

A GUIDE FOR TEACHERS OF GRADES 2-4

nickelodeon

TEENAGE MUTANT NINJA

TURTLES™

SECRETS OF THE SEWER



CHILDREN'S
MUSEUM
INDIANAPOLIS

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Exhibit produced by The Children's Museum of Indianapolis
in collaboration with Nickelodeon



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The museum provides special programs and experiences for students as well as teaching materials and professional development opportunities for teachers. To plan a visit or learn more about educational programs and resources, visit the Teacher section of the museum's website at childrensmuseum.org.

VISIT THE MUSEUM

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THE EXHIBIT

In this exhibit, visitors will have the opportunity to explore the world of the Teenage Mutant Ninja Turtles—Leonardo, Donatello, Raphael, and Michelangelo—through immersive environments representing their sewer lair and the streets of New York, where they patrol to keep the city safe from evil. Students will have an opportunity through puzzles and challenges to explore their individual and group potential as well as to train together as a team, both physically and mentally.

THE TEACHER GUIDE

Through this Teacher Guide, students can learn more about the Teenage Mutant Ninja Turtles and the important life lessons they teach. Students will experience what it is to be part of a team working toward a common goal and will learn about the importance of communication in identifying and developing their own personal strengths and working as a team to solve a challenge.

INTRODUCTION

Introduced in 1984, The Teenage Mutant Ninja Turtles seemed an unlikely success story. Yet from a single, self-published comic book, the Teenage Mutant Ninja Turtles became a phenomenon, spawning numerous comic book series, cartoons, movies, and an array of merchandise sold all over the world. Now, 30 years later, our favorite “Heroes in a Half Shell” are still going strong for a new generation of children, teaching important life lessons about teamwork, developing personal strengths, and achieving more by working together than you can by working alone.



OBJECTIVES

Students will

- Explore the importance of communication
- Identify the characteristics of good communication
- Consider how team members bring different individual skills and strengths that contribute to team success
- Identify their own personal strengths
- Work in teams
- Design a device to accomplish a goal
- Build a prototype of their device to test and refine
- Present their prototype to the class
- Reflect on their experience working as part of a team

FOCUS QUESTIONS

- What is communication? Why is it important in teamwork?
- What are the characteristics of good communication?
- How do individuals contribute to a team?
- How can teams accomplish more than individuals working alone?

VOCABULARY

communication
design
strengths
team

YOU WILL NEED

- tangram puzzle pieces or student handout on page 9
- scissors
- student handouts on pages 12 and 15
- variety of found objects (paper towel rolls, rubber bands, cardboard, boxes, paper clips, etc.)
- pretend pizza (could be coins, checkers pieces, etc.)



EXPERIENCE 1: COMMUNICATION IS KEY

Communication is a key component of teamwork and necessary for people, or Turtles, to work together successfully. In this experience, students will learn the value of good communication. Students will work in teams of two relying on their communication skills, both speaking and listening, to complete a task together: successfully constructing a combination of geometric figures sometimes called a Chinese puzzle. Students will consider what strategies worked best and what they can do to improve their communication skills.

ACADEMIC STANDARDS

Indiana Standards

English Language Arts – Speaking and Listening: 2.SL.1, 2.SL.2.1, 2.SL.2.3, 2.SL.2.4, 2.SL.3.2, 2.SL.4.3; 3.SL.1, 3.SL.2.1, 3.SL.2.3, 3.SL.2.4, 3.SL.3.2; 4.SL.1, 4.SL.2.1, 4.SL.2.3, 4.SL.2.4

Mathematics – Geometry: 2.G.1

National/Common Core Standards

English Language Arts – Speaking and Listening: SL.2.1.A, SL.2.1.C, SL.2.3; SL.3.1.B, SL.3.1.C, SL.3.3; SL.4.1.B, SL.4.1.C

Mathematics – Geometry: 2.G.A.1

PROCEDURES

- Ask students if they have ever heard of the Teenage Mutant Ninja Turtles before.
- Have students share some of what they know, either from comic books they have read, cartoons or movies they have seen, or from other sources. Be sure to ask students where their information comes from.
- Explain that with all of the different TMNT stories that exist in different media forms (comics, cartoons, and movies), there are several different versions of the stories that students might know. However, one thing always remains the same, and that is the Teenage Mutant Ninja Turtles themselves.
- See if students can name all four turtle characters: Leonardo, Raphael, Donatello, and Michelangelo.
- Help students to understand that the Turtles use their ninja skills to fight bad guys and protect innocent people.
- Ask students how these characters are different from some other superheroes, such as Superman or Spider-Man.
- Explain to students that unlike Superman or Spider-Man, who tend to work alone, the Teenage Mutant Ninja Turtles work together as a team.
- Ask students to think about what it means to work in a team. Help students brainstorm characteristics of working in a team, such as helping each other, compromise, shared responsibilities, and so on.

- Explain that one of the key components of working in a team is communication between team members.
- Ask students what they think this means. What is communication and why is it important?
- Explain to students that they will complete an exercise that will demonstrate the importance of communication and help them understand what characterizes good communication.
- Divide the class into teams of two students each. Explain that each team member has a job to do and that neither student in a team can successfully complete the task without the other student.
- First, distribute the geometric shapes used to complete tangram puzzles. If you have tangrams in your classroom, you can use those, but if not, give each team a copy of page 9 and instruct them to cut out the geometric shapes in preparation for the task.
- Once each team has their pieces ready, explain that these pieces are to be used by just one team member and only that team member.
- Next, explain that the second team member is going to receive a pattern that uses the tangram geometric shapes to create a picture. This team member cannot show the pattern to his or her partner. Distribute the patterns to the teams.
- Explain that the team member with the pattern must now instruct his or her partner to position the geometric shapes properly to create the same pattern. Be sure to encourage students to identify the two-dimensional shapes and use geometric and descriptive terms for the pieces to help them instruct their partners. For example, students can say “use the smallest triangle” or “rotate the triangle to the right.”
- Encourage students responsible for moving the geometric pieces to listen closely to what their partner is telling them and to ask questions to help clarify instructions as needed.
- Remind students to stay on task and focus their discussion on the activity at hand.
- Allow teams time to work together to complete their patterns. While they work, circulate among the teams and offer suggestions to improve communication as needed. Suggest, for example, that partners try to incorporate nonverbal instruction into their communication by using hand gestures to supplement their spoken directions.
- When time is up, have students stop what they are doing, whether they have completed their patterns or not. Have students share the pattern with their partners now so that they can assess together how close they came.
- Ask the students how many teams completed their pattern correctly.
- Have students think about how they communicated. What went well? What didn’t work so well? Did they listen to each other respectfully? Did they argue or fight? How did their communication affect their teamwork?
- Have teams share and discuss their observations with the rest of the class and together create a list of rules to follow for good communication.



HUMBLE BEGINNINGS

The Teenage Mutant Ninja Turtles began as the brainchild of Kevin Eastman and Peter Laird in 1984. It started as a parody of other comic book characters that were popular at the time, but soon became something more. Eastman and Laird borrowed money from family to publish the first black-and-white comic chronicling the adventures of these strange heroes under their own Mirage Studios imprint. There was small but growing interest in the comic for several years. The Turtles hit it big when a deal was made with Playmate Toys in 1987. The original cartoon series soon followed, running for 10 years and spawning three full-length, live-action films. There was a short-lived live-action TV show, followed by another animated series, movies, and comic books. Today, the Turtles latest adventures can be seen on Nickelodeon, with a new animated series launched in 2012. So today, more than 30 years after that first short comic, the Turtles are still going strong, with no end in sight.

- Explain that team members will now switch roles.
- Distribute new patterns to the appropriate team members.
- Instruct students to try the task again, this time keeping in mind the rules they have just established for good communication.
- Allow students time to work together to complete their patterns.
- When time is up, have students stop what they are doing.
- Ask students how many teams completed their new patterns correctly.
- Ask students if the new rules of good communication helped them work better together this time. Why or why not?



FAMOUS NAMESAKES

The names of the Teenage Mutant Ninja Turtles may sound familiar. They are all named after famous Italian Renaissance artists. In the context of the story, their adoptive father figure, Master Splinter, explains that he named the Turtles after his favorite artists soon after he found them.

LEONARDO



Named after Leonardo da Vinci, the famous artist, inventor, engineer, sculptor, and anatomist. Da Vinci is best known for his works *Mona Lisa*, *The Last Supper*, and *Vitruvian Man*. Da Vinci also left plans for many important inventions.

MICHELANGELO

Named after the artist, sculptor, architect, poet, and engineer Michelangelo di Lodovico Buonarroti Simoni. This artist is best known for his sculptures *Pietà* and *David*, as well as his paintings in the Sistine Chapel.



RAPHAEL

Named after famed painter and architect Raffaello Sanzio da Urbino. His most famous work is the fresco *The School of Athens* in the Vatican.



DONATELLO

Named after Donato di Niccolò di Betto Bardi, better known as Donatello, a sculptor and artist best known for his religious sculptural work in Florence.





EXPERIENCE 1 – STUDENT HANDOUT

TANGRAMS

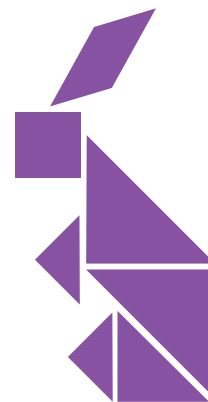
Cat



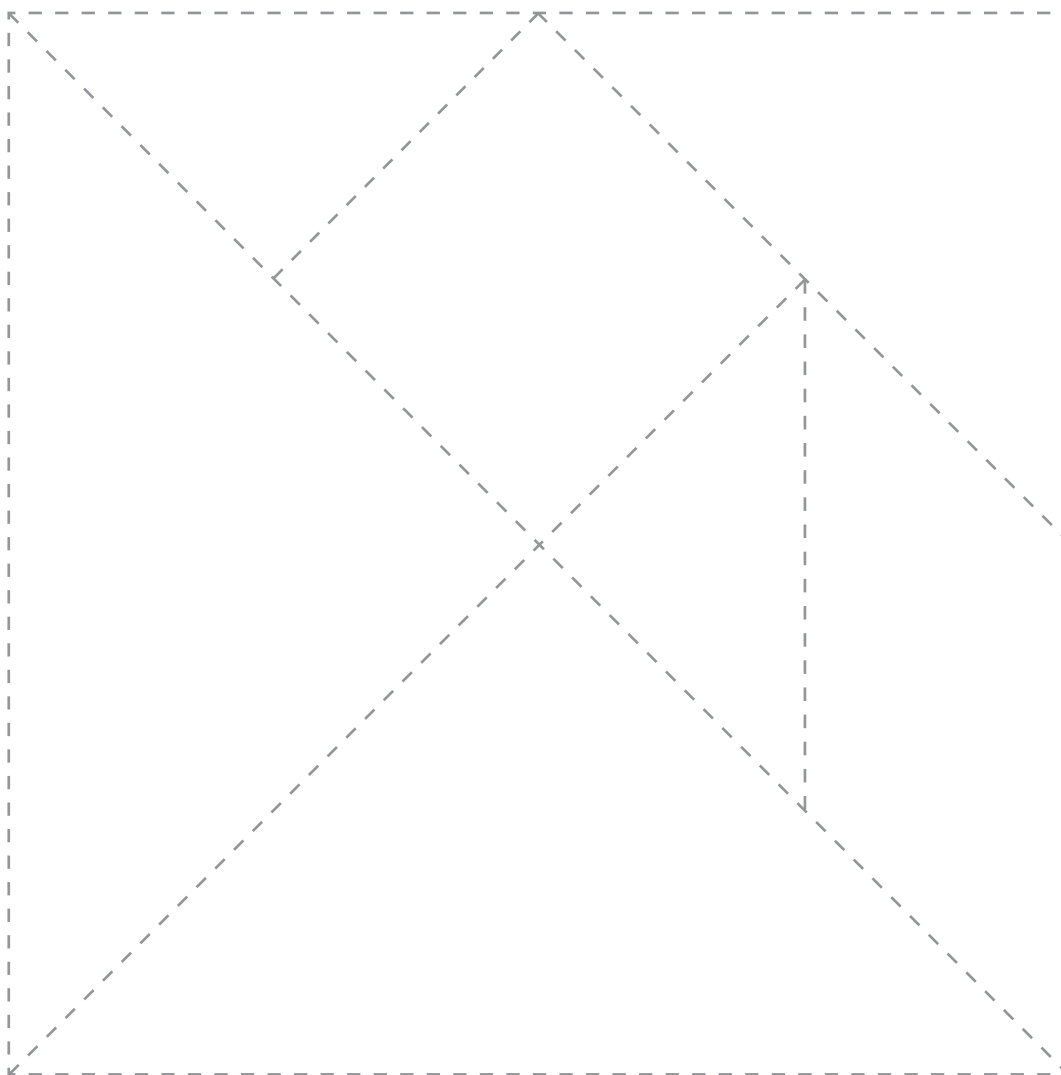
Whale



Rabbit



Cut apart the shapes below and try making these example animals.
Can you make a turtle? What other animals can you make?





EXPERIENCE 2: PERSONAL STRENGTHS

Every member of a team brings his or her own unique mix of strengths to the group, just like each of the Turtles brings his own skills and strengths to the team. In this experience, students will reflect on their own personal strengths and how these strengths can help them contribute to their own teams.

ACADEMIC STANDARDS

Indiana Standards

English Language Arts – Speaking and Listening: 2.SL.2.1, 2.SL.2.3; 3.SL.2.1, 3.SL.2.3; 4.SL.1, 4.SL.2.1, 4.SL.2.3

English Language Arts – Writing: 2.W.1, 2.W.3.2, 2.W.6.1; 3.W.1, 3.W.3.2, 3.W.6.1; 4.W.1, 4.W.3.2, 4.W.6.1

National Standards

English Language Arts – Speaking and Listening: SL.2.1.A; SL.3.1.B; SL.4.1.B

English Language Arts – Writing: W.2.2; W.3.2, W.3.10; W.4.2, W.4.10



PROCEDURES

- Ask students to reflect on what the advantages could be to working as part of a team, rather than on their own.
- Explain to the students that each member of a team plays a unique role, bringing a different set of personal strengths and weaknesses that help contribute to the team's success.
- Help students understand that members of a team can use their personal strengths to compliment the strengths of their team members, making the team stronger than it would be if each person were working alone.
- Discuss the personalities of each of the Teenage Mutant Ninja Turtles (see page 11 for details) and how their personal strengths allow them to contribute to the team in their own unique ways.
- Distribute the Personal Strengths vocabulary list on page 12. Have students read over the list of possible personal strengths and use resource materials such as dictionaries or websites to look up the meaning of any unfamiliar words.
- Students should discuss the list of strengths, brainstorming how these different strengths might help someone contribute to a team.
- Remind students to follow their rules of good communication established in Experience 1, and also to follow guidelines for good discussions, such as taking turns speaking.
- Have students reflect on their own strengths. What are they particularly good at? What do they like to do?
- Have students create a list of their own personal strengths. These strengths can be from the vocabulary list and/or ones that they have thought of on their own.

- Explain that these personal strengths are ways that they can contribute to a team in their own unique ways.
- Have students write a short explanatory piece about what they see as their personal strengths and how these strengths would help them contribute to a team. Be sure to encourage students to use examples.

ALLIES

Although the four Teenage Mutant Ninja Turtles are a team, they do not always work alone. The Turtles have a variety of allies that often help them out. These allies, though not really a part of the brothers' team, still play a valuable role in helping the team overcome the bad guys. These characters have different origin stories in different Teenage Mutant Ninja Turtle properties, but the new animated series on Nickelodeon provides the most recent versions.

- **Master Splinter:** Once a human martial arts master named Hamato Yoshi, an encounter with mutagen transformed him into a half-human half-rat now called Master Splinter. He took the Turtles in and raised them as his own sons, training them as ninjas.
- **April O'Neil:** April is a young human girl who befriends the Turtles after they rescue her from a kidnapping. The Turtles help her search for her kidnapped father, and Master Splinter trains her as a kunoichi, or female ninja.
- **Casey Jones:** A human teenage vigilante, Casey becomes good friends with the Turtles. He is a skilled fighter, and has a temper and a strong sense of justice.

- Students' written pieces should be written in paragraph(s) form, introducing the topic (personal strength), providing details about the topic, and providing a concluding statement (how the strength will help their team).

- These written pieces should display proper use of English language writing conventions, such as spelling, grammar, and punctuation.

TURTLE CHARACTER PROFILES

Each of the Turtles has a unique personality and brings his own skills and strengths to the Ninja Turtles team. Without these different strengths and personalities, the team would not be nearly as successful as they are.



LEONARDO

Wants to be the leader and likes to show off his skills. He is self-confident, hardworking, and optimistic. He cares very much about his brothers and wants to be the best so he doesn't let them down.

MICHELANGELO

The "goofball" of the group, Mikey uses humor to get attention and make people like him. He is funny, but a little immature. He keeps the mood light and tries to make his brothers laugh.



RAPHAEL

He can be a bit of a hothead, with a grim, brusque demeanor. Raph is always ready for a fight, sometimes letting his temper get the best of him, but he is ready to rise to a challenge.

DONATELLO

The "smart" one, Donnie is intelligent and likes to think his way through problems, creating fascinating inventions to help along the way. These inventions may not always work as expected, but he doesn't let that dampen his enthusiasm.





PERSONAL STRENGTHS

Name: _____

artistic
clever
collaborative

creative
leader
good listener

logical
problem solver
strong

supportive
good writer

[illegible]



EXPERIENCE 3: TEAM "BUILDING"

The Teenage Mutant Ninja Turtles work together to solve many challenges. In this experience, students will work together as a team to solve a challenge of their own. Using found materials and creative thinking, students will design and build a device to accomplish a predetermined goal: a mini-pizza transporter that can deliver its cargo over a specific distance. In teams, students will need to brainstorm together and test and revise their device until it meets the goal, a process that will require good communication and all the strengths and skills each team member brings to the group. Students are unlikely to succeed the first time, but they will learn from their mistakes and see how hard work and self-discipline will help them meet the challenge at hand.

ACADEMIC STANDARDS

Indiana Standards

English Language Arts – Speaking and Listening: 2.SL.1, 2.SL.2.1, 2.SL.2.3, 2.SL.2.4, 2.SL.2.5; 3.SL.1, 3.SL.2.1, 3.SL.2.3, 3.SL.2.4, 3.SL.2.5; 4.SL.1, 4.SL.2.1, 4.SL.2.3, 4.SL.2.4, 4.SL.2.5

Science: The Process Design Standards, Grades 2–4; 4.4.4

National Standards

Next Generation Science Standards: K-2-ETS1-1, K-2-ETS1-2; 3-5-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3

English Language Arts – Speaking and Listening: SL.2.1A, SL.2.1B, SL.2.1C, SL.2.3; SL.3.1A, SL.3.1B, SL.3.1C, SL.3.1D, SL.3.3; SL.4.1A, SL.4.1B, SL.4.1C, SL.4.1D



PROCEDURES

- Explain to students that Donatello is the inventor on the Turtles team and that he loves to design new devices and inventions to help in their fight against evil. In this experience, the students will be working together in small groups to accomplish a design challenge as a team.
- Remind students of what they learned in Experiences 1 and 2, particularly the rules they established for good communication and the importance of their personal strengths.
- Divide the class into groups of 4 or 5 students and rearrange seating as necessary to allow the groups to work together.
- Explain to students that the context of this Experience may be Teenage Mutant Ninja Turtles, but the steps they are about to follow—brainstorming, testing, and refining a solution—are all part of the engineering design process.
- Distribute the *Design Challenge: Pizza Delivery!* handout on page 15 to each group and give them time to read over the handout.
- Ask students to define the problem. What is it that they need to accomplish with their design? See the Teacher Tip below for other requirements that can be added to the challenge to increase the difficulty.

Teacher Tip

Looking for More of a Challenge?

You can increase the difficulty level of this design process by adding additional parameters to the task. Some examples of parameters you can use are:

- Limit the amount of supplies available to students
- Require that the device be some form of vehicle
- Require the device to be something other than a vehicle
- What other kinds of parameters could you suggest?

- Explain that each group will have access to the same materials to create their device and they can use their materials in any way they choose to accomplish the goal.
- Next, give students time to discuss what roles they might be able to play on their teams, just as each of the Turtles plays a role on his team. Remind students to think about what strengths they identified for themselves in Experience 2. For example, a student who considers himself or herself a leader might be responsible for keeping the team on task. One who is good at writing might take notes during brainstorming sessions. A student who self-identifies as artistic might draft diagrams of the team's designs.
- Give teams time to brainstorm solutions to their pizza delivery problem. Explain that in brainstorming it is important to listen to the ideas of all team members and build on each other's ideas. Students should ask and

answer questions to help clarify each other's ideas.

- Brainstorming should focus on this question: *What kinds of devices can we build to accomplish the goal of moving our pizza the specified distance?* Students should document the brainstorming session with notes and drawings to illustrate their ideas.
- Remind students to follow the rules for good communication that they developed in Experience 2 during these brainstorming sessions.
- Students should select a design and collect the materials they need to build a prototype to test their design.
- Once students have built their prototype, they will need to test it to see how well it works to accomplish the goal. Students should run their tests several times, keeping notes about how well the design works, or what goes wrong. These tests should include measurements, such as the distance the device is able to transport the pizza.

- Assure students that very few prototypes work the first time, not even Donatello's. A device that does not work as planned during the first attempt is an opportunity to learn more about the prototype's design. If the device they created doesn't meet the goals of the challenge yet, teams should discuss possible revisions. How can the design be revised or changed to improve its function?
- Teams should repeat the testing and revision process, if necessary, until they meet the goals of the challenge. If a design idea needs to be entirely discarded, that is fine, too. Students may even learn more from their failed attempts than from success.
- Students will be considered successful when their device manages to repeatedly deliver the pizza to its destination several times.

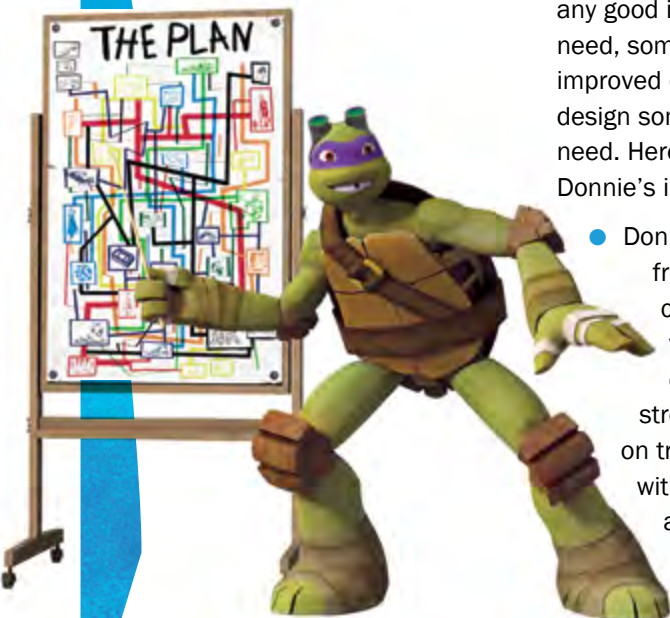
DONNIE'S INVENTIONS

Donatello uses his special skills to create inventions that help the Turtles in their fight against evil. Like any good inventor, Donnie sees a need, something that needs to be improved or created, and works to design something new to fill that need. Here are a few examples of Donnie's inventions:

- Donnie built the Shellraiser from an abandoned subway car. The tank-like tactical vehicle is designed to run on wheels through the streets or sewers as well as on train tracks. It is designed with infrared sensors and a variety of defensive weapons, including a pizza grease oil slick,

a smoke screen, and a cannon that can shoot manhole covers, garbage balls, or pizzas.

- Monitors in the Turtles Shellraiser tap into security footage and allow Donatello to keep an eye out for his brothers and help from a distance.
- Ooze Scanners/Mutagen Trackers allow Donnie to track down missing canisters of the dangerous mutagenic Ooze.
- Donnie invented the Ooze Specs, special goggles to allow him to see trails of mutagen not visible to the naked eye.





EXPERIENCE 3 – STUDENT HANDOUT

DESIGN CHALLENGE: PIZZA DELIVERY!

Team members: _____

It is dinnertime and the Turtles need your help! The Turtles have ordered their favorite dinner, pizza, but they are having trouble getting it delivered to their current location. The pizza delivery driver will bring the pizza only so far, but where the Turtles are training is farther away.

Can you design and build a device to transport the pizza the rest of the way?

Your devices should be able to move the pizza from one location to a location 10 feet away without the pizza touching the ground.

Define the problem: _____

Brainstorming notes: _____

PROTOTYPE DESIGN

TEST TRIALS		TEST TRIALS AFTER REVISION	
Test #	Distance Traveled	Test #	Distance Traveled

Possible revisions: _____

PIZZA!

Like most teenagers, the Turtles love pizza, especially Michelangelo. Pizza was one of the first things they discovered after leaving the sewers to explore the world above, and it has become more than just a favorite treat. Pizza saved the day when the Turtles faced off against Ho Chan, a magical martial arts expert who brainwashed three of the Turtles. It can also be used as weapon, shot out of the Shellraiser cannon. There is even a pizza-themed villain, Pizza Face, created when Antonio, a pizzeria owner, is exposed to mutagenic Ooze. Needless to say, pizza plays a very important role in the world of the Teenage Mutant Ninja Turtles.





CULMINATING EXPERIENCE: BETTER TOGETHER

Once the devices are built, groups will share their final design with the rest of the class. Students will be able to see how each group found their own way to complete the challenge and will discuss how each team member contributed to the final product. Students will also consider how working in teams allowed them to accomplish a goal they might not have been able to meet as easily on their own.

ACADEMIC STANDARDS

Indiana Standards

English Language Arts – Speaking and Listening: 2.SL.4.1, 2.SL.4.2; 3.SL.4.1, 3.SL.4.2; 4.SL.4.1, 4.SL.4.2

English Language Arts – Writing: 2.W.1, 2.W.3.2, 2.W.6.1; 3.W.1, 3.W.3.2, 3.W.6.1; 4.W.1

Science: The Process Design Standards, Grades 2–4

National Standards

English Language Arts – Speaking and Listening: SL.2.4; SL.3.4; SL.4.4

English Language Arts – Writing: W.2.2; W.3.2; W.4.2

PROCEDURES

- Explain to students that they will be giving a formal presentation to the class about their device.
- Give teams time to plan their presentations. In these presentations, students should:
 - Demonstrate how their device works
 - Use visual aids, such as diagrams and the prototype, to discuss their design process
 - Share the difficulties they encountered in designing and revising their devices
 - Explain how they overcame these difficulties
- Teams should assign parts of the presentation to different team members so that each student is responsible for part of the presentation.
- Presenters should speak clearly and loud enough to be heard.
- Allow time for students to ask and answer questions about each team's designs.
- After all of the teams have presented their devices, ask students to think about their experiences working as a team.
- Ask students to discuss what went well and what went less well working as a team.
- Ask: How did each team member contribute to the project? Encourage students to offer specific examples of how different team members played different roles.
- Have students discuss how working in a team was different from working alone on this project. Would they have been able to do what they did working by themselves?
- After the discussion, have students write a short reflective essay about their experience. What was it like working with a team? What role did they and the other team members play? How was working as a team different from working on their own?
- These essays should be written in paragraph form, provide details about their experience, and include both an introduction and conclusion.
- These essays should conform to standard use of English grammar, spelling, and punctuation.

RESOURCES

Nickelodeon

nick.com/ninja-turtles

The home of the Teenage Mutant Ninja Turtles online, the Nickelodeon website offers videos, games, and other content for the Heroes in a Half Shell.

Casey, Susan. *Kids Inventing! A*

Handbook for Young Inventors.
Hoboken, NJ: John Wiley, 2005.

This book offers children easy-to-follow instructions for transforming ideas into reality.

Books

Check out your local library for books chronicling the adventures of the Teenage Mutant Ninja Turtles. A variety of books are available for readers of varying age and ability, from picture books to comic books.

The library also offers books about inventions and inventors, such as:

Sandler, Martin. *Inventors.* New York:

HarperCollins Publishers, 1996.

This book highlights American inventors from the 19th and early 20th centuries and their inventions.

Williams, Marcia. *Hooray for Inventors!* Cambridge, MA:

Candlewick Press, 2005.

This highly accessible comic-style book shares the stories behind some of the inventions that changed the world.

Turner, Tracey. *100 Inventions that Made History: Brilliant Breakthroughs that Shaped Our World.* New York: DK Publishing, 2014.

This book looks at inventions and technological advances that changed the world and the way we live.

INDIANA ACADEMIC STANDARDS

English Language Arts – Speaking and Listening

2.SL.1 Listen actively and adjust the use of spoken language (e.g., *conventions, vocabulary*) to communicate effectively with a variety of audiences and for different purposes.

2.SL.2.1 Participate in collaborative conversations about grade-appropriate topics and texts with peers and adults in small and larger groups.

2.SL.2.3 Listen to others, take one's turn in respectful ways, and speak one at a time about the topics and text under discussion.

2.SL.2.4 Ask for clarification and further explanation as needed about the topics and texts under discussion.

2.SL.2.5 Build on others' talk in conversations by linking comments to the remarks of others.

2.SL.3.2 Ask and answer questions about what a speaker says to clarify comprehension, gather information, or deepen understanding of a topic or issue.

2.SL.4.1 Using appropriate language, recite poems and rhymes, and tell a story or recount an experience, in an organized manner, with appropriate facts and careful attention to sensory details, speaking audibly in coherent sentences and at an appropriate pace.

2.SL.4.2 Create simple presentations that maintain a clear focus, using various media when appropriate to clarify ideas, thoughts, and feelings.

2.SL.4.3 Give and follow multi-step directions.

3.SL.1 Listen actively and adjust the use of spoken language (e.g., *conventions, style, vocabulary*) to communicate effectively with a variety of audiences and for different purposes.

3.SL.2.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) on grade-appropriate topics and texts, building on others' ideas and expressing personal ideas clearly.

3.SL.2.3 Demonstrate knowledge and use of agreed-upon rules for discussions and identify and serve in roles for small group discussions or projects.

3.SL.2.4 Ask questions to check understanding of information presented, stay on topic, and link comments to the remarks of others.

3.SL.2.5 Explain personal ideas and understanding in reference to the discussion.

3.SL.3.2 Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.

3.SL.4.1 Using appropriate language, report on a topic or text, or provide a narrative that organizes ideas chronologically or around major points of information, with appropriate facts and relevant, descriptive details, speaking at an understandable pace, in a clear, concise manner.

3.SL.4.2 Create oral presentations that maintain a clear focus, using various media when appropriate to emphasize or enhance certain facts or details.

4.SL.1 Listen actively and adjust the use of spoken language (e.g., *conventions, style, vocabulary*) to communicate effectively with a variety of audiences and for different purposes

4.SL.2.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) on grade-appropriate topics and texts, building on others' ideas and expressing personal ideas clearly.

4.SL.2.3 Demonstrate knowledge and use of agreed-upon rules for discussions and carry out assigned roles.

4.SL.2.4 Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.

4.SL.4.1 Using appropriate language, report on a topic or text or provide a narrative in an organized manner, with effective introductions and conclusions, using appropriate structure, appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly and concisely at an understandable pace.

4.SL.4.2 Create oral presentations that maintain a clear focus, using multimedia to enhance the development of main ideas and themes that engage the audience.

English Language Arts – Writing

2.W.1 Write routinely over brief time frames and for a variety of tasks, purposes, and audiences; apply reading standards to write in response to literature and nonfiction texts.

2.W.3.2 Write a paragraph or paragraphs on a topic that introduce a topic, provide facts and details about the topic, and provide a concluding statement.

2.W.6.1 Demonstrate command of English grammar and usage.

3.W.1 Write legibly in print or cursive, leaving space between letters in a word, words, in a sentence, and words and the edges of the paper.

3.W.3.2 Write informative compositions on a variety of topics that –

- State the topic, develop a main idea for the introductory paragraph, and group related information together.
- Develop the topic with facts and details.
- Connect ideas within categories of information using words and phrases.
- Use text features (e.g., *pictures, graphics*) when useful to aid comprehension.
- Provide a concluding statement or section.

3.W.6.1 Demonstrate command of English grammar and usage.

4.W.1 Write routinely over a variety of time frames and for a range of discipline-specific tasks, purposes, and audiences; apply reading standards to support reflection and response to literature and nonfiction texts.

4.W.3.2 Write informative compositions on a variety of topics that –

- Provide an introductory paragraph with a clear main idea.
- Provide supporting paragraphs with topic and summary sentences.
- Provide facts, specific details, and examples from various sources and texts to support ideas and extend explanations.
- Connect ideas using words and phrases.

INDIANA ACADEMIC STANDARDS

- Include text features (e.g., *formatting*, *pictures*, *graphics*) and multimedia when useful to aid comprehension.
- Use language and vocabulary appropriate for audience and topic.
- Provide a concluding statement or section.

4.W.6.1 Demonstrate command of English grammar and usage.

Mathematics – Geometry

2.G.1 Identify, describe, and classify two- and three-dimensional shapes (triangle, square, rectangle, cube, right rectangular prism) according to the number and shape of faces and the number of sides and/or vertices. Draw two-dimensional shapes.

Science

Process Design Standards, Grades 2–4: As citizens of the constructed world, students will participate in the design process. Students will learn to use materials and tools safely and employ the basic principles of the engineering design process in order to find solutions to problems.

- Identify a need or problem to be solved.
- Document the design throughout the entire design process.
- Brainstorm potential solutions.
- Select a solution to the need or problem.
- Select the materials to develop a solution.
- Create the solution.
- Evaluate and test how well the solution meets the goal.
- Communicate the solution with drawings or prototypes.
- Communicate how to improve the solution.

4.4.4 Define a problem in the context of motion and transportation. Propose a solution to this problem by evaluating, reevaluating and testing the design. Gather evidence about how well the design meets the needs of the problem. Document the design so that it can be easily replicated.

NATIONAL STANDARDS

English Language Arts – Speaking and Listening:

SL.2.1.A Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).

SL.2.1B Build on others' talk in conversations by linking their comments to the remarks of others.

SL.2.1.C Ask for clarification and further explanation as needed about the topics and texts under discussion.

SL.2.3 Ask and answer questions about what a speaker says in order to clarify comprehension, gather additional information, or deepen understanding of a topic or issue.

SL.2.4 Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences.

SL.3.1A Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion.

SL.3.1.B Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).

SL.3.1.C Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others.

SL.3.1D Explain their own ideas and understanding in light of the discussion.

SL.3.3 Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.

SL.3.4 Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.

SL.4.1A Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion.

SL.4.1.B Follow agreed-upon rules for discussions and carry out assigned roles.

SL.4.1.C Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.

SL.4.1D Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.

SL.4.4 Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

English Language Arts – Writing

W.2.2 Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section.

W.3.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

W.3.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

W.4.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

W.4.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Mathematics – Geometry

2.G.A.1 Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.

Next Generation Science Standards

K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

K-2-ETS1-2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

3-5-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3 Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.