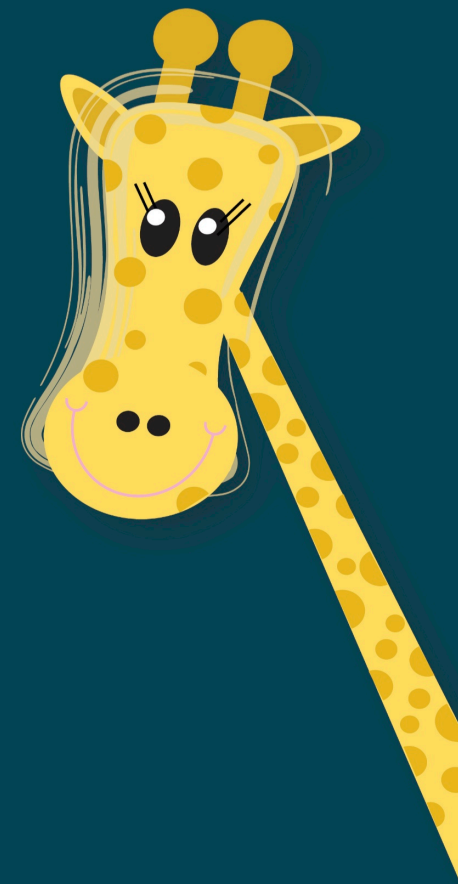
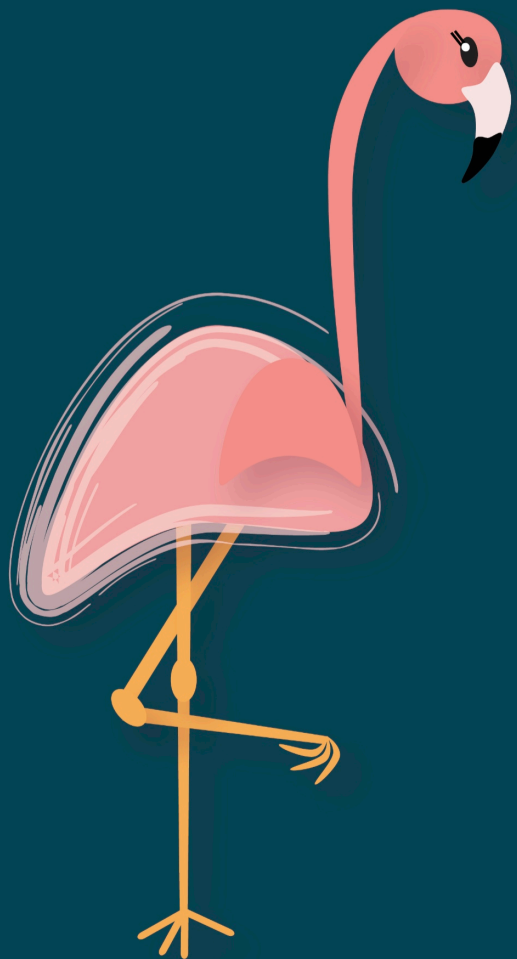
Kids' Version



WHY?

WHY?

WHY?



**Why our pals at the Zoo are
the way they are!**

Written and Illustrated by

Jennifer Singleton



Kids' Version



WHY?

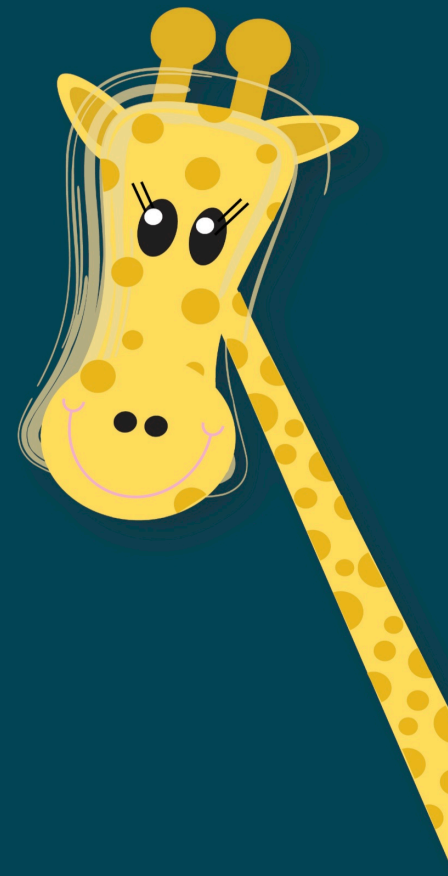
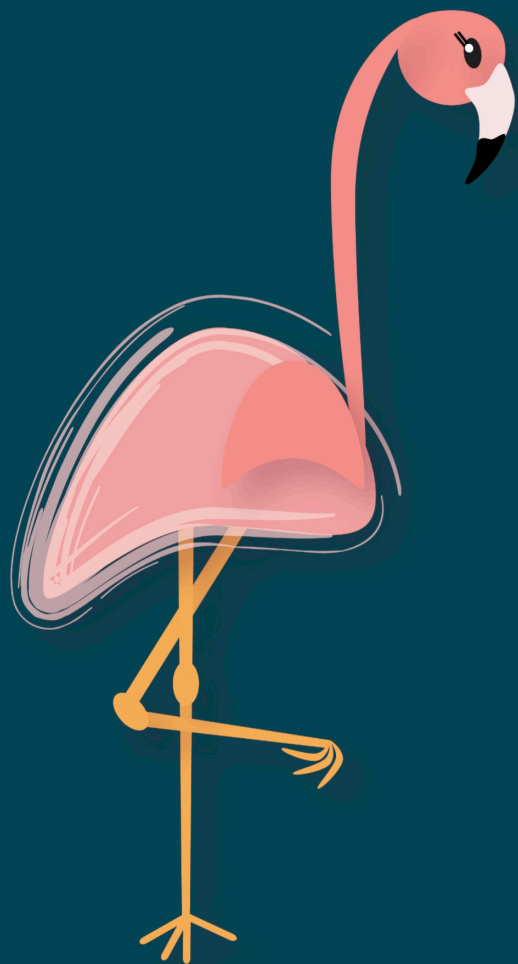
WHY?

WHY?

**Why our pals at the Zoo are
the way they are!**

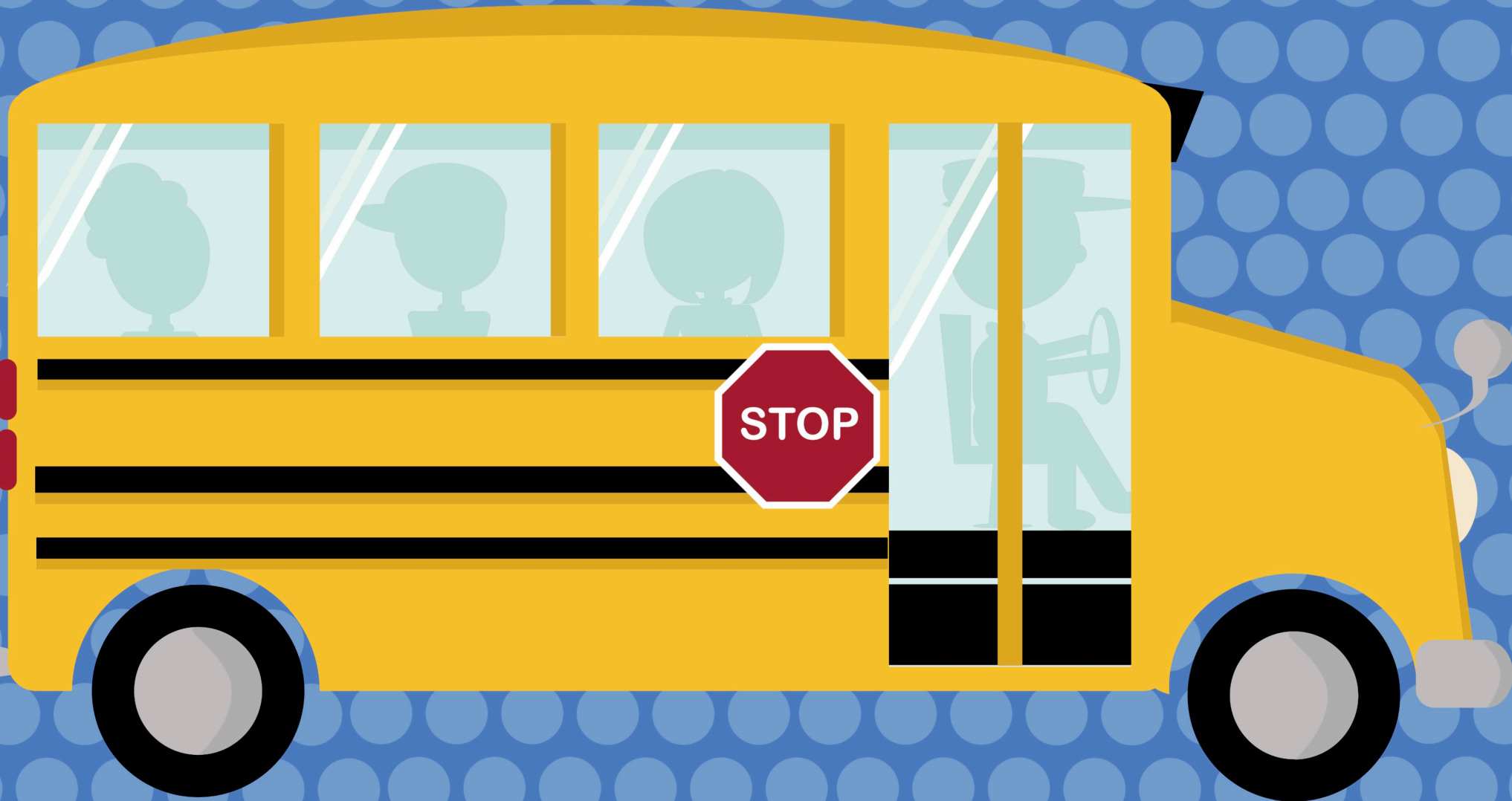
Written and Illustrated by

Jennifer Singleton



Mr. Garcia's class is going on an excursion!
They are on their way to the
ZOO to learn about animals.

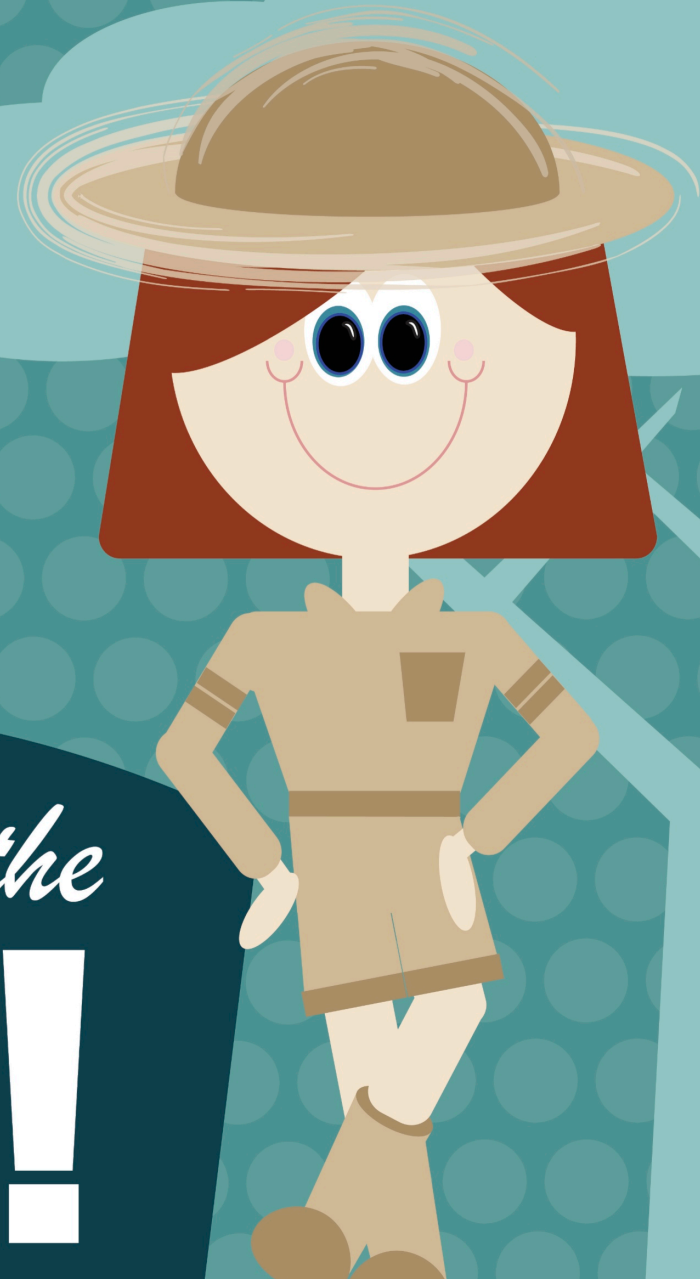




**Welcome to the Zoo. I'm Zoey,
the zookeeper.**

**I'm going to
show you all
around!**

Welcome to the
Zoo!



**All of our animals here
at the zoo are **Unique**.
No two animals
are exactly alike.**



Today we will meet...



Gabriella
the giraffe



Olivia
the octopus



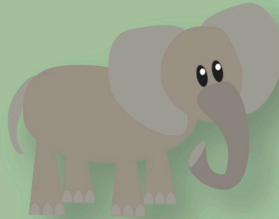
Frank
the flamingo

Let's stop by and see **Gabriella** first.

Zebra



Elephant



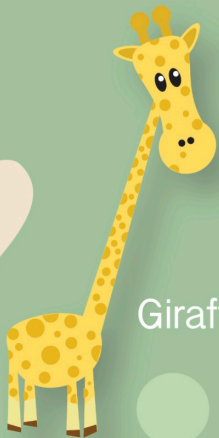
Octopus



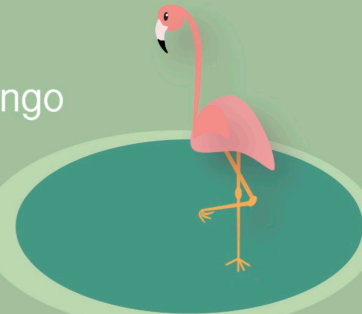
Hippopotamus



Giraffe



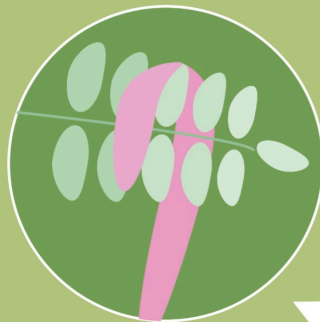
Flamingo




Gabriella is our tallest giraffe here at the zoo.
Her neck is over **6** feet long.



Gabriella likes to eat leaves
from the **Acacia** tree.

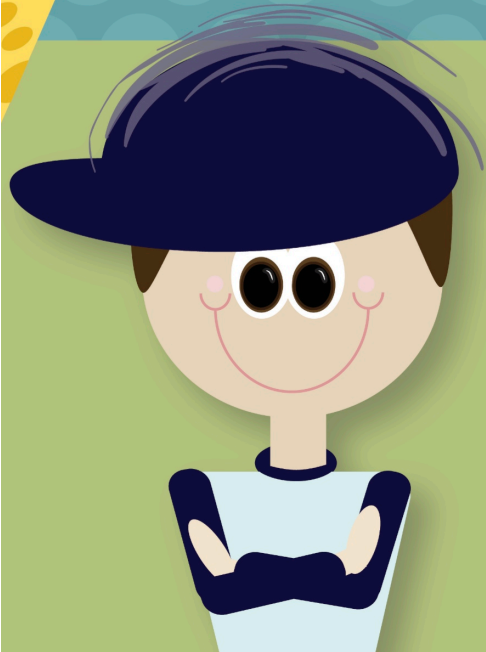


Gabriella grabs the Acacia
leaves with her sticky tongue

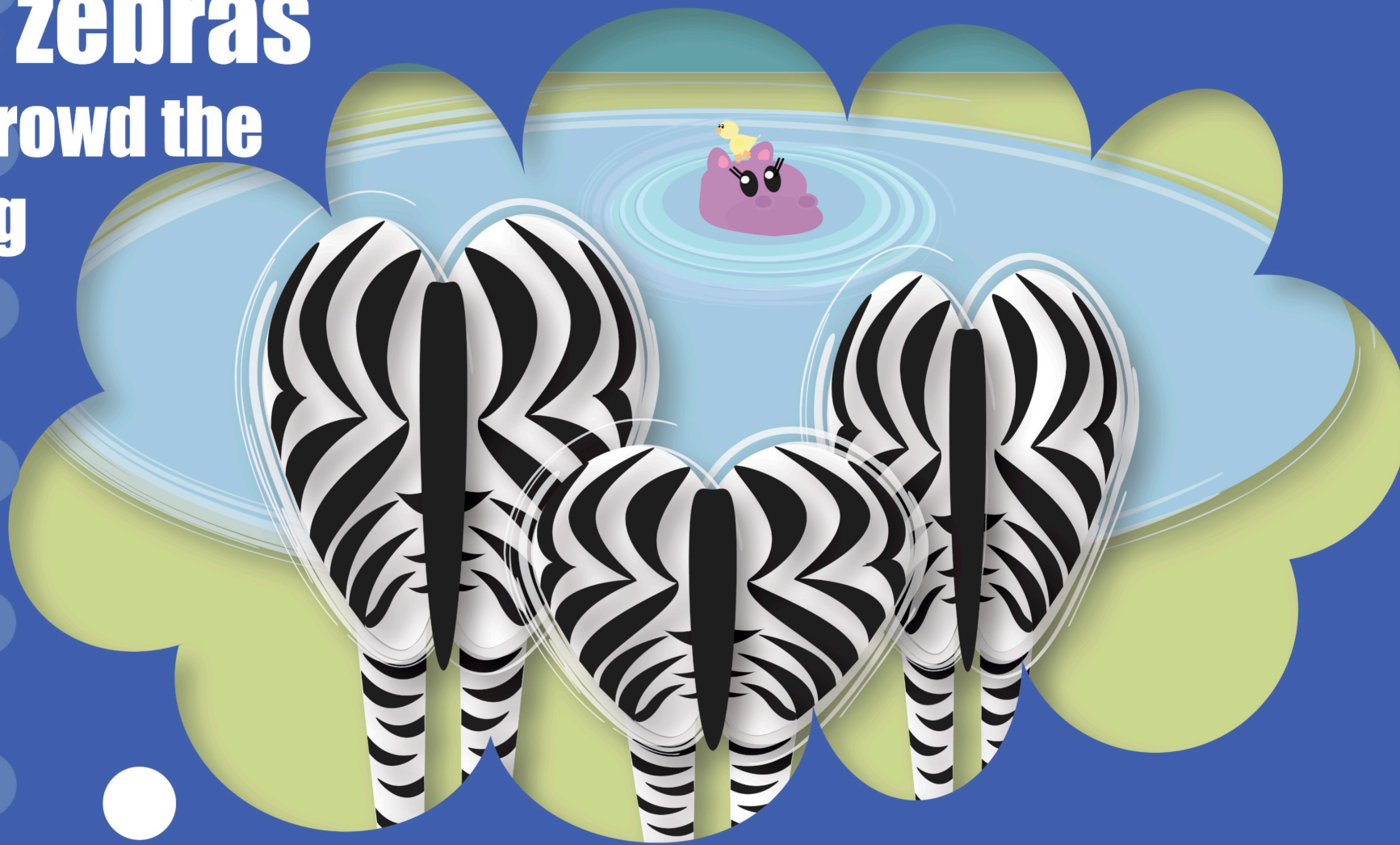


Do any of you have
an idea about
why Gabriella's neck
is so **long**?

Leanne thinks and
raises her hand...



**I bet the zebras
would crowd the
watering
hole...**



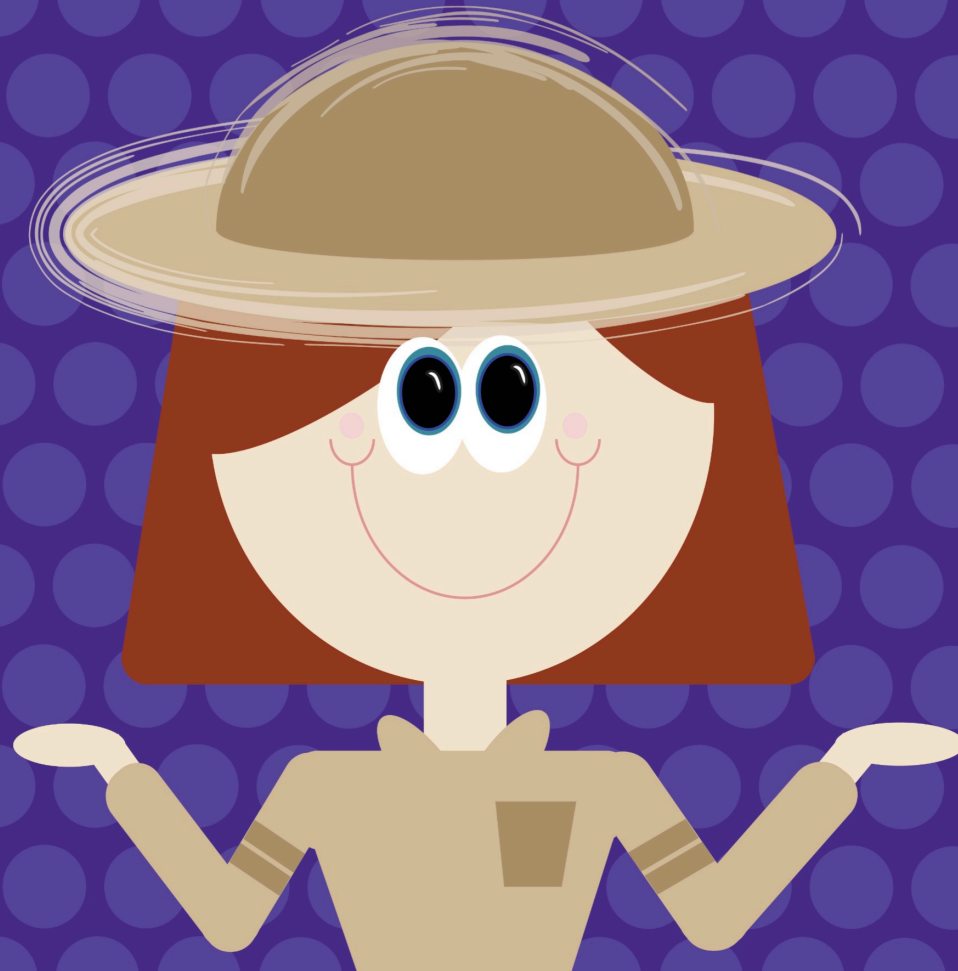
**...and poor Gabriella could
never reach the water!**





**Her neck must have grown
extra long so she could reach
the watering hole.**

**I had never thought of
that before, Leeanne!**



**Why do YOU
think Gabriella's
neck is so long?**



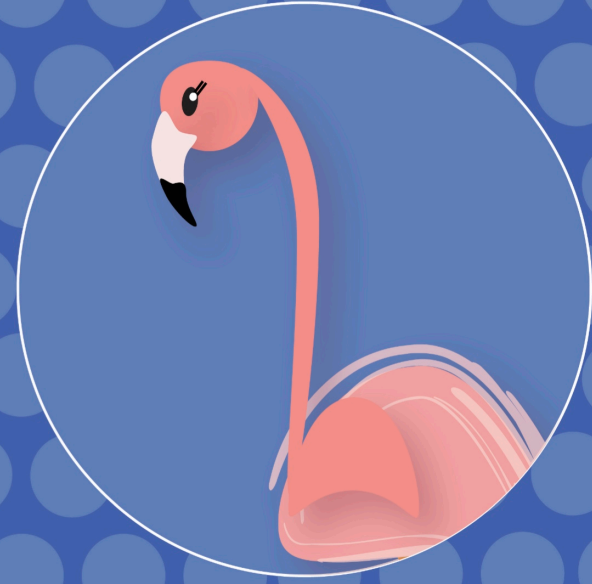
Today we will meet...



Gabriella
the giraffe



Olivia
the octopus



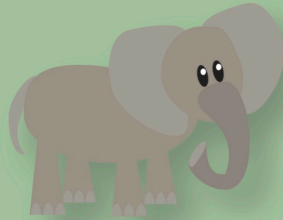
Frank
the flamingo

Let's stop by and see **Olivia** now.

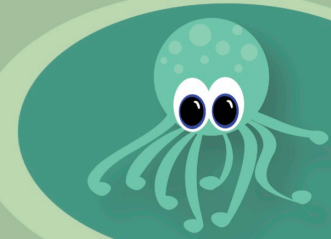
Zebra



Elephant



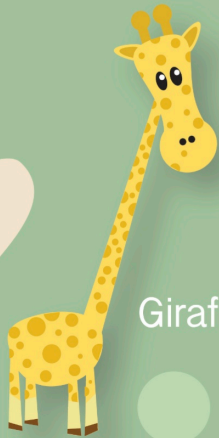
Octopus



Hippopotamus



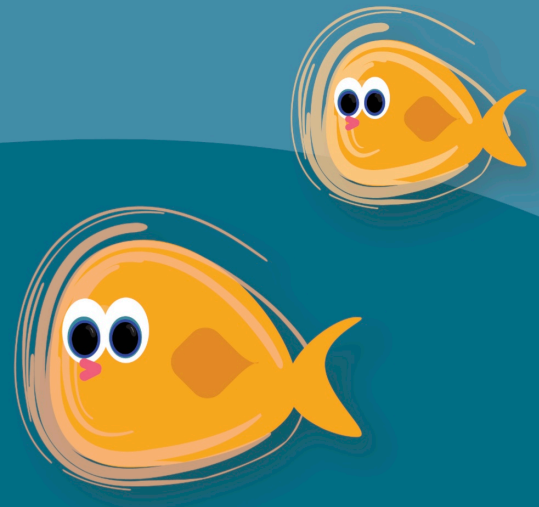
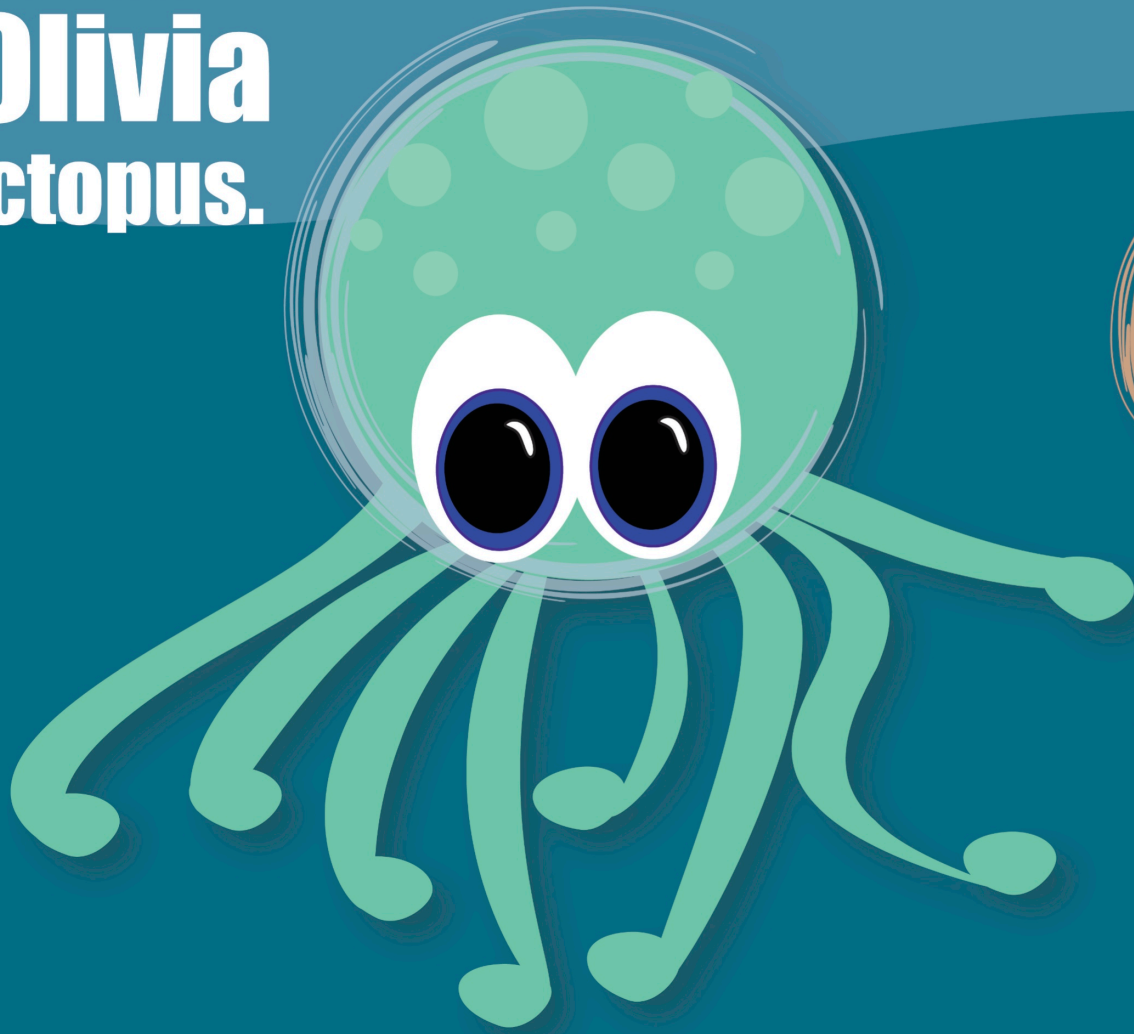
Giraffe



Flamingo



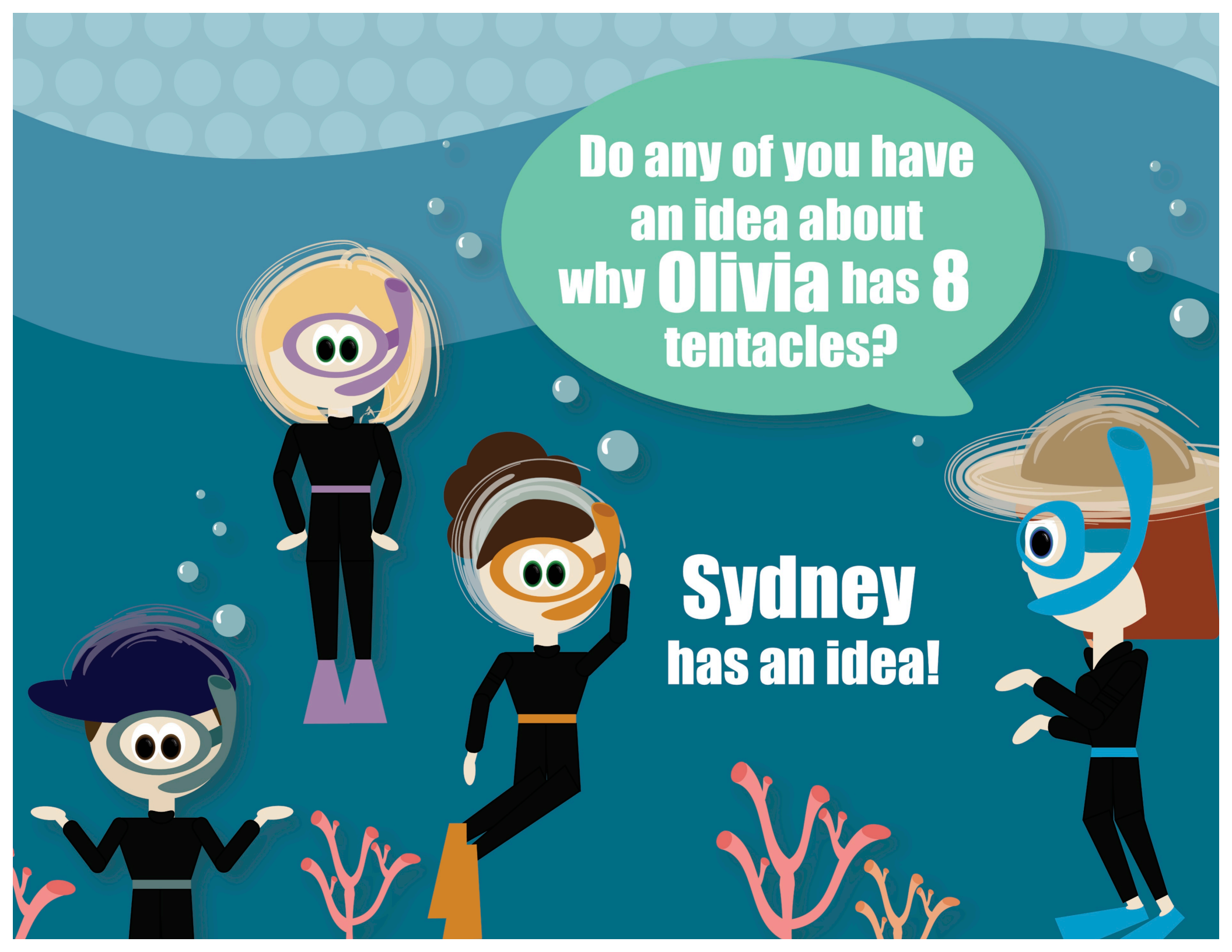
This is **Olivia**
the octopus.



Olivia's tentacles are lined
with suction cups to grab things!



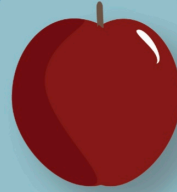
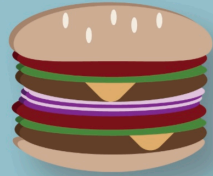
Olivia has **8** arms.
We call them **tentacles**.



Do any of you have
an idea about
why **Olivia** has 8
tentacles?

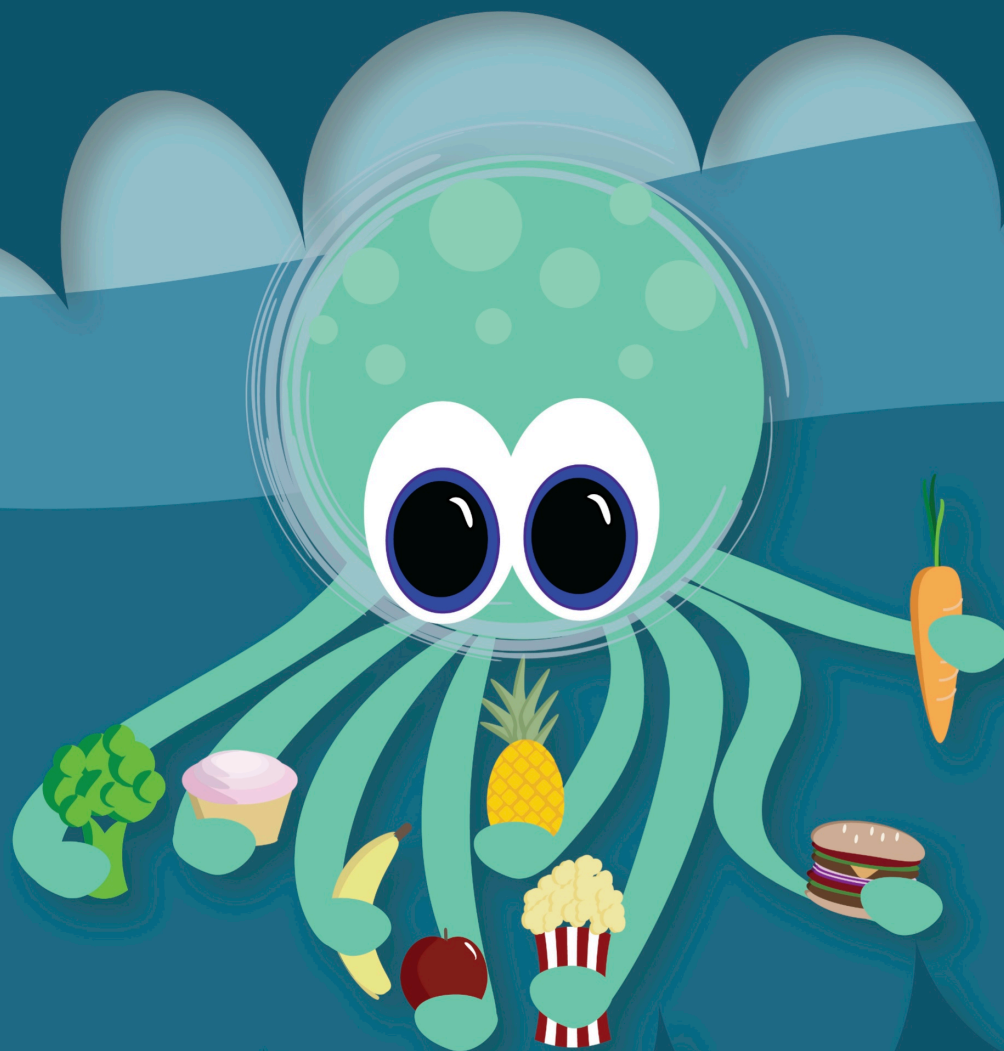
Sydney
has an idea!

I bet **Olivia**
loves food...



...so much that she **dreams**
about it all day long.





**She needs all 8 tentacles
to carry her food so
she will **never** be hungry!**

**I had never thought of
that before, Sydney!**



Why do YOU
think Olivia
has 8
tentacles?



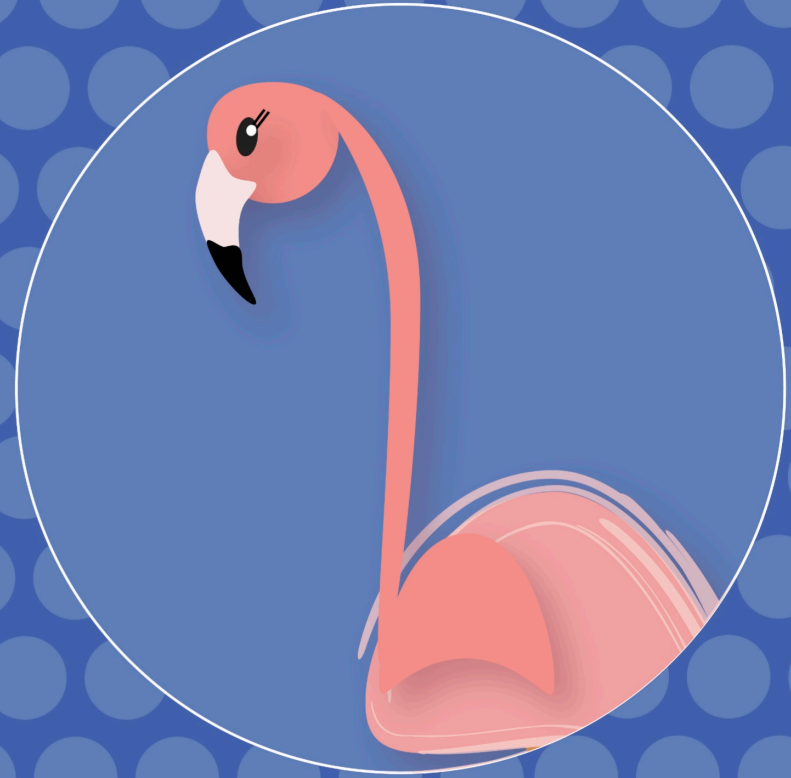
Today we will meet...



Gabriella
the giraffe



Olivia
the octopus



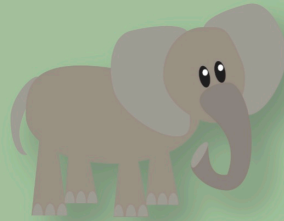
Frank
the flamingo

Let's stop by and see **Frank** now.

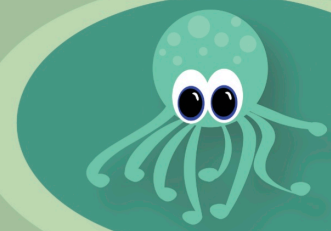
Zebra



Elephant



Octopus



Hippopotamus



Giraffe



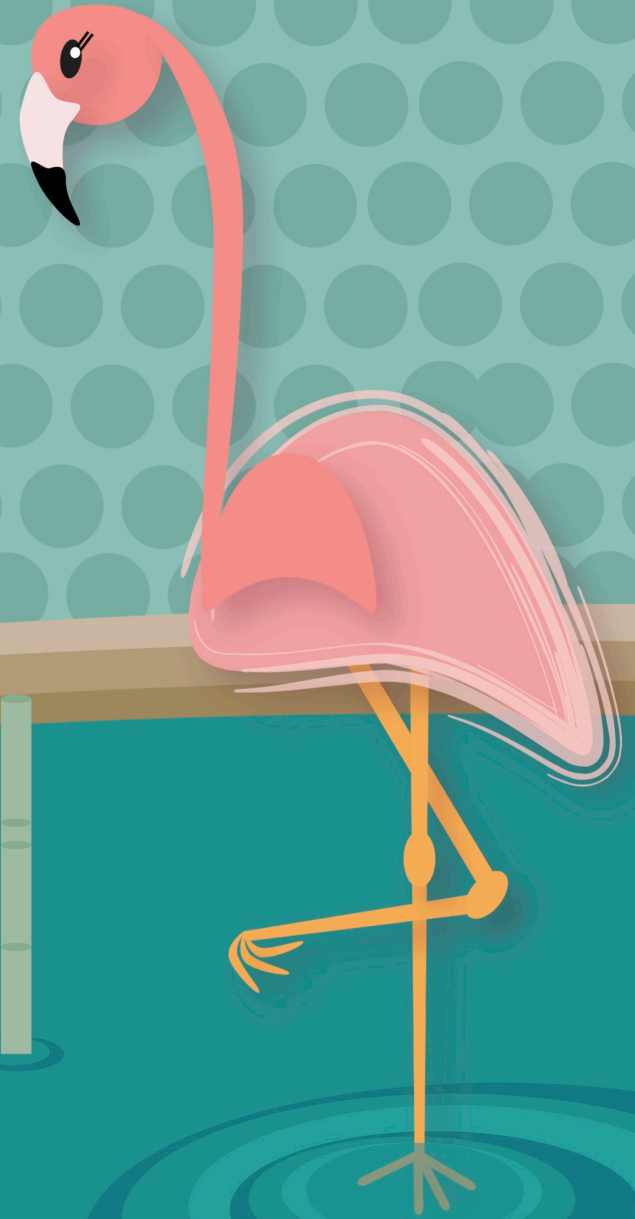
Flamingo



Meet Frank the Flamingo!

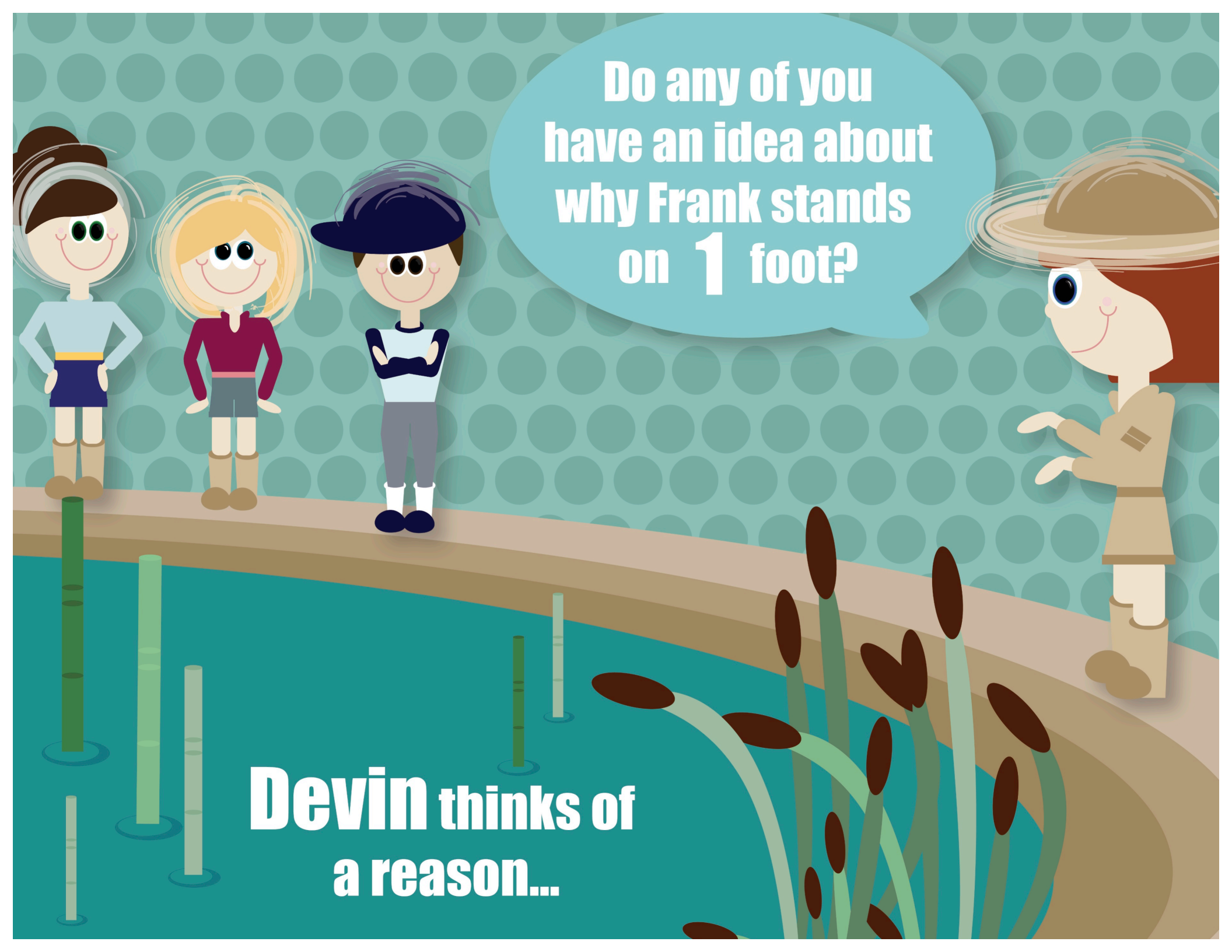
Frank usually only
stands on **1** foot.

He loves to eat
crustaceans.



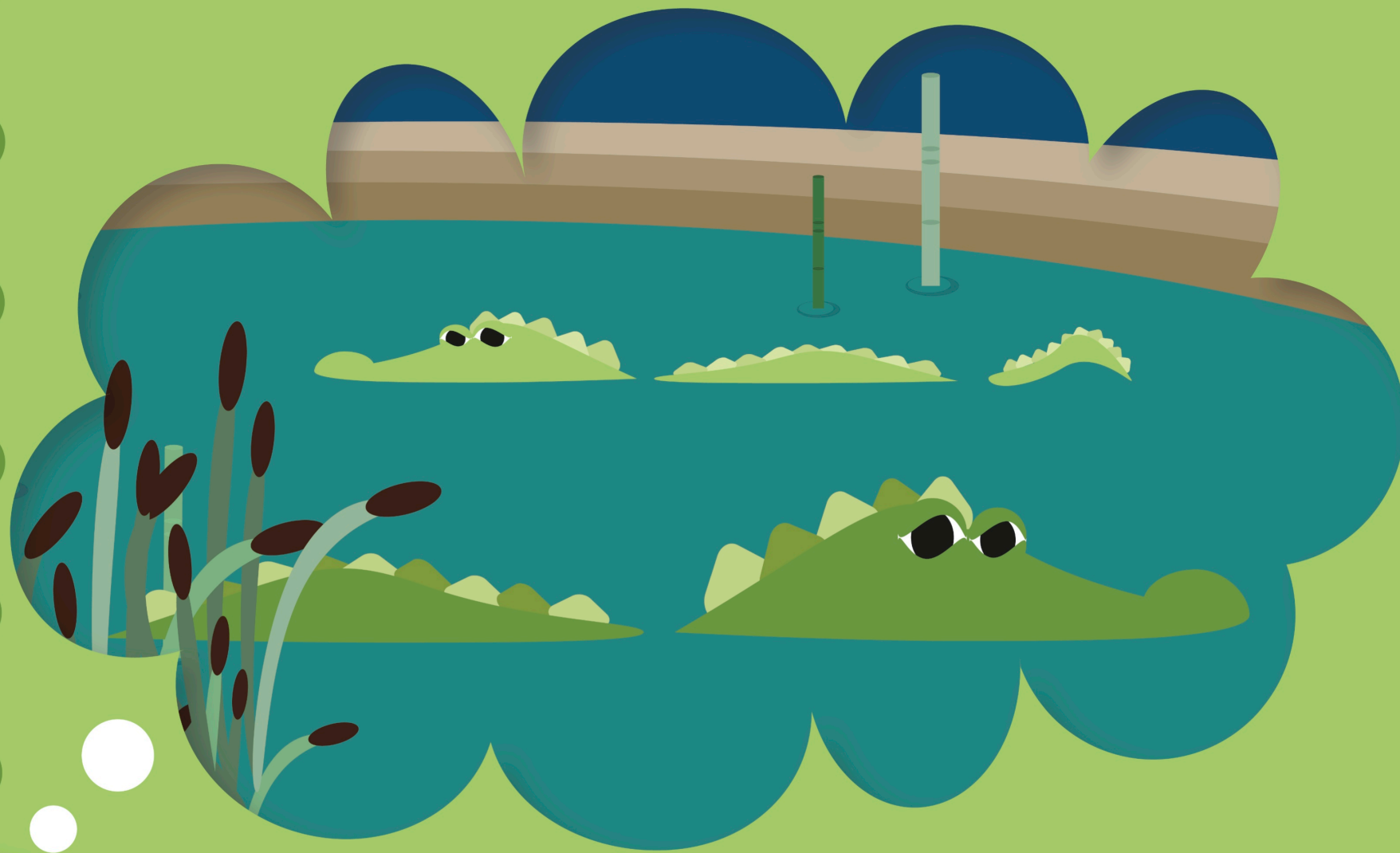
Shrimp are a type
of crustacean.





Do any of you
have an idea about
why Frank stands
on **1** foot?

Devin thinks of
a reason...



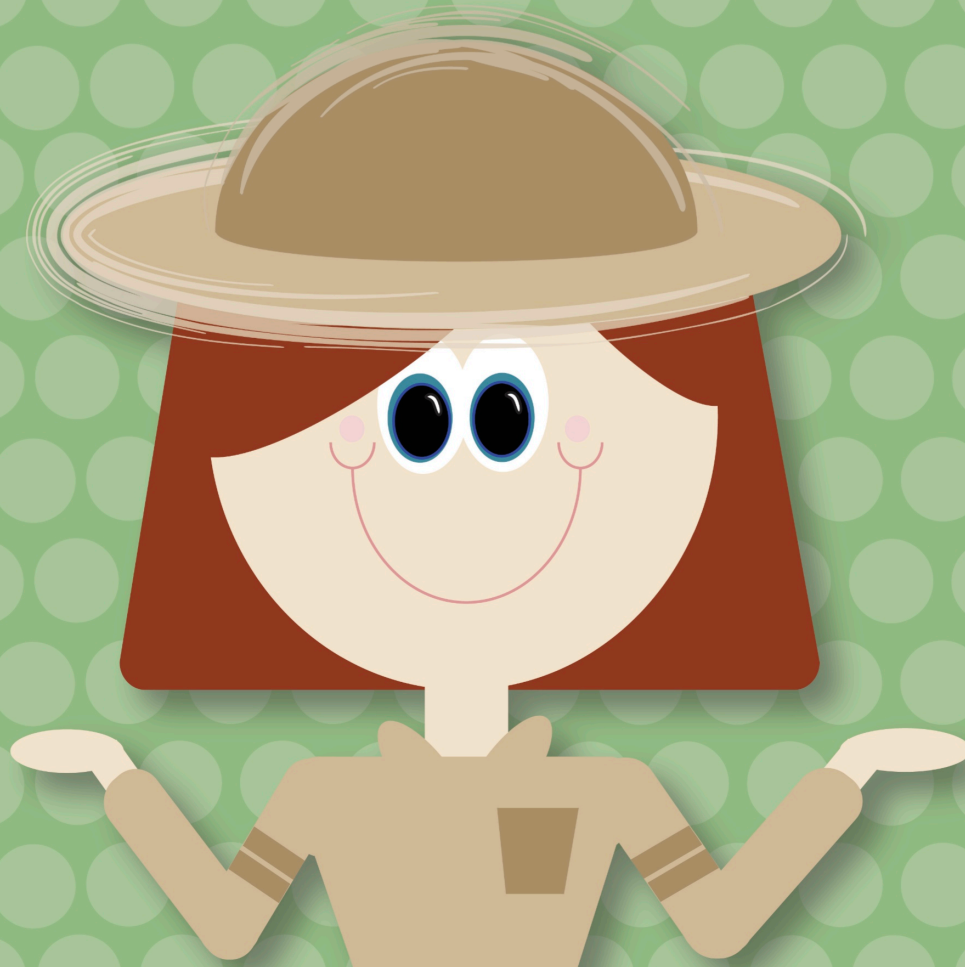
I bet there are tons of **alligators**
in the water with Frank....



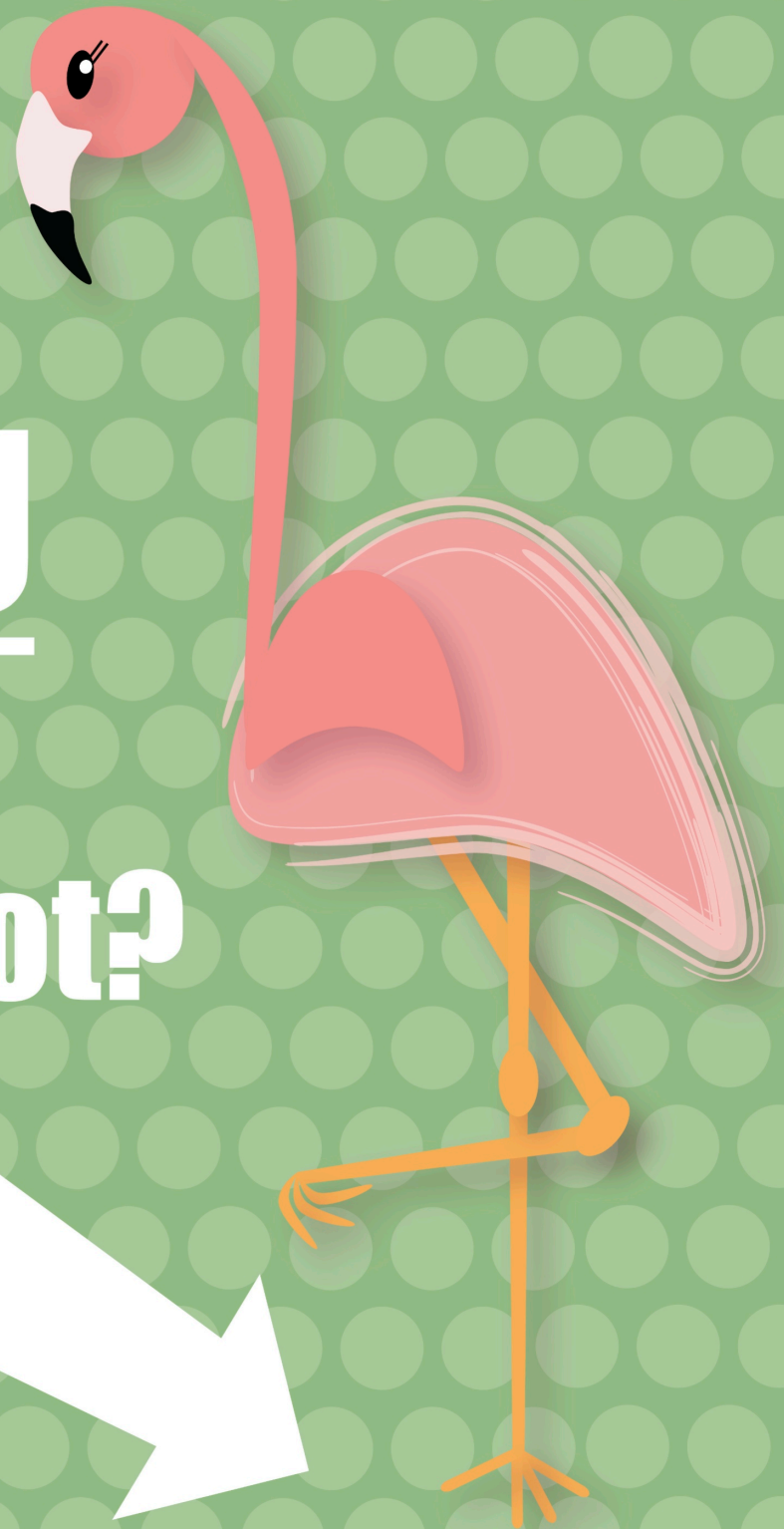


**...so Frank is scared to put both of his feet
in the water. He **tip-toes** around so
he doesn't disturb the alligators!**

**I had never thought of
that before, Devin!**



Why do YOU
think Frank
stands on 1 foot?



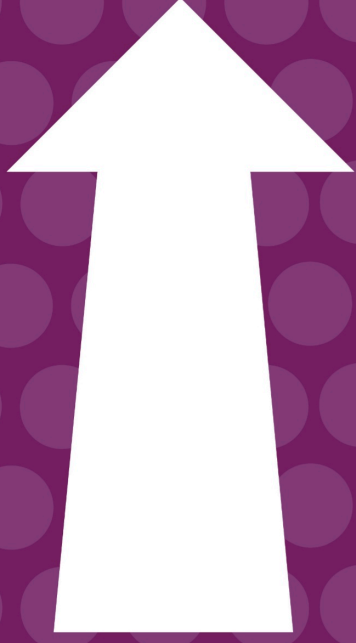
**Isn't it fun to use your
imagination
to come up with hypotheses
about why animals are
the way they are?**

Hypothesis: A tentative theory about the natural world; a concept that is not yet verified but that if true, would explain certain facts or phenomena

**Flip the book over to hear
Zoey's explanation of why
these animals are the
way they are!**

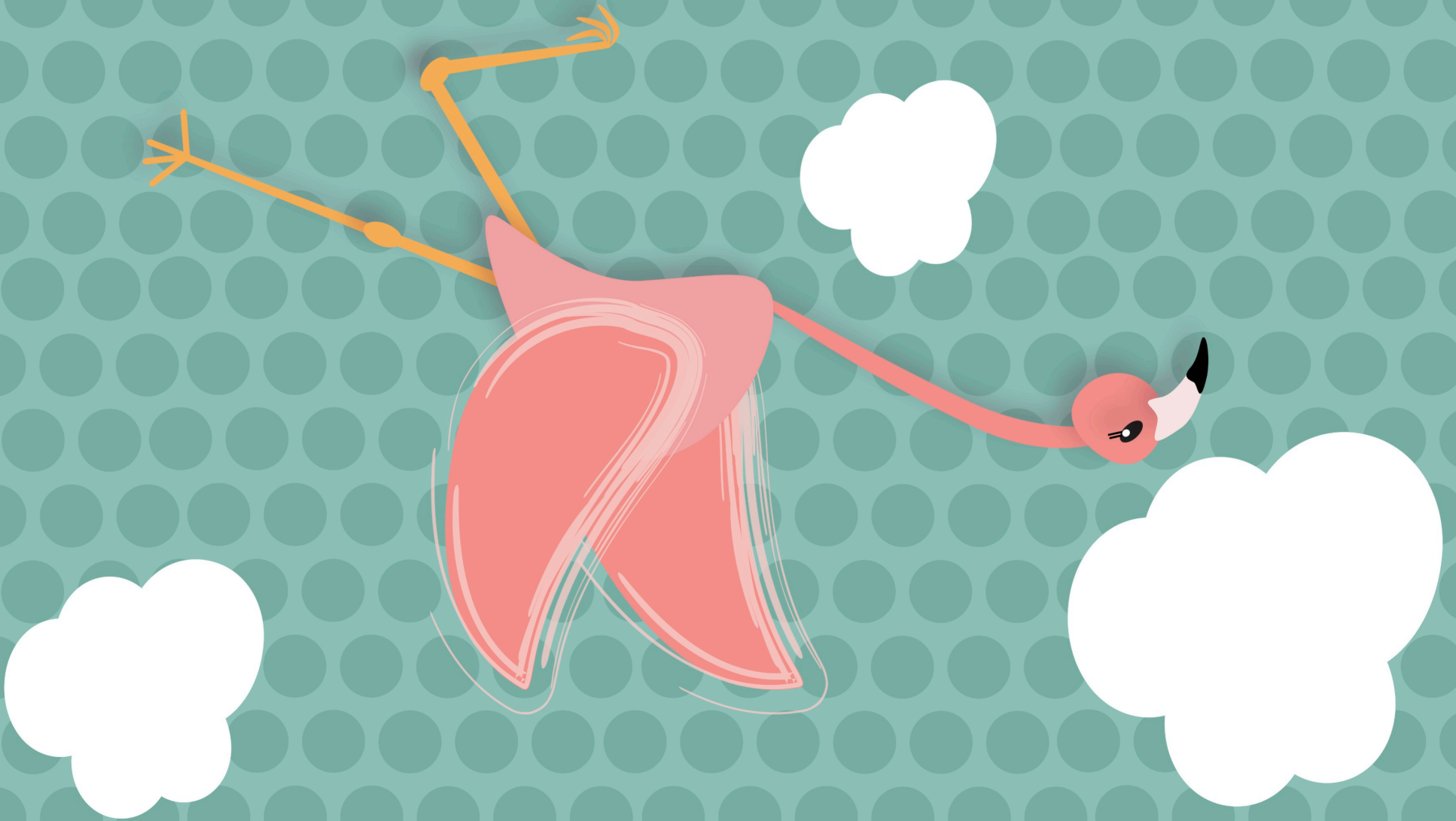


**Flip the book over to hear
Mr. Garcia's student's
explanations of why these
animals are the way they are!**



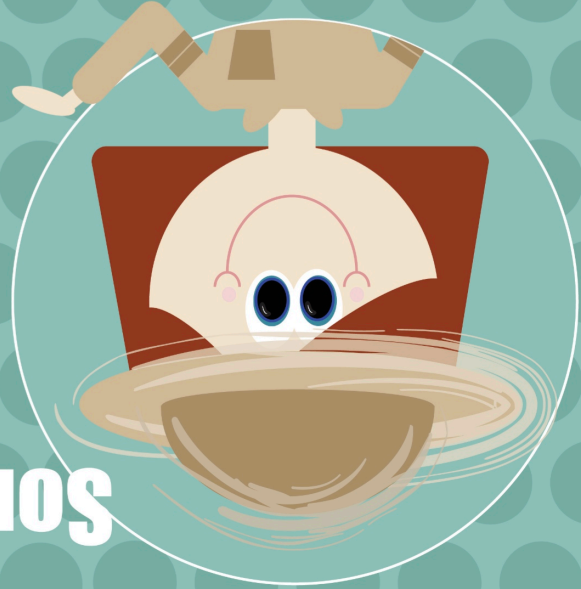
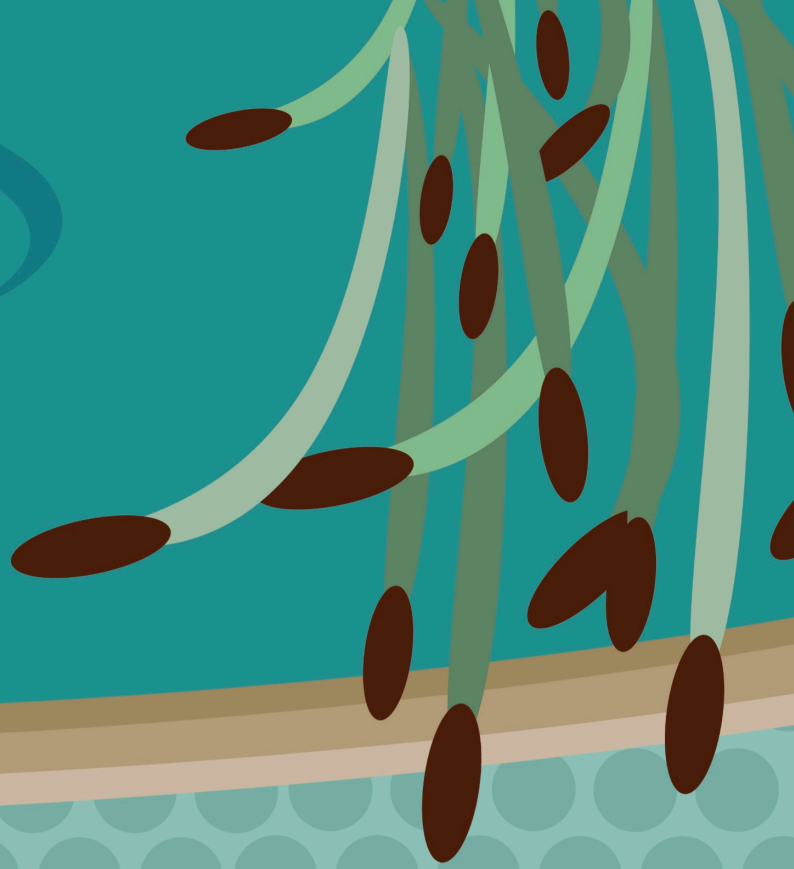
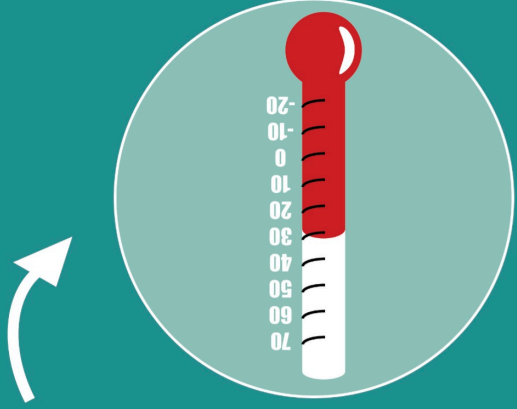
**Isn't it fun to hear
from real scientists?
They are always learning new
things about animals!**

While other scientist think standing on 1
foot allows them to quickly take off flying!

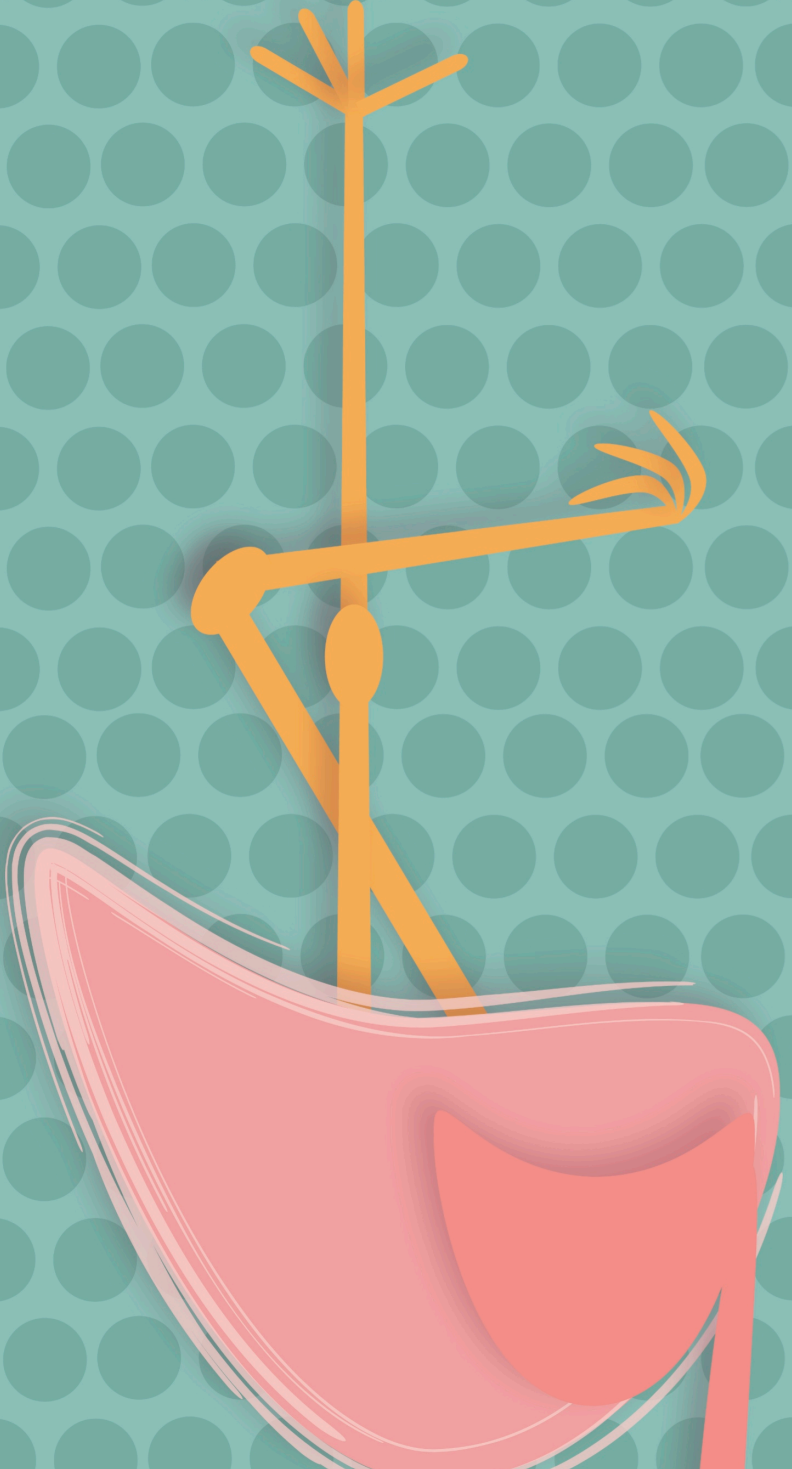
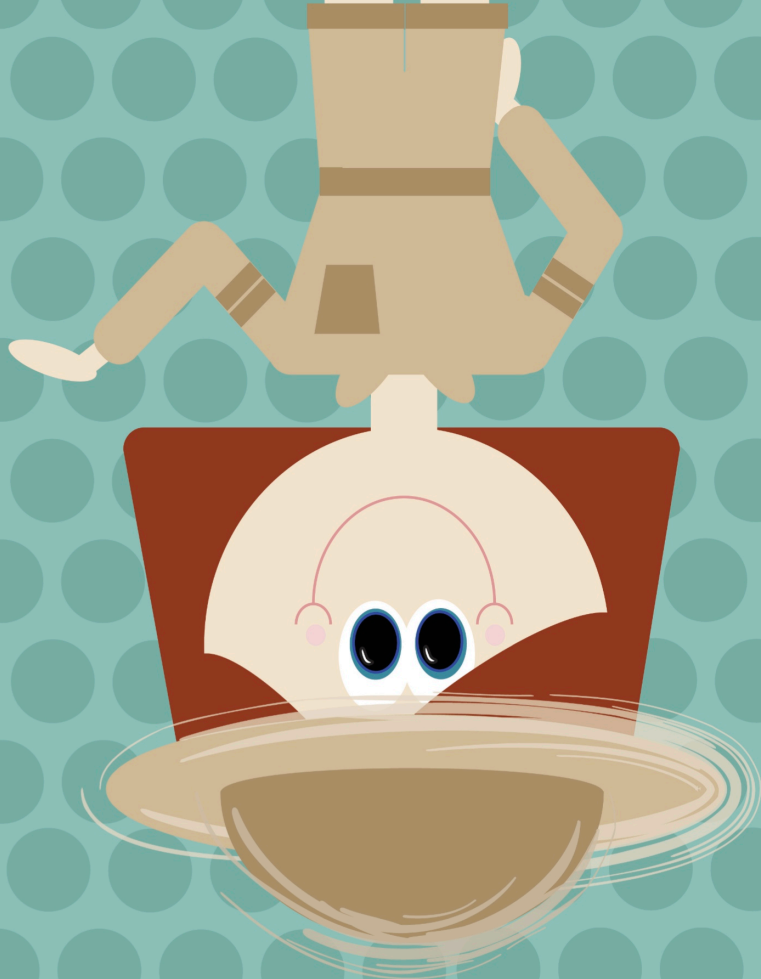


**Some scientists believe that flamingos
stand on 1 foot because the water
can make them too cold!**

Frank's body temperature drops
when both feet are kept in the water

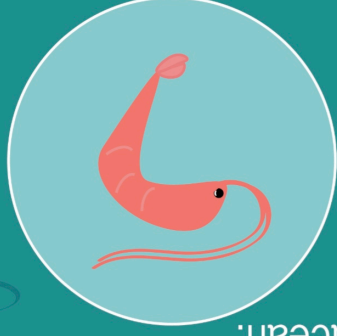


Scientists also aren't
sure why
flamingos
like Frank prefer to
stand on 1 foot.



There are a few theories...

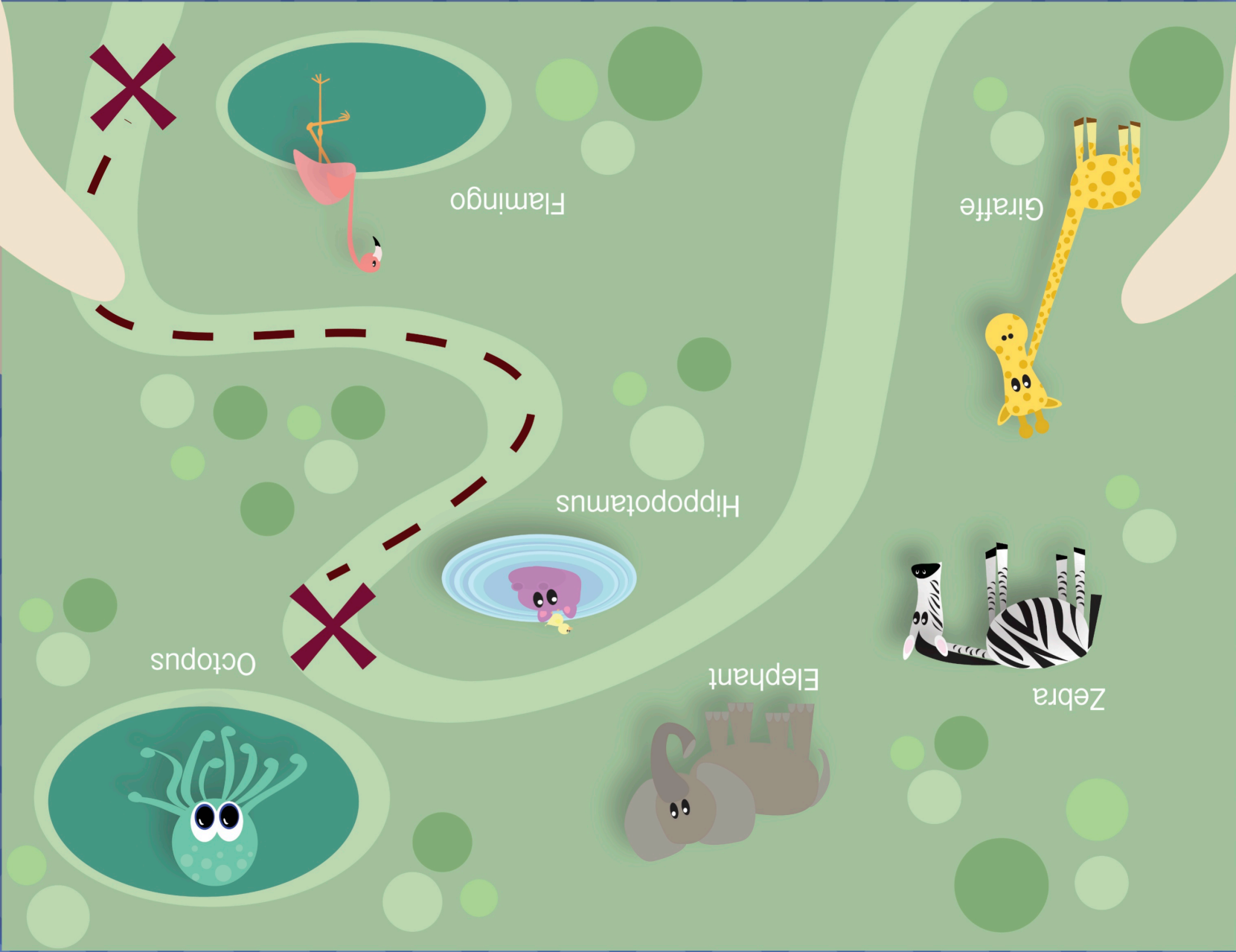
Meet Frank the flamingo!
Frank usually only
stands on 1 foot.
He loves to eat
crustaceans.



Shrimp are a type
of crustacean.



Let's stop by and see Frank now.

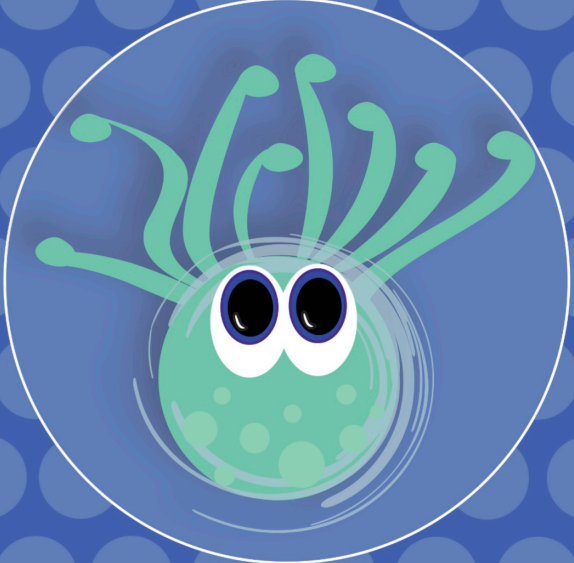


Today we will meet..

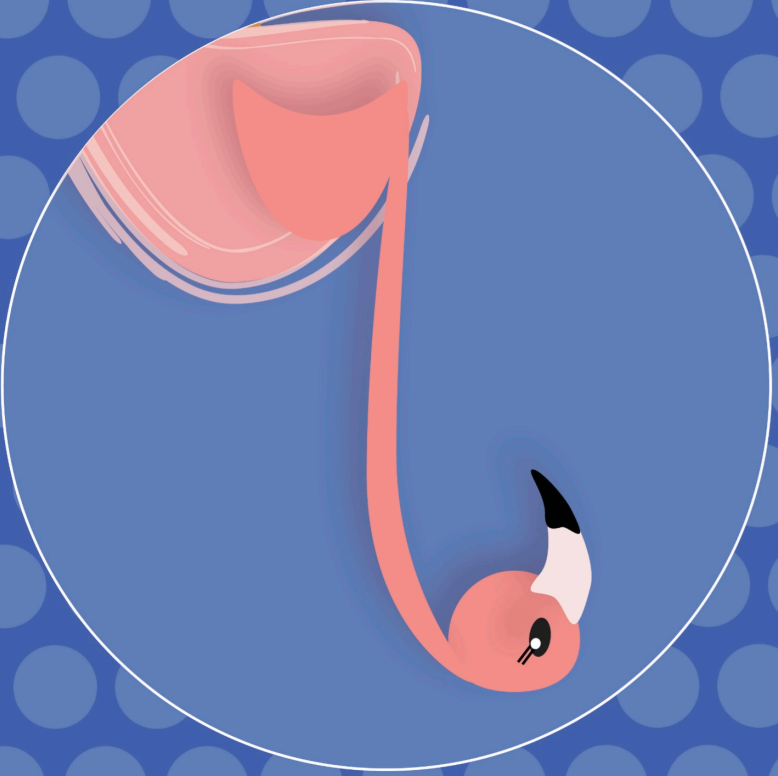
Gabriella
the giraffe



Olivia
the octopus

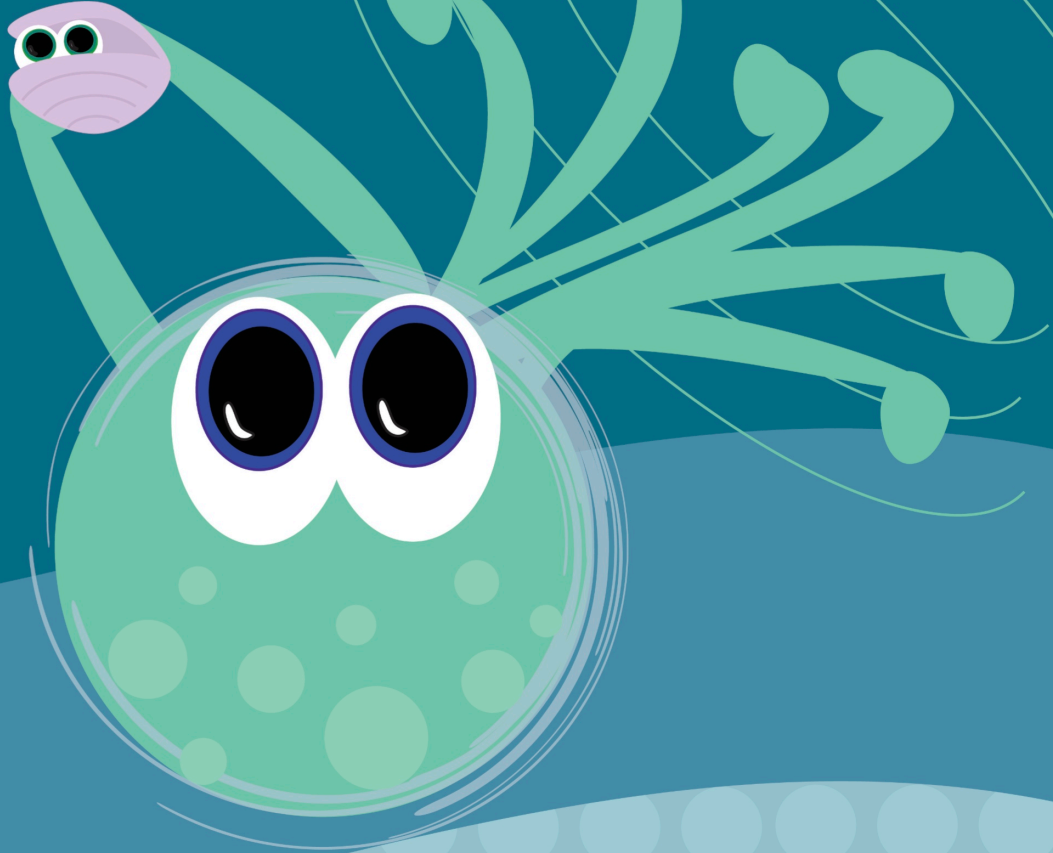
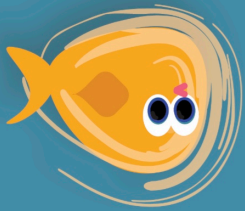


Frank
the flamingo



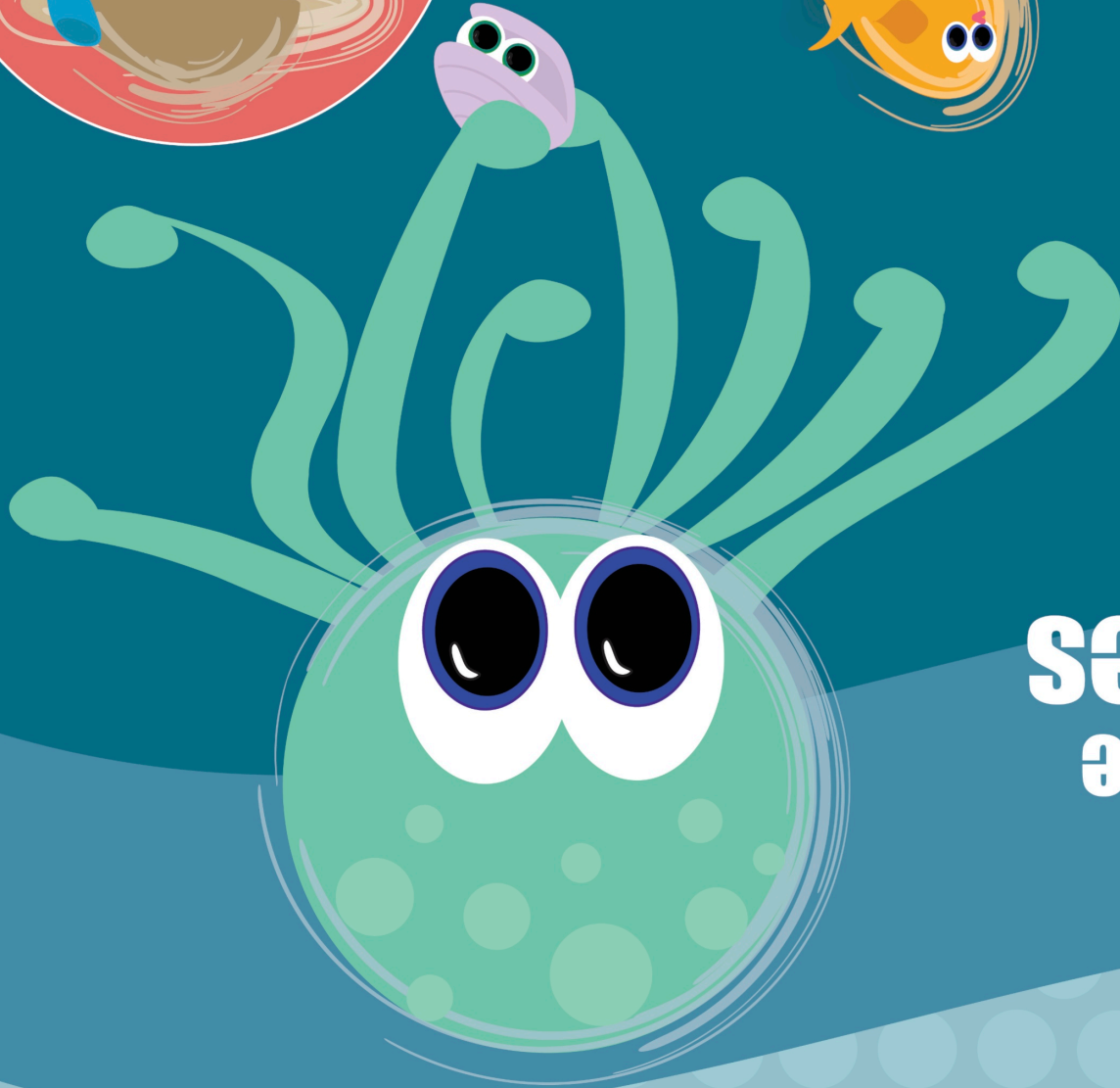
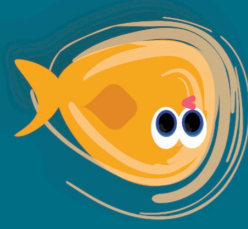
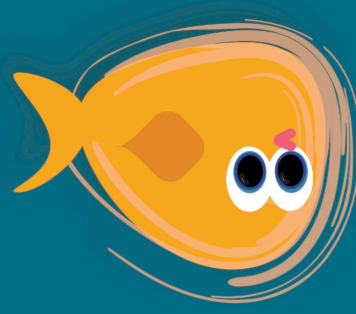
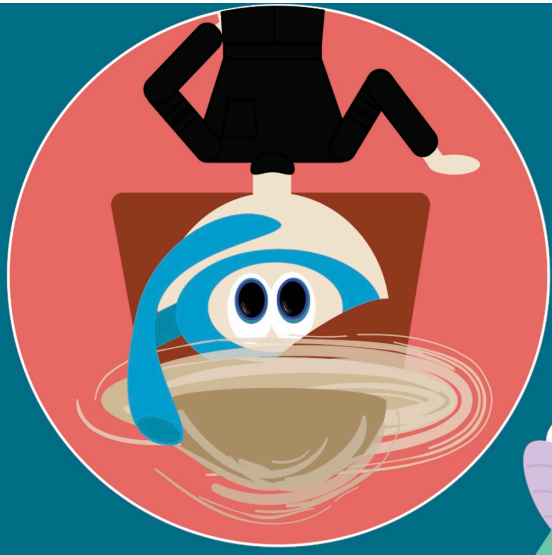
An octopus uses
its "legs" to propel
itself forward.

The remaining 6
tentacles are
more like legs.

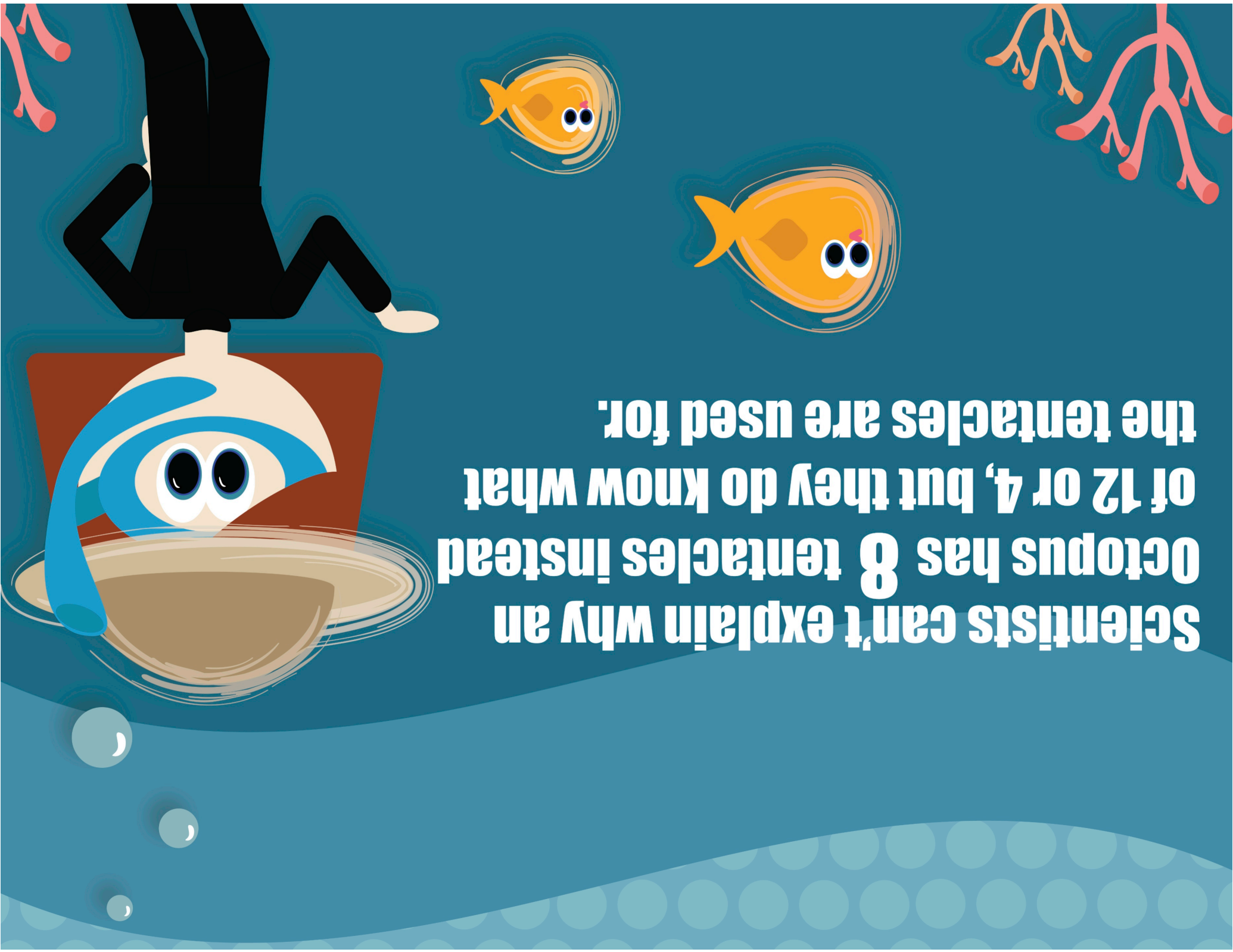


Scientists believe the
front two tentacles
are used as arms.

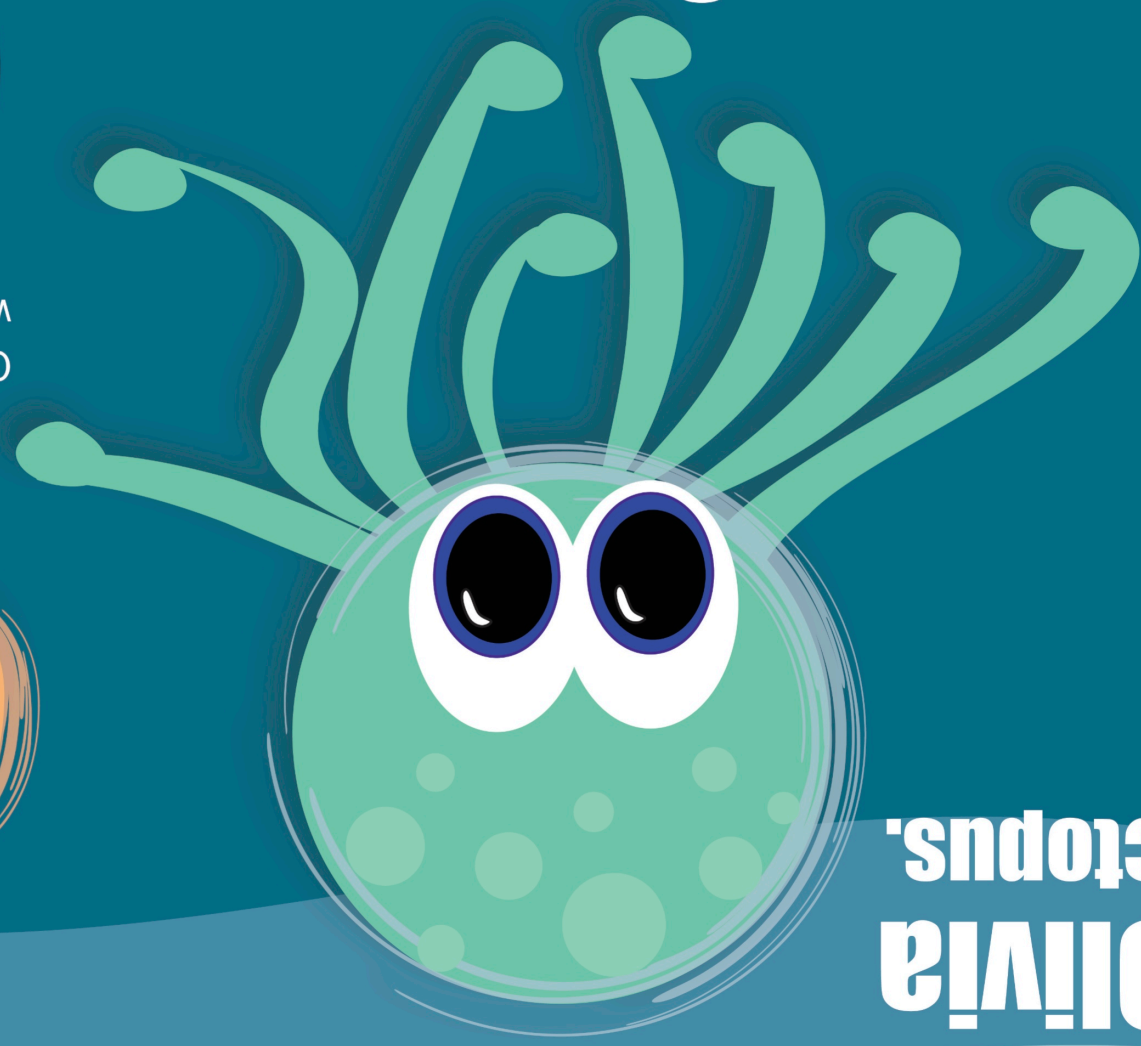
An octopus can
use its "arms"
to pry open clams!



Scientists can't explain why an octopus has 8 tentacles instead of 12 or 4, but they do know what the tentacles are used for.



**This is Olivia
the octopus.**



**Olivia has 8 arms.
We call them tentacles.**



Olivia's tentacles are lined
with suction cups to grab things!

Flamingo

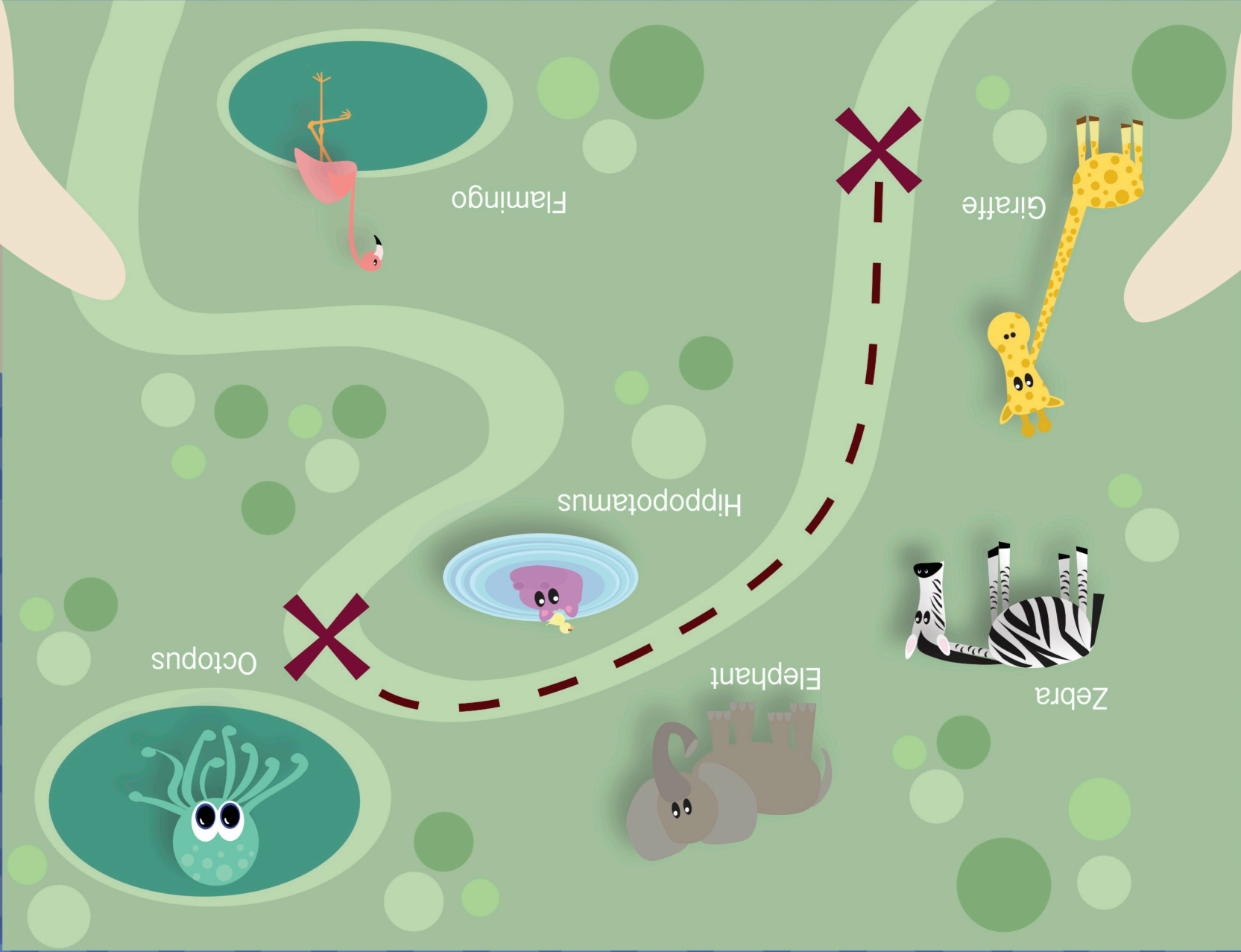
Hippopotamus

Octopus

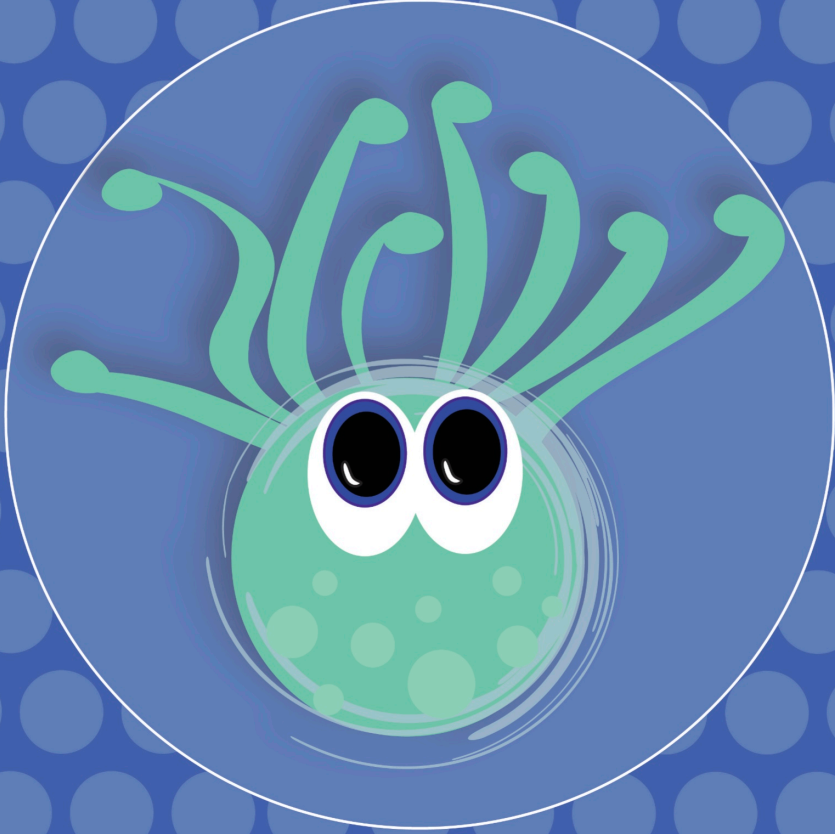
Elephant

Giraffe

Zebra



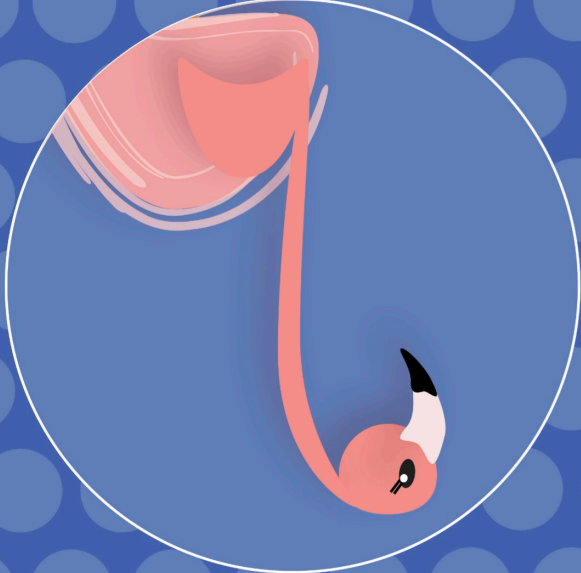
the octopus Olivia



Gabriella the giraffe

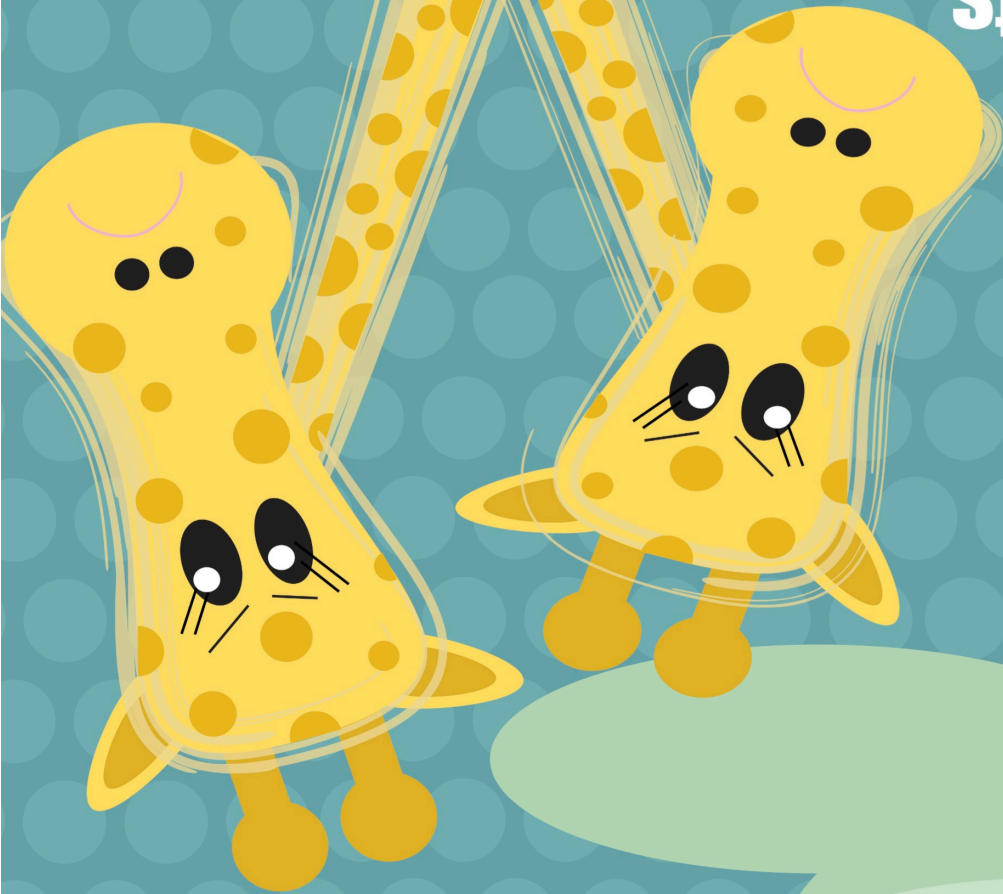


Frank the flamingo



Today we will meet...

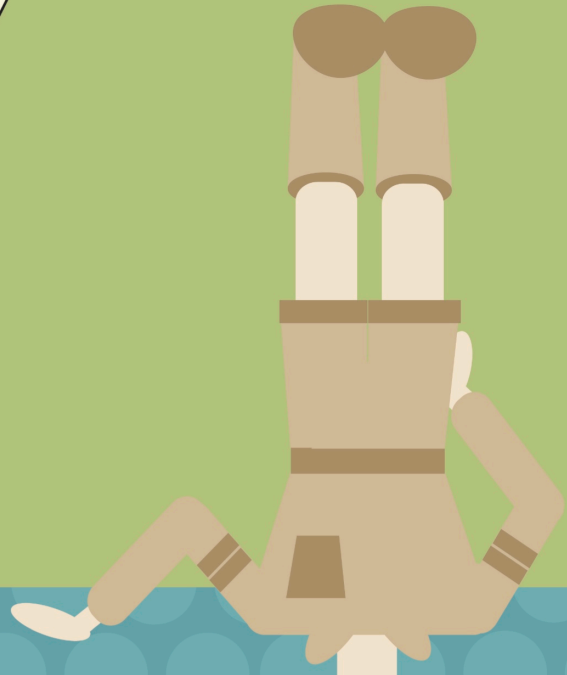
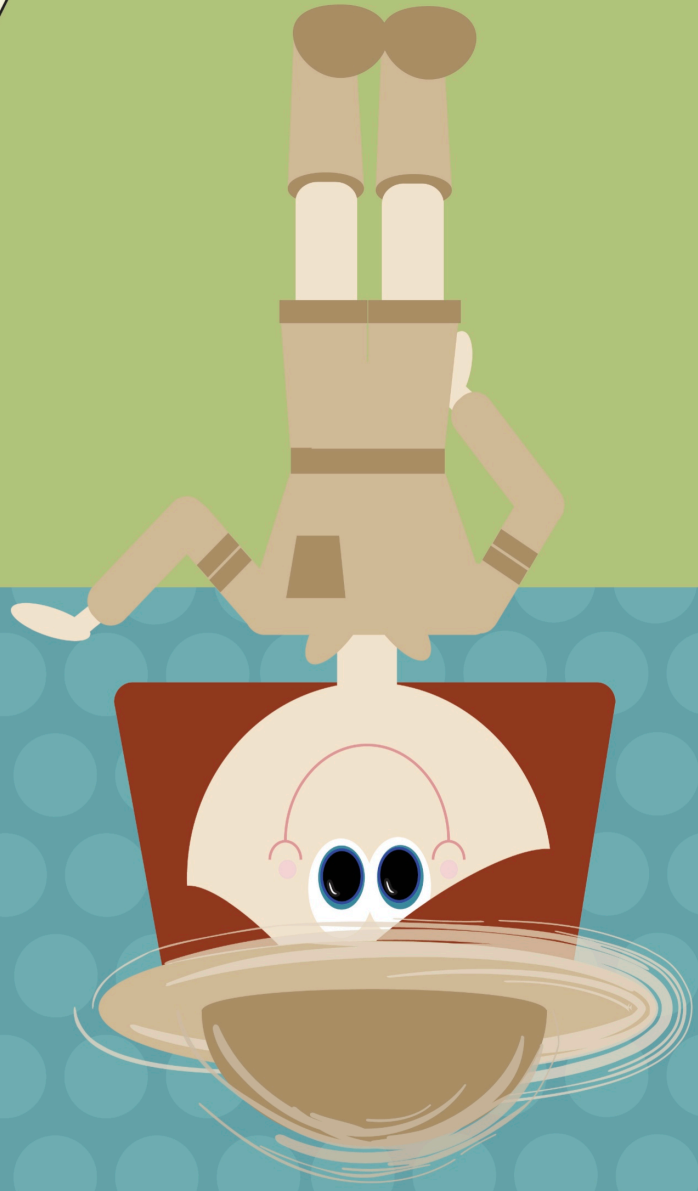
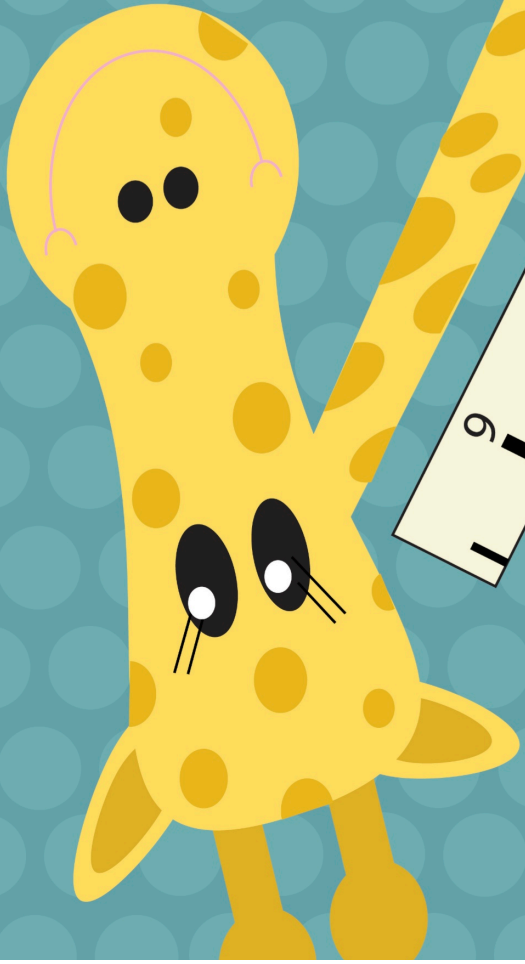
...but other scientists
think their extra long
necks grew so they would be
able to fight each other!



Some scientists
believe giraffe necks
became long so they
could reach the leaves
of the acacia tree...

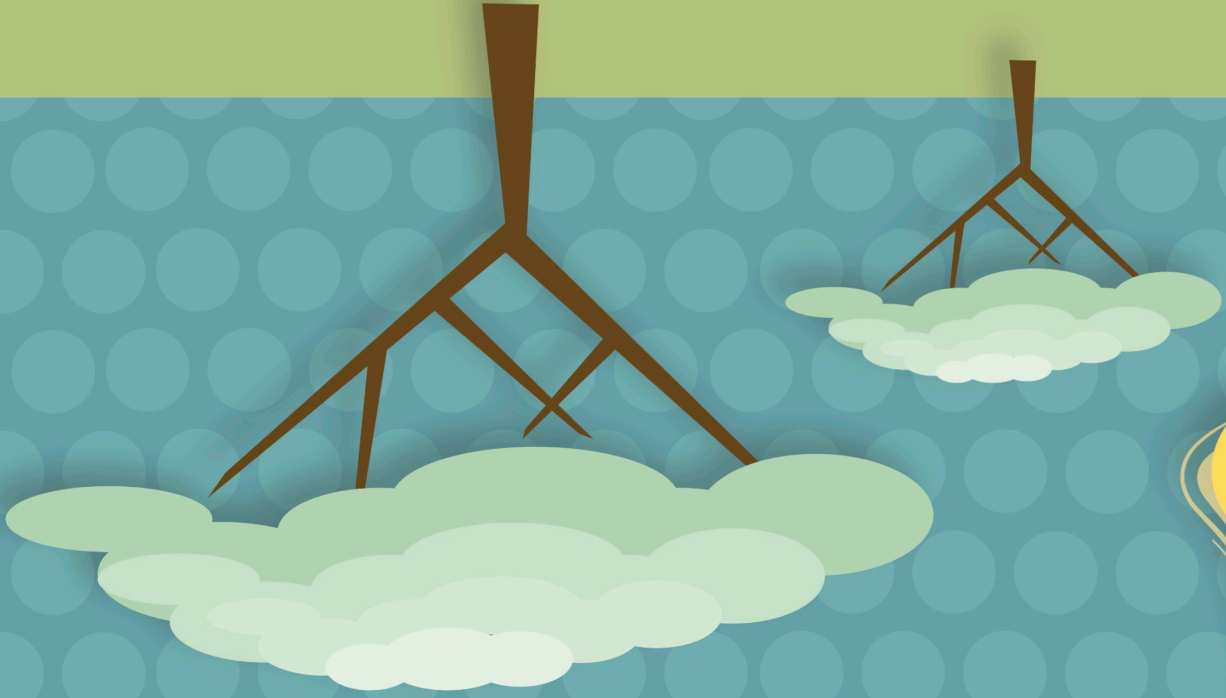


**Scientists still aren't entirely
sure why giraffe necks grow
so long. They have a few theories...**



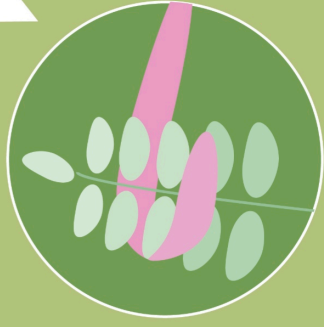
Gabriella is our tallest giraffe here at the zoo.

Her neck is over 6 feet long.

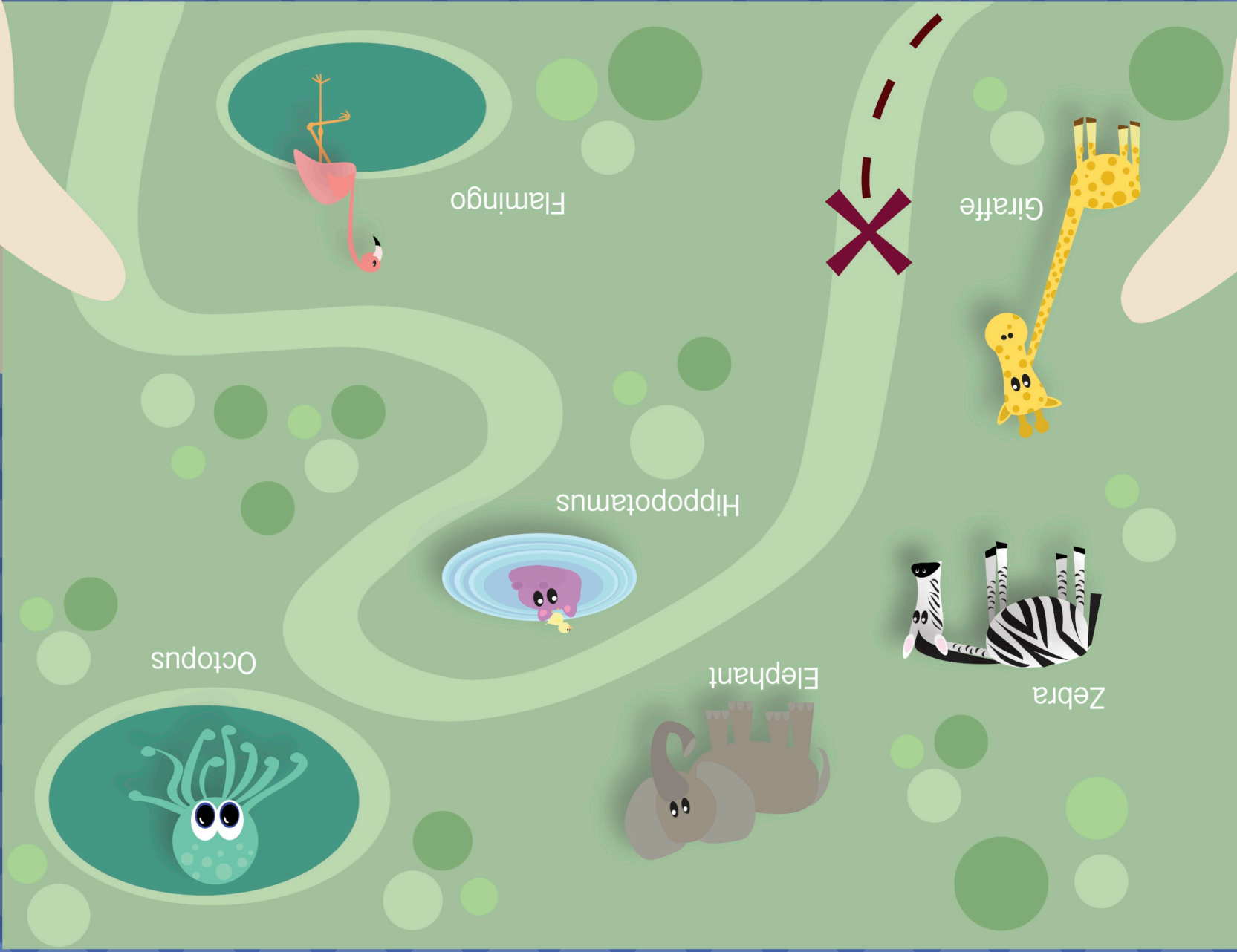


Gabriella likes to eat leaves from the Acacia tree.

Gabriella grabs the Acacia leaves with her sticky tongue



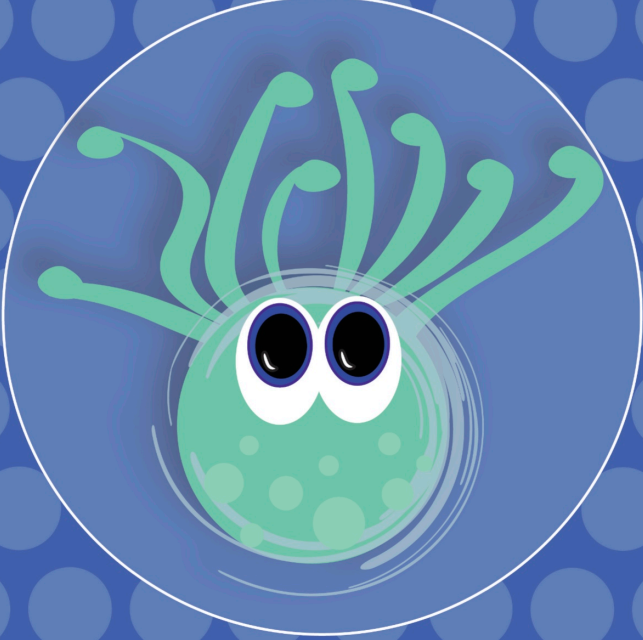
Let's stop by and see Gabriella first.



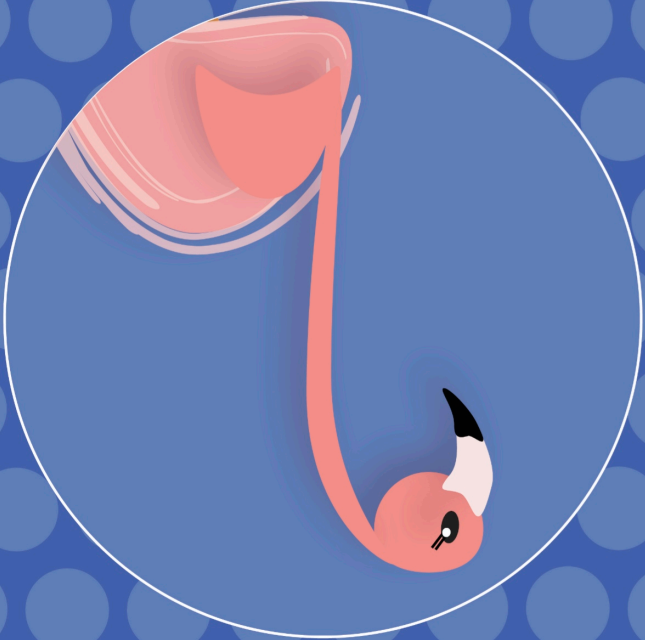
Gabriella
the giraffe



Olivia
the octopus

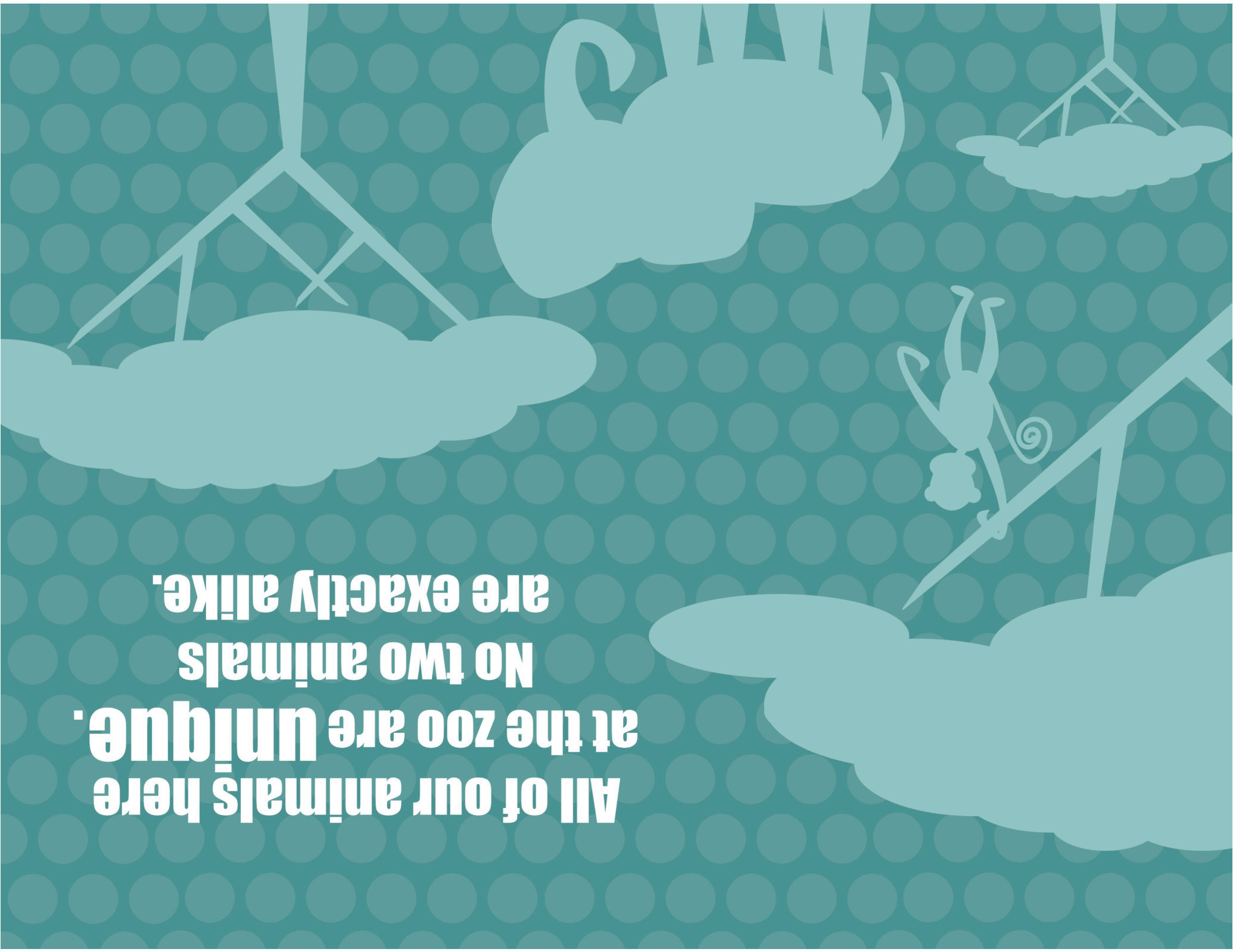


Frank
the flamingo



Today we will meet..

**All of our animals here
at the zoo are unique.
No two animals
are exactly alike.**



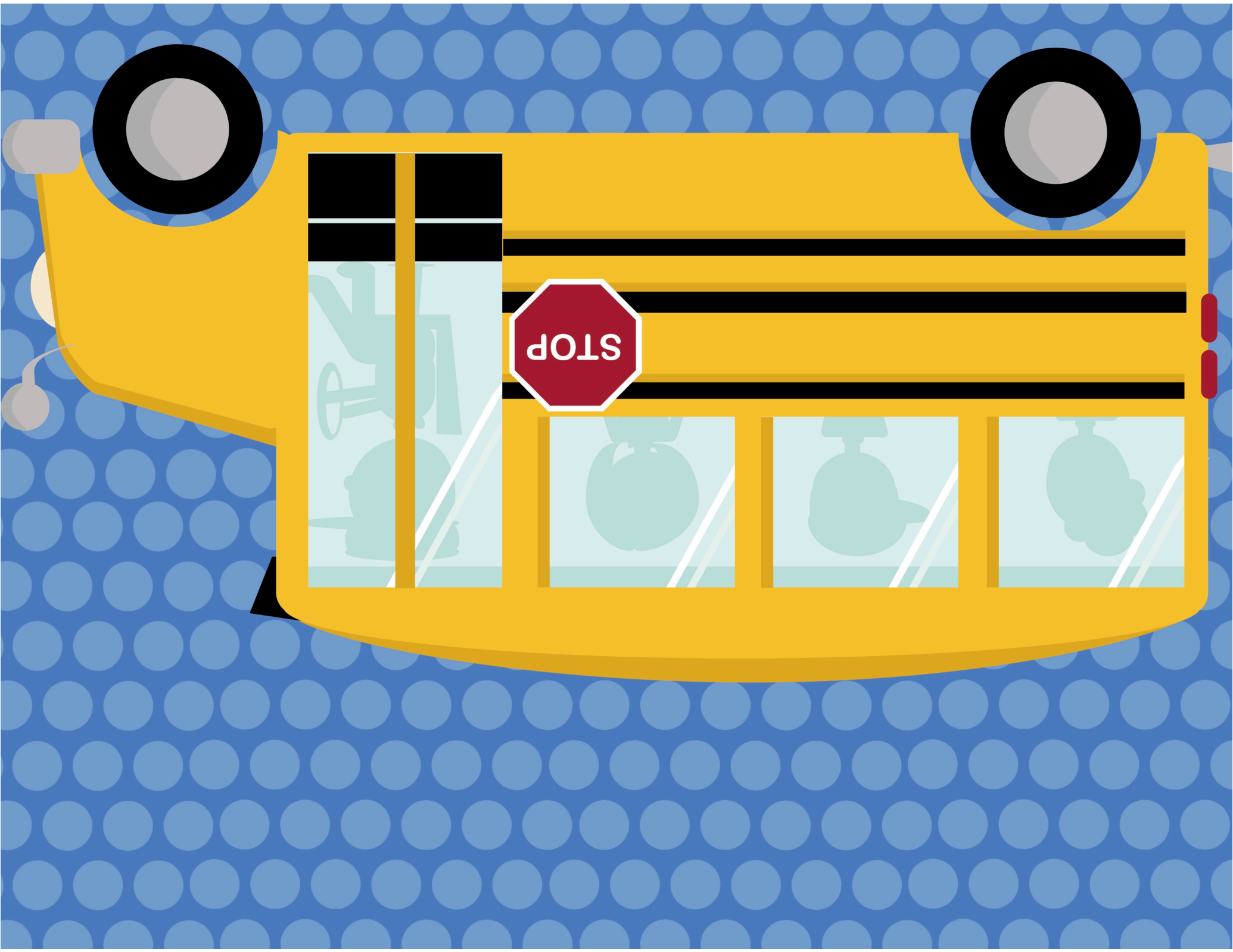
100Z

Welcome to the

I'm going to
show you all
around!

Welcome to the zoo. I'm Zoey,
the zookeeper.





**Mr. Garcia's class is going on an excursion!
They are on their way to the
ZOO to learn about animals.**



Jennifer Singleton

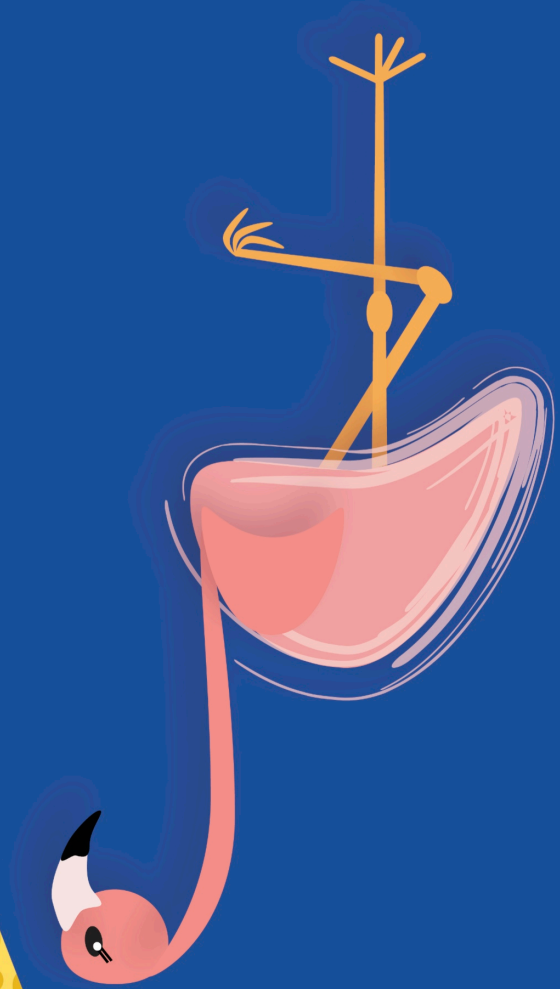
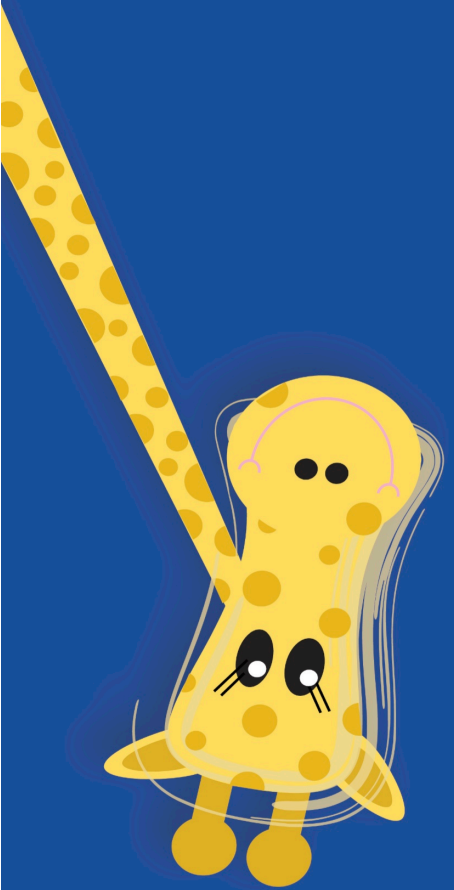
Written and Illustrated by

Why our pals at the Zoo are
the way they are!

WHY?

WHY?

WHY?



Jennifer Singleton

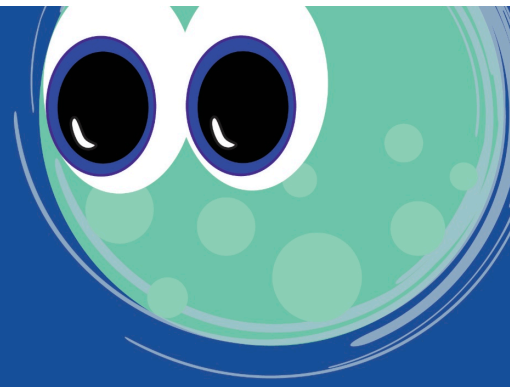
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WHY?

WHY?

WHY?



Zoe's Version