2021 NSBE SEEK

ENGINEERING CURRICULUM GUIDE 4th Grade
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About NSBE

With more than 700 chapters and more than 21,000 active members in the U.S. and abroad, the National Society of Black Engineers (NSBE) is one of the largest student-governed organizations based in the United States. NSBE, founded in 1975, supports and promotes the aspirations of collegiate and pre-collegiate students and technical professionals in engineering and technology. NSBE’s mission is “to increase the number of culturally responsible Black engineers who excel academically, succeed professionally, and positively impact the community.”

Visit www.nsbe.org to learn more.

About SEEK

The National Society of Black Engineers (NSBE) created the Summer Engineering Experience for Kids (SEEK) to inspire Black students with the opportunities and wonders of the STEM fields. SEEK is a free, three-week summer program that offers a fun and engaging educational experience for students in grades 3–5. SEEK aims to provide high-quality learning opportunities to underrepresented students who otherwise may not have access to a robust STEM education.

Visit www.nsbe.org/SEEK to learn more.
THANK YOU TO OUR WEEK 1 SPONSORS

BECHTEL
Honeywell
HOWMET
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Welcome: Week 1

Dear Young Engineers,

Around the world, drone technology is rapidly changing the way we live! Right now, big companies are finding ways to use drones for package delivery and other useful tasks. In fact, a lot of industries are looking at ways to use drones. In the near future, drones could be used in agriculture, environmental conservation, law enforcement, disaster relief, and providing internet access, just to name a few! But there is a problem: all these drones flying around in the future need people to design, build, and FLY them! This week, SEEK students will begin learning the necessary skills to become SEEK-approved Drone Pilots. You will complete three different challenges that will sharpen your drone-flying skills while you also learn about drones and aerospace engineering. Check out the challenges below:

**Challenge #1: Emergency Supply Delivery**
Design and navigate a drone course with at least 3 “dropoff” locations.

**Challenge #2: Obstacle Course Race**
Design and race through your very own drone obstacle course.

**Challenge #3: Creative Use/Trick Contest**
Use the drone to perform a special/creative task or a trick move.

On behalf of the National Society of Black Engineers, we wish you the best of luck!

Sincerely,

The SEEK Team
The SEEK Engineering Design Process

DIRECTIONS: We’ll be using the SEEK Engineering Design Process to explore our projects this week. The Engineering Design Process, or EDP, is a set of steps that engineers use to solve problems and create solutions to challenges. The steps follow the order: **ASK, LEARN, IMAGINE, MODEL, CREATE, TEST, AND IMPROVE**. Notice how the steps go around in a circle (below)? The EDP can be done *over and over again* until you feel your design is *perfect*! Try it out this week. Once you finish your initial design, ask, learn, imagine, model, create, and test it all over again to see how much better your design becomes.
What Is Aerospace Engineering?

Aerospace engineering is the field of engineering concerned with the development of aircraft and spacecraft. It has two major and overlapping branches: aeronautical engineering and astronautical engineering.

What Is an Aerospace Engineer?

- Aeronautical or aerospace engineers are responsible for the research, design, and production of aircraft, spacecraft, aerospace equipment, satellites, and missiles.
- Aerospace engineers work with aircraft. They are involved primarily in designing aircraft and propulsion systems and in studying the aerodynamic performance of aircraft and construction materials.
- Aspiring engineers develop their skills during the four years it takes to earn a bachelor's degree.
- Preparation can begin in high school, with courses in physics, chemistry, and advanced mathematics, such as trigonometry and calculus.

Aisha Bowe creates software solutions for government and corporations. Also, she works hard to close the achievement gap within communities of color.

Focus: Aerospace Engineering
**KWL Chart**

**DIRECTIONS:** KWL charts are meant to help organize your thoughts. Use the following chart to write down what you ALREADY KNOW about drones, aeronautical engineering, etc., as well as what you WANT TO KNOW. Then come back and fill in the last column with what you’ve LEARNED at the end of each day.

<table>
<thead>
<tr>
<th>What you KNOW about drones, aerospace engineering, etc.</th>
<th>What you WANT TO KNOW about drones, Aerospace engineering, etc.</th>
<th>What you’ve LEARNED about drones, Aerospace engineering, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
LEARN

4th Grade Vocabulary List

**Accelerometer**
A sensor used for measuring changes in acceleration; useful to see if a device is in motion

**Altimeters**
A device used to measure the altitude of a given object

**Center of Gravity**
The point at which gravity can be considered to act on an object; sometimes referred to as the balance point

**Center of Lift**
The point of an aircraft through which the total lift force can be considered to act

**Flight Path**
The path of a drone through the air, viewed from the side

**Force Diagram**
A diagram that uses arrows to indicate the direction and strength of the forces acting on an object

**Fuselage**
The central body of an aircraft where propellers, motors, and stabilizers are attached

**Gravity**
The force that pulls objects toward each other; the force that opposes the lift force

**Gyroscope**
A device that measures any changes in pitch, roll, and yaw to help keep the drone balanced

**Lift**
The upward force created by the propeller of an aircraft due to a greater air pressure below than above

**Motor**
A machine that supplies power for a vehicle or for some other device with moving parts

**Receiver**
A device that receives electrical signals or messages

**Thrust**
The force of pushing or propelling

**Transmitter**
A device used to generate and transmit electromagnetic waves carrying messages or signals

**Propeller**
A device that provides lift for the aircraft by spinning and creating an airflow
### 4th Grade Fill-in-the-Blank Worksheet

**DIRECTIONS:** Using your vocabulary knowledge, fill in any blank squares on the following table. In the first column, place the vocabulary word, and the second column is for the definitions. In the last column, draw a picture that best represents what the vocabulary word means to you.

<table>
<thead>
<tr>
<th>Vocabulary Term</th>
<th>Definition</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>A device used to generate and transmit electromagnetic waves carrying messages or signals</td>
<td><img src="image1.png" alt="Image of a device" /></td>
<td></td>
</tr>
<tr>
<td>Center of Gravity</td>
<td>The point of an aircraft through which the total lift force can be considered to act</td>
<td><img src="image2.png" alt="Image of a seesaw" /></td>
</tr>
<tr>
<td>A sensor used for measuring changes in acceleration; useful to see if a device is in motion.</td>
<td><img src="image3.png" alt="Image of an accelerometer" /></td>
<td></td>
</tr>
<tr>
<td>Fuselage</td>
<td>A diagram that uses arrows to indicate the direction and strength of the forces acting on an object</td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Gyroscope</td>
<td><img src="image" alt="Gyroscope Diagram" /></td>
<td></td>
</tr>
<tr>
<td>Lift</td>
<td>The upward force created by the wing of an aircraft due to a greater air pressure below the wing than above it</td>
<td></td>
</tr>
<tr>
<td><strong>Altimeter</strong></td>
<td>A device used to measure the altitude of a given object</td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Thrust</strong></td>
<td>The path of a drone through the air</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A machine that supplies power for a vehicle or for some other device with moving parts</td>
<td></td>
</tr>
<tr>
<td><strong>Receiver</strong></td>
<td>A device that provides lift for the aircraft by spinning and creating an airflow</td>
<td></td>
</tr>
</tbody>
</table>
4th Grade Vocabulary Match Worksheet

**DIRECTIONS:** Using your vocabulary knowledge, match the vocabulary word with the correct description.

<table>
<thead>
<tr>
<th>Definition</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 A device that provides lift for the aircraft by spinning and creating an airflow</td>
<td>A. Thrust</td>
</tr>
<tr>
<td>2 A sensor used for measuring changes in acceleration. Useful to see if a device is in motion</td>
<td>B. Lift</td>
</tr>
<tr>
<td>3 The point of an aircraft through which the total lift force can be considered to act</td>
<td>C. Gyroscope</td>
</tr>
<tr>
<td>4 A device used to measure the altitude of a given object</td>
<td>D. Gravity</td>
</tr>
<tr>
<td>5 The central body of an aircraft where wings and stabilizers are attached</td>
<td>E. Propeller</td>
</tr>
<tr>
<td>6 The force of pushing or propelling</td>
<td>F. Center of Lift</td>
</tr>
<tr>
<td>7 The force that pulls objects toward each other; the force that opposes the lift force</td>
<td>G. Center of Gravity</td>
</tr>
<tr>
<td>8 The upward force created by the wing of an aircraft due to a greater air pressure below the wing than above it</td>
<td>H. Fuselage</td>
</tr>
<tr>
<td>9 A device that measures any changes in pitch, roll, and yaw to help keep the drone balanced</td>
<td>I. Altimeter</td>
</tr>
<tr>
<td>10 The point at which gravity can be considered to act on an object; sometimes referred to as the balance point</td>
<td>J. Receiver</td>
</tr>
<tr>
<td></td>
<td>K. Motor</td>
</tr>
<tr>
<td></td>
<td>L. Accelerometer</td>
</tr>
<tr>
<td></td>
<td>M. Transmitter</td>
</tr>
<tr>
<td></td>
<td>N. Flight Path</td>
</tr>
<tr>
<td></td>
<td>O. Force Diagram</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>11</td>
<td>A machine that supplies power for a vehicle or for some other device with moving parts</td>
</tr>
<tr>
<td>12</td>
<td>A diagram that uses arrows to indicate the direction and strength of the forces acting on an object</td>
</tr>
<tr>
<td>13</td>
<td>A device that receives electrical signals or messages</td>
</tr>
<tr>
<td>14</td>
<td>The path of a drone through the air, viewed from the side</td>
</tr>
<tr>
<td>15</td>
<td>A device used to generate and transmit electromagnetic waves carrying messages or signals</td>
</tr>
</tbody>
</table>
Cultural Connection

Directions: The amazing contributions of Black and Brown people throughout history have helped shape the modern, high-tech world as we know it. Read below to learn more about these amazing leaders.

Bessie Coleman
Bessie Coleman was the first Black woman to earn a pilot’s license. Because flying schools in the United States denied her entry, she taught herself French and moved to France, earning her license from France’s well-known Caudron Brother’s School of Aviation in just seven months. Coleman specialized in stunt flying and parachuting, earning a living barnstorming and performing aerial tricks. To this day, she remains a pioneer of women in the field of aviation.

"I decided Blacks should not have to experience the difficulties I had faced, so I decided to open a flying school and teach other Black women to fly." — Bessie Coleman

C. Alfred (“Chief”) Anderson
A Philadelphia native, C. Alfred Anderson was one of the most talented Black aviators of the 1930s. He taught himself how to fly and earned his pilot's license in 1929 at the age of 22. In 1933, he teamed up with Albert E. Forsythe, a physician from Atlantic City, New Jersey, and the two became the first African Americans to fly across the United States. With Anderson’s skills as a pilot and Forsythe’s financial backing, they made a name for themselves flying long-distance flights. Their “Goodwill Flight” of 1934 was even more ambitious: an aerial trek from the United States to the Caribbean and South America.

Known as the “Father of Black Aviation,” because of his training and mentoring of hundreds of African-American pilots

Bernard A. Harris Jr.
In 1995, Bernard Harris became the first African American to walk in space, during the STS-63 Discovery mission. During this 10-day mission, he served as the payload commander. He was elected by NASA to be an astronaut in 1990.

The first African American to walk in space
Guion ("Guy") Bluford, Ph.D.
Guion "Guy" Bluford was born in Philadelphia, Pennsylvania, on Nov. 22, 1942. He began his career as a pilot in the U.S. Air Force, flying 140 missions during the Vietnam War, before becoming a NASA astronaut in 1979. In 1983, Dr. Bluford became the first African American to travel in space, as a mission specialist aboard the space shuttle Challenger. He later participated in three other space missions.

“I felt an awesome responsibility, and I took the responsibility very seriously, of being a role model and opening another door to Black Americans, but the important thing is not that I am Black but that I did a good job as a scientist and an astronaut. There will be Black astronauts flying in later missions…and they, too, will be people who excel, not simply who are Black...who can ably represent their people, their communities, their country.” — Dr. Guy Bluford

Mae C. Jemison, M.D.
Mae Jemison was the first African-American woman in space. She served as mission specialist on STS-47 Endeavor in 1992. Astronauts on this cooperative mission between the United States and Japan conducted experiments in life science and materials processing. Dr. Jemison was selected as an astronaut candidate by NASA in June 1987.

“Never limit yourself because of others’ limited imagination; never limit others because of your own limited imagination.” — Dr. Mae C. Jemison

Frederick D. Gregory
Col. Frederick D. Gregory became the first Black person to pilot a space shuttle, when he led the Challenger on a seven-day mission in 1985. As an astronaut, he has spent more than 455 hours in outer space and commanded three major space missions from 1985 to 1991. Col. Gregory was a decorated helicopter pilot during the Vietnam War and was a jet test pilot before working with NASA. From 2002 to 2005, Gregory held the second-highest administration position, deputy administrator, with NASA.

The first black space shuttle pilot
Review Questions:
Where did Bessie Coleman learn to fly?

Who was the first African American to walk in space?

Who was the first Black space shuttle pilot?

Name the first African-American woman in space.

Name a Black pilot who taught himself to fly at the age of 22.
DIRECTIONS: Complete the following worksheets by writing your answer on the line provided.

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 27 is _____ times as many as 3.</td>
<td>9</td>
</tr>
<tr>
<td>2) 5 times as many as 8 is _____</td>
<td>4</td>
</tr>
<tr>
<td>3) 54 is 6 times as many as _____</td>
<td>9</td>
</tr>
<tr>
<td>4) 3 times as many as 3 is _____</td>
<td>1</td>
</tr>
<tr>
<td>5) 36 is _____ times as many as 4.</td>
<td>9</td>
</tr>
<tr>
<td>6) 2 times as many as 2 is _____</td>
<td>1</td>
</tr>
<tr>
<td>7) 36 is _____ times as many as 6.</td>
<td>6</td>
</tr>
<tr>
<td>8) 54 is 9 times as many as _____</td>
<td>6</td>
</tr>
<tr>
<td>9) 3 times as many as 2 is _____</td>
<td>1</td>
</tr>
<tr>
<td>10) 14 is 2 times as many as _____</td>
<td>7</td>
</tr>
<tr>
<td>11) 21 is _____ times as many as 7.</td>
<td>3</td>
</tr>
<tr>
<td>12) 48 is 6 times as many as _____</td>
<td>8</td>
</tr>
<tr>
<td>13) 45 is _____ times as many as 5.</td>
<td>9</td>
</tr>
<tr>
<td>14) 15 is 5 times as many as _____</td>
<td>3</td>
</tr>
<tr>
<td>15) 4 times as many as 7 is _____</td>
<td>2</td>
</tr>
<tr>
<td>16) 24 is 3 times as many as _____</td>
<td>8</td>
</tr>
<tr>
<td>17) 81 is _____ times as many as 9.</td>
<td>9</td>
</tr>
<tr>
<td>18) 6 times as many as 5 is _____</td>
<td>3</td>
</tr>
<tr>
<td>19) 9 times as many as 7 is _____</td>
<td>2</td>
</tr>
<tr>
<td>20) 12 is _____ times as many as 4.</td>
<td>3</td>
</tr>
</tbody>
</table>
Shade in the equivalent fraction and answer with shaded fraction.

1) \(\frac{1}{2}\) \(\frac{1x2}{2x2}\)

2) \(\frac{3}{4}\) \(\frac{3x2}{4x2}\)

3) \(\frac{1}{3}\) \(\frac{1x4}{3x4}\)

4) \(\frac{1}{5}\) \(\frac{1x3}{5x3}\)

5) \(\frac{2}{6}\) \(\frac{2x2}{6x2}\)

6) \(\frac{2}{3}\) \(\frac{2x4}{3x4}\)

7) \(\frac{1}{6}\) \(\frac{1x2}{6x2}\)

8) \(\frac{3}{6}\) \(\frac{3x2}{6x2}\)

9) \(\frac{1}{2}\) \(\frac{1x4}{2x4}\)

10) \(\frac{1}{4}\) \(\frac{1x2}{4x2}\)

Answers:
1. ____________
2. ____________
3. ____________
4. ____________
5. ____________
6. ____________
7. ____________
8. ____________
9. ____________
10. ____________
## 4th Grade Math Worksheet #3 — Multiplication WithMultiples of Ten

**DIRECTIONS:** Complete the following worksheets by writing your answer on the line provided.

<table>
<thead>
<tr>
<th>Solve each problem.</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1) $\frac{32}{x}80$</td>
<td>2) $\frac{15}{x}20$</td>
<td>3) $\frac{82}{x}20$</td>
<td></td>
</tr>
<tr>
<td>$\times 60$</td>
<td>$\times 40$</td>
<td>$\times 10$</td>
<td></td>
</tr>
<tr>
<td>4) $\frac{77}{x}60$</td>
<td>5) $\frac{56}{x}40$</td>
<td>6) $\frac{44}{x}10$</td>
<td></td>
</tr>
<tr>
<td>$\times 90$</td>
<td>$\times 10$</td>
<td>$\times 50$</td>
<td></td>
</tr>
<tr>
<td>7) $\frac{25}{x}90$</td>
<td>8) $\frac{84}{x}10$</td>
<td>9) $\frac{19}{x}50$</td>
<td></td>
</tr>
<tr>
<td>$\times 80$</td>
<td>$\times 10$</td>
<td>$\times 10$</td>
<td></td>
</tr>
<tr>
<td>10) $\frac{26}{x}80$</td>
<td>11) $\frac{69}{x}10$</td>
<td>12) $\frac{52}{x}10$</td>
<td></td>
</tr>
<tr>
<td>$\times 50$</td>
<td>$\times 40$</td>
<td>$\times 10$</td>
<td></td>
</tr>
<tr>
<td>13) $\frac{83}{x}50$</td>
<td>14) $\frac{45}{x}40$</td>
<td>15) $\frac{77}{x}10$</td>
<td></td>
</tr>
<tr>
<td>$\times 70$</td>
<td>$\times 30$</td>
<td>$\times 40$</td>
<td></td>
</tr>
<tr>
<td>16) $\frac{18}{x}70$</td>
<td>17) $\frac{28}{x}30$</td>
<td>18) $\frac{33}{x}40$</td>
<td></td>
</tr>
</tbody>
</table>

**Answers**

<table>
<thead>
<tr>
<th>1.</th>
<th>2.</th>
<th>3.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.</td>
<td>5.</td>
<td>6.</td>
</tr>
<tr>
<td>7.</td>
<td>8.</td>
<td>9.</td>
</tr>
<tr>
<td>10.</td>
<td>11.</td>
<td>12.</td>
</tr>
<tr>
<td>16.</td>
<td>17.</td>
<td>18.</td>
</tr>
</tbody>
</table>
4th Grade Math Worksheet #4 — Determining Angles

DIRECTIONS: Complete the following worksheets by writing your answer on the line provided.

Determine if the angle shown is 'less', 'more' or 'equal' to 90°.

Ex)  1)  2)

3)  4)  5)

6)  7)  8)

9)  10)  11)

12)  13)  14)

15)  16)  17)

18)  19)  20)

Answers

Ex.  less

1.  
2.  
3.  
4.  
5.  
6.  
7.  
8.  
9.  
10.  
11.  
12.  
13.  
14.  
15.  
16.  
17.  
18.  
19.  
20.  
4th Grade Crossword

Directions: Use the definitions at the bottom of the page to fill in the crossword puzzle.

ACROSS
4. A device that measures any changes in pitch, roll, and yaw to help keep the drone balanced
7. A device used to measure the altitude of a given object
9. A device used to generate and transmit electromagnetic waves carrying messages or signals
10. The force of pushing or propelling
11. A sensor used for measuring changes in acceleration; useful to see if a device is in motion
12. A diagram that uses arrows to indicate the direction and strength of the forces acting on an object
14. A device that receives electrical signals or messages
15. The point of an aircraft through which the total lift force can be considered to act

DOWN
1. The path of a drone through the air, viewed from the side
2. The central body of an aircraft where propellers, motors, and stabilizers are attached
3. A machine that supplies power for a vehicle or for some other device with moving parts
5. A device that provides lift for the aircraft by spinning and creating an airflow
6. The upward force created by the propeller of an aircraft due to a greater air pressure below than above
8. The point at which gravity can be considered to act on an object; sometimes referred to as the balance point
13. The force that pulls objects toward each other; the force that opposes the lift force
4th Grade Word Search

**DIRECTIONS:** Search through the scramble below to locate all the words in the word bank at the bottom of the page.

A
C

Accelerometer
Altimeters
Center of Gravity

Center of Lift
Flight Path
Force Diagram

Fuselage
Gravity
Gyroscope

Lift
Motor
Propeller

Receiver
Thrust
Transmitter
Drone Pilot Training Course

DIRECTIONS: Now that we’ve learned about drones and aerospace engineering, we’ll learn how to properly fly our drones. First, we’ll need to get acquainted with the parts of the drone and learn how to put the device together.

PLEASE WATCH THIS FLIGHT INSTRUCTION VIDEO BEFORE FLYING YOUR DRONE.

Click here to access a DIGITAL VERSION of the UFO3000 Drone User Manual.

Next, we need to get comfortable with the remote controls. First, look over the instruction booklet, and read pages 1–9. This exercise is meant to familiarize you with how the basic components of your drone operate. The lessons you learn now will help as you develop more advanced drone-flying skills for competition.

Lesson 1: Pre-Flight Check and Calibration
Before any flight, it’s important to go through a pre-flight checklist to ensure that you haven’t missed anything. Part of the pre-flight checklist is ensuring that you have properly calibrated your drone. Follow the steps listed on pages 10–12 of your User Manual to learn the proper way to check your drone pre-flight and calibrate it (trim adjustments) for a smooth and safe flight!

Lesson 2: Basic Drone Controls
If you want to fly your drone like a pro, you have to learn the controls. Review pages 12–14 to learn how to fly your drone, perform tricks, and more…

Lesson 3: How to Safely Take Off and Land Your Drone
To fly, you have to get yourself off the ground. On page 14, you’ll learn how to take off and land using the one-button press along with a few other flight modes.

**Lesson 4: Flying the Box**
Flight practice time! Flying the Box is the drill that drone pilots practice daily! Check out this video for detailed instructions. Repetition of this flight pattern will help you master your drone and fly safely no matter what situation you find yourself in. If your drone isn’t flying stably upon lift-off, try adjusting the trim as shown to the right. More troubleshooting is available on page 16 of your User Manual.

**Lesson 5: Post-Flight Check and Flight Logbook**
After each flight, it’s a good idea to give your drone a look over to ensure that it’s still in the same condition it was when it took off. Crashes may cause your drone propellers to become loose or misaligned. Also, be sure to take notes during your flights in a drone flight logbook!
Begin to Plan for the Week’s Challenges

**DIRECTIONS:** Use your time now to imagine the ideas you have for this week’s challenges: **Emergency Supply, Obstacle Course, and the Creative Use Contest.** Remember to use whatever extra materials you have available, and check with your parent or guardian before working on your projects!

---

**Challenge #1: Emergency Supply Delivery**
**Description:** In emergency situations, drones can quickly deliver life-saving supplies to people in need. Your challenge is to design and navigate a drone course that has **at least** three landing pads or “drop-off locations.” Check with your parents/guardian before flying your drone. **Be sure to record, and submit your best trial!**

**Challenge #2: Obstacle Course Race**
**Description:** Drones are well-known for their speed and agility. In this challenge, you’ll design and race through your very own obstacle course. Heads up: drone courses typically include a starting line, landing pads, gates, and finish line. Learn more about these items below! Check with your parents/guardian before flying your drone. **Be sure to record, and submit your best trial!**

**Challenge #3: Creative Use/Trick Contest**
**Description:** Use the drone to perform a special/creative task or a trick move. The possibilities here are limitless. Feel free to do research online or elsewhere to see what others are doing. Check with your parents/guardian before flying your drone. **Be sure to record, and submit your best trial!**
To build a fun drone course, you need to take many different things into consideration, including the space and obstacles you will be using. For a drone race, a few things are necessary: landing pads, gates, and a finishing line!

**Landing Pads:** Small, flat platforms that the drone can land and take off from.

**Gates:** Either a hoop or two vertical poles that a drone must fly through to stay on course.

**Starting/Finish Line:** Marks the beginning and end of the course.

Questions
Are there any items you already have that you can use as a landing pad, gate, or finish line (e.g., cardboard or other recycled materials)?

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

Where did you decide to place your drone obstacle course? Did you get your parents’ approval? Tip: Large open spaces are BEST for drone flying, SEEK does NOT recommend that students or parents fly drones inside. When planning to fly your drone outside, you may need to wait for suitable conditions. Wind and other other factors may affect your flying!

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

Which challenge(s) do you think will be the most fun? Which do you think will be the hardest?
MODEL

Sketches

**DIRECTIONS:** Use the following space to sketch out your ideas or designs for the drone courses. Be sure to also create a material list for any items you’ll need. TIP: use recycled materials you have around the house. Remember to use what you have available, and check with your parent or guardian before starting to build!

What special or unique elements did you include in your design(s)?
Using your sketches, create a material list containing all the items you’ll need to complete your build.

Which feature(s) do you think will be the most fun? Which features do you think will be the hardest?
CREATE

Begin to Build

**DIRECTIONS:** Using the designs and material list from the IMAGINE and MODEL sections, you will now build the pieces necessary for your obstacle courses and complete any designs for the Creative Use Contest.

**OBSERVATIONS:**
How many different obstacle courses did you create? How many ideas for the Creative Use Contest did you think of?

Which creative use do you think works best for your purpose? Why?

Which course do you think works best for your purpose? Why?

Do you have any tips to share?
**TEST**

**DIRECTIONS:** It’s finally time to TEST! Use the following tables to keep track of your accomplishments. This will help you find out what’s working well and what can be improved. Be sure to add any notes or tips for getting the best trial!

## Challenge #1: Emergency Supply Delivery

**Description:** In emergency situations, drones can quickly deliver life-saving supplies to people in need. Your challenge is to design and navigate a drone course that has *at least* three landing pads or “drop-off locations.” Check with your parents/guardian before flying your drone. **Be sure to record, and submit your best trial!**

<table>
<thead>
<tr>
<th>Trial</th>
<th>Number of Landing Pads <em>(Try at least three.</em>)</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How did the drone perform?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Which setup do you think works best for you? Why?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Do you have any tips to remember for next time?

________________________________________________________________________

________________________________________________________________________
Challenge #2: Obstacle Course Race

**Description:** Drones are well-known for their speed and agility. In this challenge, you’ll design and race through your very own obstacle course. Heads up: drone courses typically include a starting line, landing pads, gates, and finish line. Check with your parents/guardian before flying your drone. **Be sure to record, and submit your best trial!**

<table>
<thead>
<tr>
<th>Trial</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

How did the drone perform? Were you inside or outside?

________________________________________________________________________________________________________________________________________

Which obstacle course do you think works best for your purpose? Why?

________________________________________________________________________________________________________________________________________

Do you have any tips to remember for next time?

________________________________________________________________________________________________________________________________________

________________________________________________________________________________________________________________________________________
Challenge #3: Creative Use/Trick Contest

**Description:** Use the drone to perform a special/creative task or a trick move. The possibilities here are limitless. Feel free to do research online or elsewhere to see what others are doing. Check with your parents/guardian before flying your drone. **Be sure to record, and submit your best trial!**

<table>
<thead>
<tr>
<th>Special Task/Creative Use Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
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<tr>
<td>2</td>
<td></td>
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<tr>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

How did the drone perform?

______________________________________________________________________________________________________________________________________________________________

______________________________________________________________________________________________________________________________________________________________

______________________________________________________________________________________________________________________________________________________________

Which configuration do you think works best for your purpose? Why?

______________________________________________________________________________________________________________________________________________________________

______________________________________________________________________________________________________________________________________________________________

Do you have any tips to remember for next time?

______________________________________________________________________________________________________________________________________________________________

______________________________________________________________________________________________________________________________________________________________

______________________________________________________________________________________________________________________________________________________________
IMPROVE

DIRECTIONS: Congrats, you’ve made it to the seventh step of SEEK’s Engineering Design Process! You’ve just finished CREATING your design and TESTING it, so now it’s time to IMPROVE! You’ll be asking yourself questions about the performance of your design to see how you can make it better. This step is special, because even though it’s the last step of the EDP, we can begin the cycle all over! Feel free to repeat the SEEK Engineering Design Process until you’re happy with your design.

Did your design work perfectly? Why or why not?

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Submit Your Showcase Challenge Videos

**Directions:** Now it's time to submit your Showcase Challenge videos. The purpose of the challenges is to encourage you to try something new and “think outside of the box.” Use your video submissions to express your **creativity,** and talk about the **WHYs** behind your project. Be sure to share with the judges and sponsors everything you learned the past week. They are super excited to hear from you!

**Additional Presentation Tips:**
- You should explain how your design connects to competition themes or the real world.
- Describe how and why you developed your design. Explain why your design is fun, useful, and unique/special. The judges watch lots of videos. What makes yours different?
- Demonstrate in-depth understanding by using **vocabulary words and describing the science and engineering concepts** behind this week’s challenge.

CLICK HERE TO SUBMIT YOUR FINAL DESIGNS!!
## Math Worksheet Answer Keys

### Interpreting Multiplication

**Name:** **Answer Key**

<table>
<thead>
<tr>
<th>Determine the number that correctly fills in the blank.</th>
<th><strong>Answers</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 27 is ___ times as many as 3.</td>
<td>9</td>
</tr>
<tr>
<td>2) 5 times as many as 8 is ____.__.</td>
<td>40</td>
</tr>
<tr>
<td>3) 54 is 6 times as many as _____.</td>
<td>9</td>
</tr>
<tr>
<td>4) 3 times as many as 3 is _____.</td>
<td>9</td>
</tr>
<tr>
<td>5) 36 is ____ times as many as 4.</td>
<td>9</td>
</tr>
<tr>
<td>6) 2 times as many as 2 is _____.</td>
<td>4</td>
</tr>
<tr>
<td>7) 36 is ____ times as many as 6.</td>
<td>6</td>
</tr>
<tr>
<td>8) 54 is 9 times as many as _____.</td>
<td>6</td>
</tr>
<tr>
<td>9) 3 times as many as 2 is _____.</td>
<td>6</td>
</tr>
<tr>
<td>10) 14 is 2 times as many as _____.</td>
<td>7</td>
</tr>
<tr>
<td>11) 21 is ____ times as many as 7.</td>
<td>3</td>
</tr>
<tr>
<td>12) 48 is 6 times as many as _____.</td>
<td>8</td>
</tr>
<tr>
<td>13) 45 is ____ times as many as 5.</td>
<td>9</td>
</tr>
<tr>
<td>14) 15 is 5 times as many as _____.</td>
<td>3</td>
</tr>
<tr>
<td>15) 4 times as many as 7 is _____.</td>
<td>28</td>
</tr>
<tr>
<td>16) 24 is 3 times as many as _____.</td>
<td>8</td>
</tr>
<tr>
<td>17) 81 is ____ times as many as 9.</td>
<td>9</td>
</tr>
<tr>
<td>18) 6 times as many as 5 is _____.</td>
<td>30</td>
</tr>
<tr>
<td>19) 9 times as many as 7 is _____.</td>
<td>63</td>
</tr>
<tr>
<td>20) 12 is ____ times as many as 4.</td>
<td>3</td>
</tr>
</tbody>
</table>
Shade in the equivalent fraction and answer with shaded fraction.

1) \( \frac{1}{2} \)  \( \frac{1 \times 2}{2 \times 2} \)
2) \( \frac{3}{4} \)  \( \frac{3 \times 2}{4 \times 2} \)
3) \( \frac{1}{3} \)  \( \frac{1 \times 4}{3 \times 4} \)
4) \( \frac{1}{5} \)  \( \frac{1 \times 3}{5 \times 3} \)
5) \( \frac{2}{6} \)  \( \frac{2 \times 2}{6 \times 2} \)
6) \( \frac{2}{3} \)  \( \frac{2 \times 4}{3 \times 4} \)
7) \( \frac{1}{6} \)  \( \frac{1 \times 2}{6 \times 2} \)
8) \( \frac{3}{6} \)  \( \frac{3 \times 2}{6 \times 2} \)
9) \( \frac{1}{2} \)  \( \frac{1 \times 4}{2 \times 4} \)
10) \( \frac{1}{4} \)  \( \frac{1 \times 2}{4 \times 2} \)
<table>
<thead>
<tr>
<th>Problem</th>
<th>Answer</th>
<th>Answer</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 32 × 80</td>
<td>2,560</td>
<td>2,560</td>
<td></td>
</tr>
<tr>
<td>2) 15 × 20</td>
<td>300</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>3) 82 × 20</td>
<td>1,640</td>
<td>1,640</td>
<td></td>
</tr>
<tr>
<td>4) 77 × 60</td>
<td>4,620</td>
<td>4,620</td>
<td></td>
</tr>
<tr>
<td>5) 56 × 40</td>
<td>2,240</td>
<td>2,240</td>
<td></td>
</tr>
<tr>
<td>6) 44 × 10</td>
<td>440</td>
<td>440</td>
<td></td>
</tr>
<tr>
<td>7) 25 × 90</td>
<td>2,250</td>
<td>2,250</td>
<td></td>
</tr>
<tr>
<td>8) 84 × 10</td>
<td>840</td>
<td>840</td>
<td></td>
</tr>
<tr>
<td>9) 19 × 50</td>
<td>950</td>
<td>950</td>
<td></td>
</tr>
<tr>
<td>10) 26 × 80</td>
<td>2,080</td>
<td>2,080</td>
<td></td>
</tr>
<tr>
<td>11) 69 × 10</td>
<td>690</td>
<td>690</td>
<td></td>
</tr>
<tr>
<td>12) 52 × 10</td>
<td>520</td>
<td>520</td>
<td></td>
</tr>
<tr>
<td>13) 83 × 50</td>
<td>4,150</td>
<td>4,150</td>
<td></td>
</tr>
<tr>
<td>14) 45 × 40</td>
<td>1,800</td>
<td>1,800</td>
<td></td>
</tr>
<tr>
<td>15) 77 × 10</td>
<td>770</td>
<td>770</td>
<td></td>
</tr>
<tr>
<td>16) 18 × 70</td>
<td>1,260</td>
<td>1,260</td>
<td></td>
</tr>
<tr>
<td>17) 28 × 30</td>
<td>840</td>
<td>840</td>
<td></td>
</tr>
<tr>
<td>18) 33 × 40</td>
<td>1,320</td>
<td>1,320</td>
<td></td>
</tr>
</tbody>
</table>
Determining relation to 90°

Determine if the angle shown is 'less', 'more' or 'equal' to 90°.

Ex) 1) 55° 2) 54° 3) 90° 4) 90° 5) 146° 6) 66° 7) 120° 8) 60° 9) 155° 10) 90° 11) 90° 12) 90° 13) 155° 14) 90° 15) 123° 16) 90° 17) 132° 18) 125° 19) 90° 20) 10°

Answers
Ex.

1. less
2. less
3. equal
4. equal
5. more
6. less
7. more
8. less
9. more
10. equal
11. equal
12. equal
13. more
14. equal
15. more
16. equal
17. more
18. more
19. less
20. less
THANK YOU TO OUR WEEK 2 SPONSORS

BOEING

the human energy company

Cummins

Medtronic

John Deere
Welcome: Week 2

Dear Young Engineers,

Self-driving (autonomous) electric vehicles are the next big thing in tech! American car companies are trying to make the transition, but they need YOUR help. The American car industry has asked SEEK students to design several different types of autonomous vehicles that can navigate through different environments and accomplish tasks (such as saving people during emergencies). For this challenge, SEEK students will be using the mBot robotics kit to learn the fundamentals of mechanical engineering and autonomous vehicles, while solving real-life problems.

To ensure that SEEK students develop awesome, high-performing robots, the following challenges have been designed to highlight different aspects of the curriculum. The challenges are as follows:

**Challenge #1: Delivery Route**

Program your robot to transport objects from one location to another.

**Challenge #2: Obstacle Course Race**

Design your very own obstacle course, and program your autonomous robot to race through it.

**Challenge #3: Creative Use/Trick Contest**

Use the robot to perform a special/creative task, and explain why it's helpful.

On behalf of the National Society of Black Engineers, we wish you the best of luck!

Sincerely,

The SEEK Team
The SEEK Engineering Design Process

**DIRECTIONS:** We'll be using the SEEK Engineering Design Process to explore our projects this week. The Engineering Design Process, or EDP, is a set of steps that engineers use to solve problems and create solutions to challenges. The steps follow the order: **ASK, LEARN, IMAGINE, MODEL, CREATE, TEST, AND IMPROVE.** Notice how the steps go around in a circle (below)? The EDP can be done *over and over again* until you feel your design is *perfect!* Try it out this week. Once you finish your initial design, ask, learn, imagine, model, create, and test it all over again to see how much better your design becomes.
What Is Mechanical Engineering?

Mechanical engineering is one of the broadest engineering disciplines. Mechanical engineers design, develop, build, and test. They deal with anything that moves, from components to machines to the human body.

What Is an Autonomous Car?

An autonomous car is capable of sensing its environment and operating without humans involved. An autonomous car can go anywhere a traditional car goes and do everything that an experienced human driver does.

What Is a Mechanical Engineer?

Mechanical engineers play an important role in the automotive, aerospace, biotechnology, computer and electronics, automation, and manufacturing industries. They can design and manufacture everything from small parts to large machine tools such as drill presses. Examples of products that mechanical engineers can design and develop are engine parts; aircraft engines; prosthetic devices; disk drives; printers; sensors; wind turbines; fuel cells; compressors; robots; and machine tools!

Some of the Key Skills for Mechanical Engineers

- The ability to work under pressure
- Problem-solving skills
- Creativity
- Interpersonal skills
- Verbal and written communication skills
- Team-working skills

Dr. Aprille Ericsson-Jackson works on NASA missions to bring dust from space back to Earth.

Focus: Mechanical Engineering
**KWL Chart**

**DIRECTIONS:** KWL charts are meant to help organize your thoughts. Use the following chart to write down what you already know about robotics and mechanical engineering as well as what you WANT TO KNOW. Then come back and fill in the last column with what you’ve LEARNED at the end of each day.

<table>
<thead>
<tr>
<th><strong>What you KNOW</strong> about robotics and mechanical engineering</th>
<th><strong>What you WANT TO KNOW</strong> about robotics and mechanical engineering</th>
<th><strong>What you’ve LEARNED</strong> about robotics and mechanical engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>
4th Grade Vocabulary List

**LED**
A light-emitting diode

**Assemble**
Fitting together the separate parts of an object

**Force**
A natural power or effect that can change the speed or direction of something

**Motor**
A machine that supplies power for a vehicle or for some other device with moving parts

**Gear**
A toothed wheel that can change the speed of an engine

**Axle**
A pin, bar, or shaft that a pair of wheels can rotate on

**Frame**
The basic structure and shape of an object

**Wheel**
A circular object that revolves on a straight rod, the axle, to make it move easily

**Rotation**
Movement in a circular direction

**Battery Holder**
The part of the machine where the battery sits

**Simple Machines**
A device that makes work easier by magnifying or changing the direction of a force

**Receiver**
A device that receives electrical signals and waves

**Sensor**
A device that detects heat, light, sound, motion, etc., and then reacts to it in a particular way

**Mechanical**
Relating to machines

**Diameter**
The distance through the center of something from one side to the other
### 4th Grade Fill-in-the-Blank Worksheet

**DIRECTIONS:** Using your vocabulary knowledge, fill in each blank square in the following table. In the Image column, draw a picture that best represents what the vocabulary word means to you.

<table>
<thead>
<tr>
<th>TERM</th>
<th>DEFINITION</th>
<th>PICTURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A light-emitting diode</td>
<td>The part of the machine where the battery sits</td>
<td><img src="image1.png" alt="Battery Holder" /></td>
</tr>
<tr>
<td>Force</td>
<td>A circular object that revolves on a straight rod, the axle, to make it move easily</td>
<td><img src="image2.png" alt="Force" /></td>
</tr>
</tbody>
</table>

---

**Image 1:** Battery Holder

**Image 2:** Force
<table>
<thead>
<tr>
<th><strong>Motor</strong></th>
<th>A device that receives electrical signals and waves</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frame</strong></td>
<td>A toothed wheel that can change the speed of an engine</td>
</tr>
<tr>
<td><strong>Assemble</strong></td>
<td>Fitting together the separate parts of an object</td>
</tr>
<tr>
<td><strong>Axle</strong></td>
<td>A pin, bar, or shaft that a pair of wheels can rotate on</td>
</tr>
<tr>
<td>----------------</td>
<td>----------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Rotate</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Simple Machine</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Mechanical</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Sensor</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Diameter</strong></td>
<td></td>
</tr>
</tbody>
</table>
# 4th Grade Match Activity

**DIRECTIONS:** Match the vocabulary word with the correct description.

<table>
<thead>
<tr>
<th>Definition</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A light-emitting diode</td>
<td>A. Wheel</td>
</tr>
<tr>
<td>2. The part of the machine where the battery sits</td>
<td>B. Gear</td>
</tr>
<tr>
<td>3. A natural power or effect that is able to change the speed or direction of something</td>
<td>C. Sensor</td>
</tr>
<tr>
<td>4. A circular object that revolves on a straight rod, the axle, to make it move easily</td>
<td>D. Axle</td>
</tr>
<tr>
<td>5. A machine that supplies power for a vehicle or for some other device with moving parts</td>
<td>E. Mechanical</td>
</tr>
<tr>
<td>6. A device that receives electrical signals and waves</td>
<td>F. Battery Holder</td>
</tr>
<tr>
<td>7. The basic structure and shape of an object</td>
<td>G. Receiver</td>
</tr>
<tr>
<td>8. A toothed wheel that can change the speed of an engine</td>
<td>H. Rotation</td>
</tr>
<tr>
<td>9. Fitting together the separate parts of an object</td>
<td>I. Frame</td>
</tr>
<tr>
<td>10. A pin, bar, or shaft that a pair of wheels can rotate on</td>
<td>J. Motor</td>
</tr>
<tr>
<td>11. Movement in a circular direction</td>
<td>K. Force</td>
</tr>
<tr>
<td>12. A device that makes work easier by magnifying or changing the direction of a force</td>
<td>L. Diameter</td>
</tr>
<tr>
<td>13. Relating to machines</td>
<td>M. Simple Machines</td>
</tr>
<tr>
<td>14. A device that detects heat, light, sound, motion, etc., and then reacts to it in a particular way</td>
<td>N. LED</td>
</tr>
<tr>
<td>15. The distance through the center of something from one side to the other</td>
<td>O. Assemble</td>
</tr>
</tbody>
</table>
Cultural Connection

**Directions:** The amazing contributions of Black and Brown people throughout history and even today are helping shape the modern, high-tech world as we know it. Read more below to learn more about these amazing Black and Brown leaders.

**Silas Adekunle**
A Nigerian inventor and entrepreneur, known for creating the world's first intelligent gaming robot, has become the highest-paid robotics engineer in the world after signing a new deal with Apple Inc. in 2018.

**The SpelBots**
The goal of SpelBots, Spelman College’s robotics team, was to encourage students and young women of African descent to explore robotics and computer science. The SpelBots, founded in 2004 by Andrew Williams, Ph.D., made history in 2005 as the first all-female, all African-American undergraduate team to qualify for and compete in the International RoboCup four-legged robot soccer competition. In another history-making moment, the SpelBots tied for first place in the RoboCup Japan 2009 Standard Platform League Nao League humanoid soccer championship.

**Lonnie Johnson**
Lonnie Johnson (born in 1949) used to build robots and cook up batches of rocket fuel in his kitchen when he was a boy. As an adult, he worked on NASA’s Mars Observer project and on the mission to Saturn. Later in his life, Dr. Johnson used his training in astrophysics to invent fun tools and toys. He connected one of his inventions to the bathroom sink, which made a powerful stream of water squirt across the room. He called his invention the Power Drencher, but later changed the name to Super Soaker!

**Ayanna Howard, Ph.D.**
Dr. Howard is the founder and chief technology officer of Zyrobotics, a company that uses machine learning and robots to make educational toys for kids, with a particular emphasis on helping those with special needs. Dr. In addition, Howard is dean of the College of Engineering at The Ohio State University, where she is also a professor of electrical and computer engineering and a professor of computer science and engineering. She holds three patents.

---

**Did You Know...**
Madam C.J. Walker had an electric vehicle? That’s right, Electric vehicles are NOT a new thing. Madam C.J. Walker (America’s first self-made female millionaire) was known to drive around in a Waverley automobile, one of the many EV brands at the time.
Review Questions:
What was the name of Spelman College’s robotics team?

Dr. Ayanna Howard is the chief technology officer of which robotics company?

Who is the highest-paid robotics engineer?

Name the African-American engineer who created the Super Soaker.

What brand of electric vehicle did Madam C.J. Walker drive?
4th Grade Math Worksheet #1 – Determining Angles Visually

**DIRECTIONS:** Complete the following worksheets by writing your answer on the line provided.

Determine if the angle shown is acute, obtuse, right or straight.

<table>
<thead>
<tr>
<th>Ex</th>
<th>1)</th>
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<tbody>
<tr>
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<td><img src="image1.png" alt="Diagram" /></td>
<td><img src="image2.png" alt="Diagram" /></td>
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<th>3)</th>
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<th>5)</th>
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<tbody>
<tr>
<td><img src="image3.png" alt="Diagram" /></td>
<td><img src="image4.png" alt="Diagram" /></td>
<td><img src="image5.png" alt="Diagram" /></td>
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<tr>
<th>6)</th>
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<tr>
<td><img src="image6.png" alt="Diagram" /></td>
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<tr>
<th>9)</th>
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<td><img src="image9.png" alt="Diagram" /></td>
<td><img src="image10.png" alt="Diagram" /></td>
<td><img src="image11.png" alt="Diagram" /></td>
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<th>12)</th>
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<td><img src="image12.png" alt="Diagram" /></td>
<td><img src="image13.png" alt="Diagram" /></td>
<td><img src="image14.png" alt="Diagram" /></td>
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<th>15)</th>
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<tbody>
<tr>
<td><img src="image15.png" alt="Diagram" /></td>
<td><img src="image16.png" alt="Diagram" /></td>
<td><img src="image17.png" alt="Diagram" /></td>
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</tbody>
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<th>18)</th>
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<th>20)</th>
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<tbody>
<tr>
<td><img src="image18.png" alt="Diagram" /></td>
<td><img src="image19.png" alt="Diagram" /></td>
<td><img src="image20.png" alt="Diagram" /></td>
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</tbody>
</table>

**Answers**

<table>
<thead>
<tr>
<th>Ex</th>
<th>obtuse</th>
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<tbody>
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<td>19.</td>
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<tr>
<td>20.</td>
<td></td>
</tr>
</tbody>
</table>
Solve the problems.

1) A piece of plywood was cut so its length was 8 feet by 4 feet. What is the area of the wood?

2) A book had a length of 5 inches and a width of 10 inches. What is the area of the book?

3) A rectangle swimming pool was 9 meters wide with a surface area of 90 square meters. What is the length of the pool?

4) An envelope from the post office is 3 inches wide with a total area of 30 square inches. What is the height of the envelope?

5) A book had a length of 5 inches and a width of 8 inches. What is the perimeter of the book?

6) Wendy bought some wrapping paper for Christmas that was 5 feet long and 2 feet wide. What is the area of the wrapping paper she bought?

7) Rachel was cutting out some fabric for a friend. She cut a piece that was 5 centimeters wide and had an area of 20 cm². How long was the piece?

8) Faye bought some wrapping paper for Christmas that was 8 feet long and 8 feet wide. What is the perimeter of the wrapping paper she bought?

9) A rug had a length of 2 feet and a total area of 10 ft². What is the width of the rug?

10) An envelope from the post office is 6 inches wide and 8 inches long. What is the perimeter of the envelope?
4th Grade Math Worksheet #3 – Adding Fractions

DIRECTIONS: Complete the following worksheets by writing your answer on the line provided.

Shade in the fraction to solve the problem.

Ex) \( \frac{3}{7} + \frac{2}{7} = \frac{5}{7} \)

1) \( \quad + \quad = \quad \)

2) \( \quad + \quad = \quad \)

3) \( \quad + \quad = \quad \)

4) \( \quad + \quad = \quad \)

5) \( \quad + \quad = \quad \)

6) \( \quad + \quad = \quad \)

7) \( \quad + \quad = \quad \)

8) \( \quad + \quad = \quad \)

9) \( \quad + \quad = \quad \)

10) \( \quad + \quad = \quad \)

Answers

Ex. \( \frac{3}{7} + \frac{2}{7} = \frac{5}{7} \)

1. \( \quad + \quad = \quad \)

2. \( \quad + \quad = \quad \)

3. \( \quad + \quad = \quad \)

4. \( \quad + \quad = \quad \)

5. \( \quad + \quad = \quad \)

6. \( \quad + \quad = \quad \)

7. \( \quad + \quad = \quad \)

8. \( \quad + \quad = \quad \)

9. \( \quad + \quad = \quad \)

10. \( \quad + \quad = \quad \)
4th Grade Math Worksheet #4 – Solving Word Problems

DIRECTIONS: Complete the following worksheets by writing your answer on the line provided.

Use addition, subtraction, multiplication or division to solve each problem.

1) Robin had 17 math problems for homework. If she finished 8 of them on the bus ride home, how many more did she have to do?

2) Carol needs to buy 16 apples for apple bobbing. If each bag contains 4 apples, how many bags will she need?

3) Tom bought 4 boxes of candy. Later he bought 2 more boxes. How many boxes did he have total?

4) For a potluck lunch Katie brought 6 bottles of soda. If everyone only drank 2 of the sodas, how many did she have to take back home?

5) Victor played 8 games of basketball with his friends. If Victor scored 2 points each game, how many points did he score total?

6) While playing basketball Team A scored 35 points. If each person scored 7 points, how many people were playing?

7) A pet store had 4 cages of snakes with 9 snakes in each cage. How many snakes did the pet store have total?

8) Ned bought 17 books at the book fair. If he gave 8 of them to his brother, how many books did he have left?

9) Edward was drawing super heroes on a sheet of scrap paper. He drew 4 heroes on the front and 8 heroes on the back. How many heroes did he draw total?

10) The mailman delivered 11 pieces of mail to a house. If 8 of the pieces were junkmail, how many pieces were actually good?

11) Oliver is helping to put away books. If he has 12 books to put away and each shelf can hold 2 books how many shelves will he need?

12) Adam has to sell 18 chocolate bars to get a prize. If each box contains 3 chocolate bars, how many boxes does he need to sell?

13) Tiffany was placing her spare change into stacks. One stack had 4 coins and the other had 8. How many coins did she have total?

14) Paul was helping his mom wash clothes. They washed 4 short sleeve shirts and 4 long sleeve shirts. How many shirts did they wash total?

15) Isabel was helping her mom pick apples from the tree in their front yard. Together they picked 10 total. If 4 of the apples weren’t ripe yet, how many good apples did they pick?
Crossword – 4th Grade

DIRECTIONS: Use the definitions at the bottom of the page to fill in the crossword puzzle.

**ACROSS**
5. Movement in a circular direction
7. A machine that supplies power for a vehicle or for some other device with moving parts
11. A device that receives electrical signals and waves
12. The distance through the center of something from one side to the other
13. A device that makes work easier by magnifying or changing the direction of a force
14. A natural power or effect that is able to change the speed or direction of something
15. A light-emitting diode

**DOWN**
1. Fitting together the separate parts of an object
2. A toothed wheel that can change the speed of an engine
3. A device that detects heat, light, sound, motion, etc., and then reacts to it in a particular way
4. The part of the machine where the battery sits
6. A pin, bar, or shaft that a pair of wheels can rotate on
8. Relating to machines
9. The basic structure and shape of an object
10. A circular object that revolves on a straight rod, the axle, to make it move easily
Word Search – 4th Grade

DIRECTIONS: Search through the scramble below to locate all the words in the word bank at the bottom of the page.

WORD BANK

Assemble  Axle  BatteryHolder
Diameter  Force  Frame
Gear  LED  Mechanical
Motor  Receiver  Rotate
Sensor  SimpleMachines  Wheel
Robotics User Manual

DIRECTIONS: Now that we’ve learned about mechanical engineering, robotics, and autonomous cars, we’ll learn how to properly assemble and use our mBots.

Click here to access a DIGITAL VERSION of the mBot User Manual.

Look over the Instruction booklet. This will help familiarize you with how your mBot works.

Step 1: Assembly Instructions
Before using the mBot, we have to put it all together! Be sure to ask for a parent’s permission when building. Follow the steps listed on pages 4–11 of your User Manual.

Lesson 2: Basic Controls and Graphical Programming
Review pages 11–12 to learn how to operate the mBot using the remote/onboard controls.

Then turn to page 13 for an introduction to graphical programming.
Fire Tablet and mBot Setup

**DIRECTIONS:** Let’s set up our Fire tablet to be ready to operate the mBot. The mBot can be connected to PC, iOS, and Android. Please follow the instructions that apply to the device you are using. Since our mentors will be working with their Amazon Fire Tablets, we recommend you do the same.

<table>
<thead>
<tr>
<th>Fire Tablet Installation Steps</th>
<th>Android Installation Steps</th>
<th>iOS Installation Steps</th>
</tr>
</thead>
</table>
| 1. Visit m.apkpure.com, and download the APKPure app to your device, if you haven’t already.  
   a. [Click here to download.](#)  
2. Launch the APKPure app.  
   a. Use the search bar to search for “Makeblock”, or [click here to install.](#)  
3. Use the search bar to search for “mblock”, or [click here to install.](#)  
4. Follow these steps to connect your mBot to your device.  
   a. [How to Connect mBot](#) | 1. [Follow these steps.](#) | 1. [Follow these steps.](#) |

Watch this video to connect your mBot to your device!!

Let’s Practice!
Now that we’ve set up our mBot, let’s begin to experiment. Our mBot has different buttons and sensors, and we can control how our robot responds to those. Follow the instructions on the following cards to learn how your mBot can be used.

Watch these tutorial videos to get comfortable with your mBot device!
IMAGINE

Begin to Plan for the Week’s Challenges

DIRECTIONS: Use your time to imagine the ideas you have for this week’s challenges: Target, Obstacle Course, and the Creative Use Contest. Remember to use whatever extra materials you have available, and check with your parent or guardian before working on your projects!

Challenge #1: Target Course
Description: Program your robot to transport objects from one location to another. Whether it's delivering packages or moving objects, create a vehicle that can move something from Point A to Point B. As always, exercise caution, and check with your parent/guardian before any activity. Be sure to record, and submit your best trial!

Challenge #2: Obstacle Course
Description: Design your very own course full of obstacles (such as twists and turns, ramps, tunnels, or bridges, to name a few), and program your robot to race through it. Use this opportunity to show the judges your creativity and coding abilities! As always, exercise caution, and check with your parent/guardian before any activity. Be sure to record, and submit your best trial!

Challenge #3: Creative Use/Trick Contest
Description: Use the mBot to perform a special/creative task. The possibilities here are limitless. Feel free to do research online or elsewhere to see what others are doing. As always, exercise caution, and check with your parent/guardian before any activity. Be sure to record, and submit your best trial!
**Targets:** Small, easy to move objects that can be used for the Target Challenge

**Obstacles:** This can be a ramp, a bridge, or something partially blocking the path. Get creative and show your coding expertise!

**Creative Use:** This is up to you.

**Starting/Finish Line:** A mark to signal the beginning and end of the race

**Pro-Tip:** Use these printable Line Following tiles to help construct your courses!

There are multiple ways to complete the challenges. Do you plan to use the robots' sensors to complete the challenges? Which sensors do you plan to use and why?

____________________________________________________

____________________________________________________

____________________________________________________

Are there any items you already have that you can use in the target/obstacle course or the creative-use competition (e.g., cardboard or other recycled materials)?

____________________________________________________

____________________________________________________

____________________________________________________

____________________________________________________

Where did you decide to place your obstacle course? Did you get your parents’ approval?

____________________________________________________

____________________________________________________

____________________________________________________

____________________________________________________

Which challenge(s) do you think will be the most fun? Which do you think will be the hardest?

____________________________________________________

____________________________________________________

____________________________________________________

____________________________________________________
MODEL

Sketches

**DIRECTIONS:** Use the following space to sketch out your ideas or designs for the autonomous vehicle courses. Be sure to also create a material list for any items you’ll need. TIP: use recycled materials you have around the house. Remember to use what you have available, and check with your parent or guardian before starting to build!

What special or unique elements did you include in your design(s)?

________________________________________

________________________________________

________________________________________
Using your sketches, create a material list including all the items you’ll need to complete your build.

________________________________________________________________________

________________________________________________________________________

Which feature(s) do you think will be the most fun? Which features do you think will be the hardest?
CREATE

Begin to Build

DIRECTIONS: Using the designs and material list from the IMAGINE and MODEL sections, you will now build the pieces necessary for your Obstacle Course and Target Course and complete any designs for the Creative Use Contest. Use these printable Line Following tiles to help construct your courses!

OBSERVATIONS:
How many different courses did you create? How many ideas for the creative use challenge did you think of?

Which creative use do you think works best for your purpose? Why?

Which obstacle course best displays your coding abilities? Why?

Do you have any coding tips to share?
**TEST**

**DIRECTIONS:** It’s finally time to TEST! Use the following tables to keep track of your accomplishments. This will help you find out what's working well and what can be improved. Be sure to add any notes or tips for getting the best trial!

**Challenge #1: Target Course**

**Description:** Program your robot to transport objects from one location to another. Whether it's delivering packages or moving objects, create a vehicle that can move something from Point A to Point B. As always, exercise caution, and check with your parent/guardian before any activity. **Be sure to record, and submit your best trial!**

<table>
<thead>
<tr>
<th>Trial</th>
<th># of Successful Deliveries</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>___ / out of ____</td>
<td></td>
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</tbody>
</table>

How did the mBot perform?

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

Which setup do you think works best for you? Why?

____________________________________________________________________________________

____________________________________________________________________________________

Do you have any tips to remember for next time?
Challenge #2: Obstacle Course

**Description:** Design your very own course full of obstacles (such as twists and turns, ramps, tunnels, or bridges, to name a few), and program your robot to race through it. Use this opportunity to show the judges your creativity and coding abilities! As always, exercise caution, and check with your parent/guardian before any activity. **Be sure to record, and submit your best trial!**

<table>
<thead>
<tr>
<th>Trial</th>
<th>Time</th>
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<tbody>
<tr>
<td>1</td>
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</table>

How did the mBot perform?

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

Which setup do you think works best for you? Why?

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

Do you have any tips to remember for next time?
Challenge #3: Creative Use/Trick Contest

**Description:** Use the robot to perform a special/creative task and explain why it's helpful. Design your very own obstacle course, and program your robot to race through it. **Be sure to record, and submit your best trial!**

<table>
<thead>
<tr>
<th>Special Task/Creative Use Title</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
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<td>3</td>
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</tbody>
</table>

How did the mBot and code perform?

Which configuration do you think works best for your purpose? Why?

Do you have any tips to remember for next time?
DIRECTIONS: Congrats, you’ve made it to the seventh step of SEEK’s Engineering Design Process! You’ve just finished CREATING your design and TESTING it, so now it’s time to IMPROVE! You’ll be asking yourself questions about the performance of your design to see how you can make it better. This step is special, because even though it’s the last step of the EDP, we can begin the cycle all over! Feel free to repeat the SEEK Engineering Design Process until you’re happy with your design.

Did your design work perfectly? Why or why not?

Now that you’ve tried to complete the challenges, which challenges were fun/easy? What parts were harder?

If you could redo the challenges, is there anything you would change or study more to make it better/easier?

Do you have any tips to share?
Submit Your Showcase Challenge Videos

Directions: Now it's time to submit your Showcase Challenge videos. The purpose of the challenges is to encourage you to try something new and “think outside of the box.” Use your video submissions to express your creativity, and talk about the WHYs behind your project. Be sure to share with the judges and sponsors everything you learned the past week. They are super excited to hear from you!

CLICK HERE TO UPLOAD YOUR FINAL DESIGNS.

Additional Presentation Tips:

- You should have a theme for your designs and explain how your design connects to competition themes or the real world.
- Describe how and why you developed your design. Explain why your design is fun, useful, and unique/special. The judges watch lots of videos. What makes yours different?
- Demonstrate in-depth understanding by using vocabulary words and describing the science and engineering concepts behind this week’s challenge.
Determining Angle Visually

Determine if the angle shown is acute, obtuse, right or straight.

Ex) 157°
1) 90°
2) 141°
3) 61°
4) 138°
5) 90°
6) 172°
7) 49°
8) 54°
9) 106°
10) 21°
11) 37°
12) 80°
13) 154°
14) 90°
15) 120°
16) 77°
17) 180°
18) 180°
19) 90°
20) 90°

Answers:
Ex. obtuse
1. right
2. obtuse
3. acute
4. obtuse
5. right
6. obtuse
7. acute
8. acute
9. obtuse
10. acute
11. acute
12. acute
13. obtuse
14. right
15. obtuse
16. acute
17. straight
18. straight
19. right
20. right
Solve the problems.

1) A piece of plywood was cut so its length was 8 feet by 4 feet. What is the area of the wood?

2) A book had a length of 5 inches and a width of 10 inches. What is the area of the book?

3) A rectangle swimming pool was 9 meters wide with a surface area of 90 square meters. What is the length of the pool?

4) An envelope from the post office is 3 inches wide with a total area of 30 square inches. What is the height of the envelope?

5) A book had a length of 5 inches and a width of 8 inches. What is the perimeter of the book?

6) Wendy bought some wrapping paper for Christmas that was 5 feet long and 2 feet wide. What is the area of the wrapping paper she bought?

7) Rachel was cutting out some fabric for a friend. She cut a piece that was 5 centimeters wide and had an area of 20 cm². How long was the piece?

8) Faye bought some wrapping paper for Christmas that was 8 feet long and 8 feet wide. What is the perimeter of the wrapping paper she bought?

9) A rug had a length of 2 feet and a total area of 10 ft². What is the width of the rug?

10) An envelope from the post office is 6 inches wide and 8 inches long. What is the perimeter of the envelope?
<table>
<thead>
<tr>
<th></th>
<th>Ex)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex)</td>
<td>Shade in the fraction to solve the problem.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>$\frac{3}{7} + \frac{2}{7} = \frac{5}{7}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>$\frac{1}{5} + \frac{1}{5} = \frac{2}{5}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>$\frac{4}{10} + \frac{4}{10} = \frac{8}{10}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>$\frac{1}{5} + \frac{3}{5} = \frac{4}{5}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>$\frac{3}{6} + \frac{1}{6} = \frac{4}{6}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>$\frac{2}{4} + \frac{1}{4} = \frac{3}{4}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>$\frac{10}{12} + \frac{1}{12} = \frac{11}{12}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>$\frac{1}{10} + \frac{1}{10} = \frac{2}{10}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>$\frac{2}{8} + \frac{4}{8} = \frac{6}{8}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>$\frac{1}{12} + \frac{2}{12} = \frac{3}{12}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>$\frac{1}{12} + \frac{7}{12} = \frac{8}{12}$</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Solving Words Problems (+ - ÷ ×)

Use addition, subtraction, multiplication or division to solve each problem.

1) Robin had 17 math problems for homework. If she finished 8 of them on the bus ride home, how many more did she have to do?

2) Carol needs to buy 16 apples for apple bobbing. If each bag contains 4 apples, how many bags will she need?

3) Tom bought 4 boxes of candy. Later he bought 2 more boxes. How many boxes did he have total?

4) For a potluck lunch Katie brought 6 bottles of soda. If everyone only drank 2 of the sodas, how many did she have to take back home?

5) Victor played 8 games of basketball with his friends. If Victor scored 2 points each game, how many points did he score total?

6) While playing basketball Team A scored 35 points. If each person scored 7 points, how many people were playing?

7) A pet store had 4 cages of snakes with 9 snakes in each cage. How many snakes did the pet store have total?

8) Ned bought 17 books at the book fair. If he gave 8 of them to his brother, how many books did he have left?

9) Edward was drawing super heroes on a sheet of scrap paper. He drew 4 heroes on the front and 8 heroes on the back. How many heroes did he draw total?

10) The mailman delivered 11 pieces of mail to a house. If 8 of the pieces were junkmail, how many pieces were actually good?

11) Oliver is helping to put away books. If he has 12 books to put away and each shelf can hold 2 books how many shelves will he need?

12) Adam has to sell 18 chocolate bars to get a prize. If each box contains 3 chocolate bars, how many boxes does he need to sell?

13) Tiffany was placing her spare change into stacks. One stack had 4 coins and the other had 8. How many coins did she have total?

14) Paul was helping his mom wash clothes. They washed 4 short sleeve shirts and 4 long sleeve shirts. How many shirts did they wash total?

15) Isabel was helping her mom pick apples from the tree in their front yard. Together they picked 10 total. If 4 of the apples weren't ripe yet, how many good apples did they pick?
Welcome: Week 3

Dear Young Engineers,

The National Society of Black Engineers has partnered with Scratch to host the very first SEEK Hack-a-thon! What's a Hack-a-thon? It's a series of challenges that test your coding abilities. This week, students will learn how to code and use their skills to build a game, design wearable technology, and even come up with their own unique creation using code!

The SEEK students who present the most interesting solution to the challenges below will win a chance to be featured on our social media, as well as bragging rights! Be sure to try your best, and show the judges what you've learned. The student who exhibits the most knowledge about coding in this week’s competitions will have their game shared with the masses!

**Challenge #1: Mobile Game**
Design and code your very own game playable on the micro:bit.

**Challenge #2: Wearable Tech**
Design your very own wearable technology device.

**Challenge #3: Creative Use Contest**
Use the micro:bit kit to perform an innovative, special, or creative task.

On behalf of the National Society of Black Engineers, we wish you the best of luck!

Sincerely,

The SEEK Team
The SEEK Engineering Design Process

**DIRECTIONS:** We’ll be using The SEEK Engineering Design Process to explore our projects this week. The Engineering Design Process, or EDP, is a set of steps that engineers use to solve problems and create solutions to challenges. The steps follow the order: **ASK, LEARN, IMAGINE, MODEL, CREATE, TEST, AND IMPROVE.** Notice how the steps go around in a circle (below)? The EDP can be done *over and over again* until you feel your design is *perfect*! Try it out this week. Once you finish your initial design, ask, learn, imagine, model, create, and test it all over again to see how much better your design becomes.

---

**ENGINEERS USE A PROCESS LIKE THE ONE BELOW TO SOLVE PROBLEMS AND CREATE INVENTIONS THAT HELP MAKE THE WORLD AROUND US BETTER.**

**ASK**
- What is the problem?
- What are the constraints?
- Who will be impacted?
- What do they need?

**LEARN**
- What background knowledge is needed?
- How have other people solved the problem?

**MODEL IT**
- What are ways of solving the problem?
- Think of several solutions.

**IMAGINE**
- What could work better?
- Ask, Learn, Imagine, Model, Create and Test again!

**CREATE**
- Use your diagram & materials to create your prototype!
- Create more than one solution!

**TEST**
- Plan a fair test.
- Carry out a fair test.
- Record your results.

**IMPROVE**
- What could work better?
- Model IT again!
What Is Computer Engineering?

Computer science is the study of computers and computing concepts. It includes both hardware (computer mouse, monitors, game controllers) and software (programs such as Minecraft, Overwatch, and Fortnite), as well as networking and the internet.

The hardware aspect of computer science overlaps with electrical engineering. It covers the basic design of computers and the way they work. For example, understanding how a computer operates in binary enables you to understand how computers add, subtract, and perform other operations.

The software side of computer science covers programming concepts as well as specific programming languages. Programming concepts include functions, algorithms, and source code design.

What Is Programming?

Computer programming is writing a list of instructions for a computer to complete, it enables you to express yourself, create something, and innovate. There are many different ways to write code but this summer we'll be learning a really easy block-based coding language.

What Is a Computer Engineer?

Computer engineers evaluate, design, and maintain computer hardware and software systems. They develop, test, and design computers and network systems. They resolve problems that occur with computer hardware or software and aid in the advancement of computer technology.
**KWL Chart**

**DIRECTIONS:** KWL charts are meant to help organize your thoughts. Use the following chart to write down what you already know about coding, computer engineering, etc. as well as what you WANT TO KNOW. Then come back and fill in the last column with what you've LEARNED at the end of each day.

| What you KNOW about coding, computer engineering, etc. | What you WANT TO KNOW about coding, computer engineering, etc. | What you’ve LEARNED about coding, computer engineering, etc. |
LEARN

4th Grade Vocabulary List

**Algorithm**
A list of steps a machine follows to finish a task

**Bug**
An error in a program that prevents the program from running as expected

**Coding**
To control devices with a set of instructions

**Code Blocks**
Visual representations of source code

**Command**
An instruction for the computer

**Data**
Information

**Variable**
A placeholder for a piece of information that can change

**Workspace**
The area where you drag and drop commands to build your program

**Program**
An algorithm that has been coded into something that can be run by a machine

**Loop**
The action of doing something over and over again

**Binary Number**
A way to represent information using only two digits: 0 and 1

**Debugging**
Finding and fixing problems in an algorithm or program

**Event**
An action that causes something to happen

**Function**
A piece of code that you can easily call over and over again

**Parameter**
An extra piece of information passed to a function to customize it for a specific need
### 4th Grade Fill-in-the-Blank Worksheet

**DIRECTIONS:** Using your vocabulary knowledge, fill in the missing squares in the table below. Write the vocabulary word in the first column and the definitions in the second. In the last column, draw a picture that best represents what the vocabulary word means to you.

<table>
<thead>
<tr>
<th>TERM</th>
<th>DEFINITION</th>
<th>PICTURE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Algorithm</strong></td>
<td>A list of steps a machine follows to finish a task</td>
<td><img src="image1" alt="Algorithm Diagram" /></td>
</tr>
<tr>
<td><strong>Bug</strong></td>
<td></td>
<td><img src="image2" alt="Bug Diagram" /></td>
</tr>
<tr>
<td><strong>Coding</strong></td>
<td></td>
<td><img src="image3" alt="Coding Diagram" /></td>
</tr>
<tr>
<td><strong>An instruction for the computer</strong></td>
<td><img src="image1.png" alt="Image" /></td>
<td></td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>----------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Information</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Debugging</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Event</strong></td>
<td>An action that causes something to happen</td>
<td></td>
</tr>
<tr>
<td><strong>Loop</strong></td>
<td><img src="image2.png" alt="Diagram" /></td>
<td></td>
</tr>
<tr>
<td><strong>Parameter</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Program</strong></td>
<td>An algorithm that has been coded into something that can be run by a machine</td>
<td></td>
</tr>
<tr>
<td><strong>Variable</strong></td>
<td>![](x = 1)<em>Variable</em> Value_</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The area where you drag and drop commands to build your program</td>
<td></td>
</tr>
</tbody>
</table>
**4th Grade Vocabulary Match Worksheet**

**DIRECTIONS:** Using your vocabulary knowledge, match the vocabulary word with the correct description.

<table>
<thead>
<tr>
<th></th>
<th><strong>Definition</strong></th>
<th><strong>Term</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>To control devices with a set of instructions</td>
<td>Algorithm</td>
</tr>
<tr>
<td>2</td>
<td>A piece of code that you can easily call over and over again</td>
<td>Binary Number</td>
</tr>
<tr>
<td>3</td>
<td>An algorithm that has been coded into something that can be run by a machine</td>
<td>Bug</td>
</tr>
<tr>
<td>4</td>
<td>The area where you drag and drop commands to build your program</td>
<td>Coding</td>
</tr>
<tr>
<td>5</td>
<td>Visual representations of source code</td>
<td>Code Blocks</td>
</tr>
<tr>
<td>6</td>
<td>An extra piece of information passed to a function to customize it for a specific need</td>
<td>Command</td>
</tr>
<tr>
<td>7</td>
<td>An instruction for the computer</td>
<td>Data</td>
</tr>
<tr>
<td>8</td>
<td>An error in a program that prevents the program from running as expected</td>
<td>Debugging</td>
</tr>
<tr>
<td>9</td>
<td>A way to represent information using only two digits: 0 and 1</td>
<td>Event</td>
</tr>
<tr>
<td>10</td>
<td>A list of steps a machine follows to finish a task</td>
<td>Function</td>
</tr>
<tr>
<td>11</td>
<td>Information</td>
<td>Loop</td>
</tr>
<tr>
<td>12</td>
<td>The action of doing something over and over again</td>
<td>Parameter</td>
</tr>
<tr>
<td>13</td>
<td>An action that causes something to happen</td>
<td>Program</td>
</tr>
<tr>
<td>14</td>
<td>Finding and fixing problems in an algorithm or program</td>
<td>Variable</td>
</tr>
<tr>
<td>15</td>
<td>A placeholder for a piece of information that can change</td>
<td>Workspace</td>
</tr>
</tbody>
</table>
**Cultural Connection**

**DIRECTIONS:** Read through the following timeline to learn about the incredible accomplishments of trailblazing men and women who made substantial contributions to the development of modern computer technology.

1949  
Evelyn Boyd Granville became one of the first African-American women to earn a Ph.D. in mathematics from Yale.

1953  
Katherine Johnson while working at NASA earned the nickname “the Human Computer” for doing calculations essential to the success of many early space missions.

1981  
Mark Dean co-creates and debuts the IBM personal computer (PC).

2011  
Kimberly Bryant founded Black Girls Code, a nonprofit organization that teaches programming to young girls of color.
Review Questions:

Who founded Black Girls Code, and what year was it founded?

__________________________________________

__________________________________________

__________________________________________

__________________________________________

What was Katherine Johnson’s nickname at NASA?

__________________________________________

__________________________________________

__________________________________________

__________________________________________

Name one of the first African-American women to earn a Ph.D. in mathematics from Yale.

__________________________________________

__________________________________________

__________________________________________

__________________________________________

How many years ago did Mark Dean co-create the IBM personal computer?

__________________________________________

__________________________________________

__________________________________________

__________________________________________
4th Grade Math Worksheet #1 – Multiplicative Comparison With Tables

**DIRECTIONS:** Complete the following worksheets by writing your answer on the line provided.

**Solve each problem.**

1) The table below show the customers an arcade had leading up to the weekend.

<table>
<thead>
<tr>
<th>Day</th>
<th>Customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuesday</td>
<td>128</td>
</tr>
<tr>
<td>Wednesday</td>
<td>191</td>
</tr>
<tr>
<td>Thursday</td>
<td>123</td>
</tr>
<tr>
<td>Friday</td>
<td>197</td>
</tr>
</tbody>
</table>

Over the weekend they had 7 times as many customers as they did before in the previous 4 days. How many more customers did they have over the weekend than they had in the previous 4 days?

2) The table below show the pounds of candy a company sold in the months leading up to October.

<table>
<thead>
<tr>
<th>Month</th>
<th>Pounds of Candy Sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>June</td>
<td>118</td>
</tr>
<tr>
<td>July</td>
<td>168</td>
</tr>
<tr>
<td>August</td>
<td>151</td>
</tr>
<tr>
<td>September</td>
<td>151</td>
</tr>
</tbody>
</table>

In October they sold 2 times as many pounds of candy as they did in the previous 4 months combined. How many fewer pounds of candy did they sell in the previous 4 months compared to in October?

3) The table below show the number of employees each store has.

<table>
<thead>
<tr>
<th>Store #</th>
<th>Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
</tr>
</tbody>
</table>

A new larger store is opening that will employ 8 times as many employees as all the other stores combined. How many fewer employees did the old stores have compared to the new store?

4) The table below show the points Sarah scored on a video game each time she played.

<table>
<thead>
<tr>
<th>Game #</th>
<th>Points Scored</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>111</td>
</tr>
<tr>
<td>2</td>
<td>156</td>
</tr>
<tr>
<td>3</td>
<td>168</td>
</tr>
</tbody>
</table>

After the first 3 games, she took a break and came back the next day and scored 7 times as many points as she had during all the previous games combined. How many fewer points did she score before her break than she scored after her break?
4th Grade Math Worksheet #2 – Buying With Change

**DIRECTIONS:** Complete the following worksheets by writing your answer on the line provided.

**Use the price table to solve each problem.

1) The table below shows the prices of several items at the santa store.

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>ornament</td>
<td>$1.25</td>
</tr>
<tr>
<td>card</td>
<td>$3.80</td>
</tr>
<tr>
<td>candy cane</td>
<td>$3.75</td>
</tr>
<tr>
<td>bow</td>
<td>$2.15</td>
</tr>
<tr>
<td>music box</td>
<td>$1.40</td>
</tr>
</tbody>
</table>

Olivia had $5.00 when she went to the store. If she bought 1 music box what is the most expensive item she can buy with the money she has left?

2) The table below shows the prices of several items at the grocery store.

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>bag of plates</td>
<td>$1.30</td>
</tr>
<tr>
<td>cheese dip</td>
<td>$3.35</td>
</tr>
<tr>
<td>soda</td>
<td>$1.15</td>
</tr>
<tr>
<td>bag of chips</td>
<td>$1.70</td>
</tr>
<tr>
<td>bag of cups</td>
<td>$1.85</td>
</tr>
</tbody>
</table>

Tiffany had $5.00 when she went to the grocery store. If she bought 1 bag of plates what is the most expensive item she can buy with the money she has left?

3) The table below shows the prices of several items at a toy store.

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>coloring book</td>
<td>$2.05</td>
</tr>
<tr>
<td>toy car</td>
<td>$1.85</td>
</tr>
<tr>
<td>board game</td>
<td>$1.15</td>
</tr>
<tr>
<td>figurine</td>
<td>$3.10</td>
</tr>
<tr>
<td>organizer</td>
<td>$1.40</td>
</tr>
</tbody>
</table>

Katie had $5.00 when she went to the store. If she bought 1 coloring book what is the most expensive item she can buy with the money she has left?

4) The table below shows the prices of several items at the baseball game.

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>small fry</td>
<td>$1.65</td>
</tr>
<tr>
<td>hotdog</td>
<td>$3.60</td>
</tr>
<tr>
<td>soda</td>
<td>$3.75</td>
</tr>
<tr>
<td>burger</td>
<td>$3.70</td>
</tr>
<tr>
<td>corndog</td>
<td>$3.20</td>
</tr>
</tbody>
</table>

Tom had $5.00 when he went to the game. If he bought 1 corndog what is the most expensive item he can buy with the money he has left?

5) The table below shows the prices of several items at the candy shop.

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>gummy worm</td>
<td>$1.85</td>
</tr>
<tr>
<td>lollipop</td>
<td>$1.40</td>
</tr>
<tr>
<td>sugar cube</td>
<td>$3.75</td>
</tr>
<tr>
<td>chocolate bar</td>
<td>$2.15</td>
</tr>
<tr>
<td>candy cane</td>
<td>$2.20</td>
</tr>
</tbody>
</table>

John had $5.00 when he went to the shop. If he bought 1 candy cane what is the most expensive item he can buy with the money he has left?

6) The table below shows the prices of several items at a hardware store.

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>wrench</td>
<td>$3.35</td>
</tr>
<tr>
<td>screw driver</td>
<td>$1.40</td>
</tr>
<tr>
<td>tape measure</td>
<td>$2.60</td>
</tr>
<tr>
<td>socket</td>
<td>$3.10</td>
</tr>
<tr>
<td>hammer</td>
<td>$3.55</td>
</tr>
</tbody>
</table>

Carol had $5.00 when she went to the store. If she bought 1 tape measure what is the most expensive item she can buy with the money she has left?

---

**Answers**

1. 
2. 
3. 
4. 
5. 
6. 
4th Grade Math Worksheet #3 – Determining Right Angles

DIRECTIONS: Complete the following worksheets by writing your answer on the line provided. Determine if the triangle shown is a right triangle (yes) or not (no).

1. ________
2. ________
3. ________
4. ________
5. ________
6. ________
7. ________
8. ________
9. ________
10. ________
11. ________
12. ________
13. ________
14. ________
15. ________
Micro:Bit Setup

**DIRECTIONS:** Let’s begin to experiment with the micro:bit! The micro:bit can be connected to PC, iOS, Android, or Fire Tablet Devices. Please follow the instructions that apply to the device you are using. Since our mentors will be working off their Amazon Fire Tablets, we recommend you do the same.

<table>
<thead>
<tr>
<th>Fire Tablet Installation Steps:</th>
<th>Android Installation Steps:</th>
<th>iOS Installation Steps:</th>
</tr>
</thead>
</table>
| 1. Download the APKPure app to your device.  
a. Click here to download.  
2. Click here to install the micro:bit app.  
3. Follow these steps to connect your micro:bit to your device.  
a. How to Connect Micro:Bit | 1. Follow these steps. | 1. Follow these steps. |

---

Watch this video to connect your micro:bit to your device!!

---

**Let’s Practice!**

Now that we’ve set up our micro:bit, let’s begin to experiment. Our micro:bit has different buttons and sensors that can control what our program does. Follow the instructions on the following cards to learn how your micro:bit can be used in coding.

---

**Micro:Bit Cards**

- Cast a Spell
- Squeak
- Move Around
- Press a Button
- Jump
- Move Back and Forth
- Create an Emoji
Review Questions

How can you make an object move faster?

How can you make an actor move using the micro:bit buttons?

Describe how to create an actor that switches between three colors (examples: red, green, and yellow).

Write code to say “ouch” for each time the micro:bit is moved.

BONUS: Describe how to create a function that makes an actor dance.
4th Grade Crossword

Directions: Use the definitions at the bottom of the page to fill in the crossword puzzle.

ACROSS
3. An algorithm that has been coded into something that can be run by a machine
7. Visual representations of source code
9. A placeholder for a piece of information that can change
11. An action that causes something to happen
14. An extra piece of information passed to a function to customize it for a specific need
15. Finding and fixing problems in an algorithm or program

DOWN
1. An error in a program that prevents the program from running as expected
2. The area where you drag and drop commands to build your program
4. A list of steps a machine follows to finish a task
5. A piece of code that you can easily call over and over again
6. To control devices with a set of instructions
8. A way to represent information using only two digits: 0 and 1
10. The action of doing something over and over again
12. An instruction for the computer
13. Information
4th Grade Word Search

**DIRECTIONS:** Search through the scramble below to locate all the words in the word bank at the bottom of the page.

```
J B O Q T N F D G P M A G P Y
I P O O L U N C R Q L S N A C
D A T A Z A M O S G D K I R W
C G L R M F G U O V E C G A O
W Q N M E R U R P Z J O G M W
M R O I A B I N P G Q L U E O
U C I M D T M K C W X B B T R
V S J J H O I U A T K E E E K
T A Z M T C C A N W I D D R S
C U R N E C U V R Y E O X W P
I R E I O N G U B D R C N D A
M V J V A X X Q I L B A I U C
E N B X C B T Y I W X A N Y E
O W M B S B L U O K E W B I X
E R W C U A C E W X P K I G B
```

**WORD BANK**

<table>
<thead>
<tr>
<th>Algorithm</th>
<th>Binary Number</th>
<th>Bug</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code Blocks</td>
<td>Coding</td>
<td>Command</td>
</tr>
<tr>
<td>Data</td>
<td>Debugging</td>
<td>Event</td>
</tr>
<tr>
<td>Function</td>
<td>Loop</td>
<td>Parameter</td>
</tr>
<tr>
<td>Program</td>
<td>Variable</td>
<td>Workspace</td>
</tr>
</tbody>
</table>
Begin to Plan for the Week’s Challenges

**DIRECTIONS:** Use your time now to imagine the ideas you have for this week’s challenges: Mobile Game Design, Wearable Tech Design, and the Creative Use Contest. Remember to use whatever extra materials you have available, and check with your parent or guardian before working on your projects!

**Challenge #1: Mobile Game**
**Description:** Design and code a game that can be played on micro:bit. Using your coding skills, design and code a game that you can play using your micro:bit kit.

**Challenge #2: Wearable Tech**
**Description:** Design your very own wearable technology device using the micro:bit kit.

**Challenge #3: Creative Use Contest**
**Description:** Use your creative imagination to use the micro:bit kit in a way it hasn’t been used before. It should perform an innovative, special, or creative task.
**DIRECTIONS:** Put on your engineer thinking caps! To complete this week's challenges, we'll need to be extra creative. Using the link below, brainstorm the game you'll create, the wearable tech design you plan to make, as well as your creative-use idea for the micro:bit.

[https://makecode.microbit.org/](https://makecode.microbit.org/)
*Scroll through this page for project inspiration.*

What are your ideas for the Mobile Game Challenge?

What are your ideas for the Wearable Tech Challenge?

What are your ideas for the Creative Use Contest?

Are there any materials you already have that you can use to create your game device, wearable tech, or creative project (e.g., cardboard or other recycled materials)?

What materials did you choose? Did you get your parents’ approval?

Which challenge(s) do you think will be the most fun? Which do you think will be the hardest?
Sketches

**DIRECTIONS:** Use the following space to sketch out your ideas, designs, or lines of code for this week’s challenges. Wherever possible, try to use paper or other recycled materials you have around the house to create your prototype designs. Also, don’t forget to create a material list using these sketches!

What special or unique elements did you include in your design(s)?
Extra Sketching Space:

Using your sketches, create a material list including all the items you’ll need to complete your build.

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

Which feature(s) do you think will be the most fun? Which features do you think will be the hardest?

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________
CREATE

Begin to Build

**DIRECTIONS:** Use the ideas and designs from the IMAGINE and MODEL sections to begin constructing the pieces you need. (Depending on your ideas, you may be writing code or building a physical object for your micro:bit.)

**OBSERVATIONS:**
Did you think of multiple ideas or designs? How did you narrow down your ideas?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

What inspired your creative-use design?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Has the coding been easy or hard? Have you been studying the code blocks?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Do you have any tips to share?

________________________________________________________________________

________________________________________________________________________
DIRECTIONS: It’s finally time to TEST! Use the following tables to keep track of your accomplishments. This will help you find out what's working well and what can be improved. Be sure to add any notes or tips for getting the best trial!

Challenge #1: Mobile Game Design Challenge

**Description:** Design and code your very own game that can be played on the micro:bit. 
Visit this link, and scroll to the Games Section.

<table>
<thead>
<tr>
<th></th>
<th>Game (We recommend trying multiple games to find your favorite.)</th>
<th>Notes (Write any notes about why you like or dislike the game here.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How did the game(s) perform? Did they run successfully? What **bugs** did you come across?

_____________________________________________________________________________

_____________________________________________________________________________

Can your game be played by others with simple, easy to understand instructions?

_____________________________________________________________________________

_____________________________________________________________________________

Are there any ways to improve the game? Or maybe make it more challenging?

_____________________________________________________________________________

_____________________________________________________________________________
Challenge #2: Wearable Tech

**Description:** Design your very own wearable technology device using the micro:bit kit. Visit this link, and go to the Fashion Section.

<table>
<thead>
<tr>
<th>Devices</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>(We recommend trying multiple devices to find your favorite.)</td>
<td>(Write any notes about why you like or dislike the game here.)</td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

How did the wearable tech devices perform? What **bugs** did you come across?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Which device did you find to be the most useful for you? Why?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Do you have any coding tips to remember for next time?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Challenge #3: Creative Use Contest

**Description:** Put your imagination to work, and use the micro:bit kit to perform an innovative, special, or creative task. Feel free to use any section.

<table>
<thead>
<tr>
<th>Creative Use (We recommend trying multiple uses to find your favorite.)</th>
<th>Notes (Write any notes about why you like or dislike the game here.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

How did your program perform? What were the bugs?

Which device did you find to be the most useful for you? Why?

Do you have any coding tips to remember for next time?
IMPROVE

DIRECTIONS: Congrats, you’ve made it to the seventh step of SEEK’s Engineering Design Process! You’ve just finished CREATING your design and TESTING it, so now it’s time to IMPROVE! You’ll be asking yourself questions about the performance of your design to see how you can make it better. This step is special, because even though it’s the last step of the EDP, we can begin the cycle all over! Feel free to repeat the SEEK Engineering Design Process until you’re happy with your design.

Did your design work perfectly? Why or why not?
_____________________________________________________________________________________________________________________
_____________________________________________________________________________________________________________________
_____________________________________________________________________________________________________________________
_____________________________________________________________________________________________________________________

Now that you’ve tried to complete the challenges, which challenges were fun/easy? What parts were harder?
_____________________________________________________________________________________________________________________
_____________________________________________________________________________________________________________________
_____________________________________________________________________________________________________________________
_____________________________________________________________________________________________________________________

If you could redo the challenges, is there anything you would change or study more to make it better/easier?
_____________________________________________________________________________________________________________________
_____________________________________________________________________________________________________________________
_____________________________________________________________________________________________________________________
_____________________________________________________________________________________________________________________

Do you have any tips to share?
_____________________________________________________________________________________________________________________
_____________________________________________________________________________________________________________________
_____________________________________________________________________________________________________________________
Submit Your Showcase Challenge Videos

**Directions:** Now it’s time to submit your Showcase Challenge videos. The purpose of the challenges is to encourage you to try something new and “think outside of the box.” Use your video submissions to express your *creativity*, and talk about the *WHYs* behind your project. Be sure to share with the judges and sponsors everything you learned the past week. They are super excited to hear from you!

**Additional Presentation Tips:**
- You should have a theme for your design, and explain how your design connects to competition themes or the real world.
- Describe how and why you developed your design. Explain why your design is fun, useful, and unique/special. The judges watch lots of videos. What makes yours different?
- Demonstrate in-depth understanding by using vocabulary words and describing the science and engineering concepts behind this week’s challenge.

[CLICK HERE TO UPLOAD YOUR FINAL DESIGNS.]
Solving Multiplicative Comparison Problems with a Table

Name: Answer Key

1) The table below show the customers an arcade had leading up to the weekend.

<table>
<thead>
<tr>
<th>Day</th>
<th>Customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuesday</td>
<td>128</td>
</tr>
<tr>
<td>Wednesday</td>
<td>191</td>
</tr>
<tr>
<td>Thursday</td>
<td>123</td>
</tr>
<tr>
<td>Friday</td>
<td>197</td>
</tr>
</tbody>
</table>

639

Over the weekend they had 7 times as many customers as they did before in the previous 4 days. How many more customers did they have over the weekend than they had in the previous 4 days?

2) The table below show the pounds of candy a company sold in the months leading up to October.

<table>
<thead>
<tr>
<th>Month</th>
<th>Pounds of Candy Sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>June</td>
<td>118</td>
</tr>
<tr>
<td>July</td>
<td>168</td>
</tr>
<tr>
<td>August</td>
<td>151</td>
</tr>
<tr>
<td>September</td>
<td>151</td>
</tr>
</tbody>
</table>

588

In October they sold 2 times as many pounds of candy as they did in the previous 4 months combined. How many fewer pounds of candy did they sell in the previous 4 months compared to in October?

3) The table below show the number of employees each store has.

<table>
<thead>
<tr>
<th>Store #</th>
<th>Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
</tr>
</tbody>
</table>

31

A new larger store is opening that will employ 8 times as many employees as all the other stores combined. How many fewer employees did the old stores have compared to the new store?

4) The table below show the points Sarah scored on a video game each time she played.

<table>
<thead>
<tr>
<th>Game #</th>
<th>Points Scored</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>111</td>
</tr>
<tr>
<td>2</td>
<td>156</td>
</tr>
<tr>
<td>3</td>
<td>168</td>
</tr>
</tbody>
</table>

435

After the first 3 games, she took a break and came back the next day and scored 7 times as many points as she had during all the previous games combined. How many fewer points did she score before her break than she scored after her break?
Use the price table to solve each problem.

1) The table below shows the prices of several items at the santa store.

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>ornament</td>
<td>$1.25</td>
</tr>
<tr>
<td>card</td>
<td>$3.80</td>
</tr>
<tr>
<td>candy cane</td>
<td>$3.75</td>
</tr>
<tr>
<td>bow</td>
<td>$2.15</td>
</tr>
<tr>
<td>music box</td>
<td>$1.40</td>
</tr>
</tbody>
</table>

Olivia had $5.00 when she went to the store. If she bought 1 music box what is the most expensive item she can buy with the money she has left?

2) The table below shows the prices of several items at the grocery store.

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>bag of plates</td>
<td>$1.30</td>
</tr>
<tr>
<td>cheese dip</td>
<td>$3.35</td>
</tr>
<tr>
<td>soda</td>
<td>$1.15</td>
</tr>
<tr>
<td>bag of chips</td>
<td>$1.70</td>
</tr>
<tr>
<td>bag of cups</td>
<td>$1.85</td>
</tr>
</tbody>
</table>

Tiffany had $5.00 when she went to the grocery store. If she bought 1 bag of plates what is the most expensive item she can buy with the money she has left?

3) The table below shows the prices of several items at a toy store.

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>coloring book</td>
<td>$2.05</td>
</tr>
<tr>
<td>toy car</td>
<td>$1.85</td>
</tr>
<tr>
<td>board game</td>
<td>$1.15</td>
</tr>
<tr>
<td>figurine</td>
<td>$3.10</td>
</tr>
<tr>
<td>organizer</td>
<td>$1.40</td>
</tr>
</tbody>
</table>

Katie had $5.00 when she went to the store. If she bought 1 coloring book what is the most expensive item she can buy with the money she has left?

4) The table below shows the prices of several items at the baseball game.

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>small fry</td>
<td>$1.65</td>
</tr>
<tr>
<td>hot dog</td>
<td>$3.60</td>
</tr>
<tr>
<td>soda</td>
<td>$3.75</td>
</tr>
<tr>
<td>burger</td>
<td>$3.70</td>
</tr>
<tr>
<td>corn dog</td>
<td>$3.20</td>
</tr>
</tbody>
</table>

Tom had $5.00 when he went to the game. If he bought 1 corn dog what is the most expensive item he can buy with the money he has left?

5) The table below shows the prices of several items at the candy shop.

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>gummy worm</td>
<td>$1.85</td>
</tr>
<tr>
<td>lollipop</td>
<td>$1.40</td>
</tr>
<tr>
<td>sugar cube</td>
<td>$3.75</td>
</tr>
<tr>
<td>chocolate bar</td>
<td>$2.15</td>
</tr>
<tr>
<td>candy cane</td>
<td>$2.20</td>
</tr>
</tbody>
</table>

John had $5.00 when he went to the shop. If he bought 1 candy cane what is the most expensive item he can buy with the money he has left?

6) The table below shows the prices of several items at a hardware store.

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>wrench</td>
<td>$3.35</td>
</tr>
<tr>
<td>screw driver</td>
<td>$1.40</td>
</tr>
<tr>
<td>tape measure</td>
<td>$2.60</td>
</tr>
<tr>
<td>socket</td>
<td>$3.10</td>
</tr>
<tr>
<td>hammer</td>
<td>$3.55</td>
</tr>
</tbody>
</table>

Carol had $5.00 when she went to the store. If she bought 1 tape measure what is the most expensive item she can buy with the money she has left?
Identifying Right Triangles

Determine if the triangle shown is a right triangle (yes) or not (no).

1. yes
2. no
3. yes
4. no
5. no
6. yes
7. no
8. no
9. yes
10. no
11. yes
12. no
13. no
14. no
15. no