TULSA PUBLIC SCHOOLS

7th Grade

(5/4-15/20)

Distance Learning Activities

Dear families,

These learning packets are filled with grade level activities to keep students engaged in learning at home. We are following the learning routines with language of instruction that students would be engaged in within the classroom setting. We have an amazing diverse language community with over 65 different languages represented across our students and families.

If you need assistance in understanding the learning activities or instructions, we recommend using these phone and computer apps listed below.

Google Translate

- Free language translation app for Android and iPhone
- Supports text translations in 103 languages and speech translation (or conversation translations) in 32 languages
- Capable of doing camera translation in 38 languages and photo/image translations in 50 languages
- Performs translations across apps

Microsoft Translator

- Free language translation app for iPhone and Android
- Supports text translations in 64 languages and speech translation in 21 languages
- Supports camera and image translation
- Allows translation sharing between apps

ENROLL TULSA!

TULSA PUBLIC SCHOOLS

DID YOU MISS THE ENROLLMENT WINDOW IN DECEMBER AND JANUARY? ARE YOU NEW TO TULSA?

We have great schools that still have room for your child. Don't miss this opportunity!

THE WINDOW TO ENROLL AT THESE SCHOOLS IS
MAY 1–21, 2020

We want to make it simple and easy for families to choose - and stay with - Tulsa Public Schools! Our improved enrollment system ensures that our families have an easy and simple process to access the schools that are the best fit for their children.

START YOUR APPLICATION AT Enroll.TulsaSchools.org.
If you need help, please leave a message at 918-746-7500 and an enrollment specialist will return your call or email enroll@tulsaschools.org.

For more information, visit TulsaSchools.org/EnrollTulsa

INSCRIBA A SU HIJO EN LAS ESCUELAS PÚBLICAS DE TULSA

TULSA PUBLIC SCHOOLS

¿TE PERDISTE LA VENTANA DE INSCRIPCIÓN EN DICIEMBRE Y ENERO? ¿ERES NUEVO EN TULSA?

Tenemos excelentes escuelas que todavía tienen espacio para su hijo. ¡No te pierdas esta oportunidad!

LA VENTANA PARA INSCRIBIRSE EN ESTAS ESCUELAS ES DEL
1 AL 21 DE MAYO DE 2020

¡Queremos que sea simple y fácil para las familias elegir, y quedarse con, las Escuelas Públicas de Tulsa! Nuestro sistema de inscripción mejorado garantiza que nuestras familias tengan un proceso fácil y simple para acceder a las escuelas que mejor se adapten a sus hijos.

INICIE SU SOLICITUD EN Enroll.TulsaSchools.org.
Si necesita ayuda, deje un mensaje al 918-746-7500 y un especialista en inscripción le devolverá la llamada. También puede enviarnos un correo electrónico a enroll@tulsaschools.org.

Para más información, visite TulsaSchools.org/EnrollTulsa

Grade 7 ELA

May 4-15

Over the two weeks from May 4 to May 15, read both of the following texts.
Recommended: choose one to read the week of May 4. Read the other text the week of May 11.

- As you read, annotate each text.
  - With the first text, note any questions you have.
  - With the second text, note similarities and connections between the two.
- Answer questions as directed.
- Think about how these two texts help you explore the idea of resilience.

POEM	"The Raven," Edgar Allan Poe 1845
MYTH	"Apollo and Hyacinthus," by Thomas Bullfinch 1855

The Raven by Edgar Allan Poe 1845

Edgar Allan Poe (1809-1849) was an American author, poet, and literary critic whose works are still widely read today. "The Raven" is perhaps his most famous poem, celebrated for its musicality, form, and supernatural atmosphere. Read it aloud to hear its rhythm.

As you read, take notes on the symbolic nature of the raven's visit.
Also, notice how the poem's structure and form contribute to its mood.

Once upon a midnight dreary, while I pondered, weak and weary,
Over many a quaint and curious volume of forgotten lore —
While I nodded, nearly napping, suddenly there came a tapping,
As of some one gently rapping, rapping at my chamber door.
"'Tis some visitor," I muttered, "tapping at my chamber door —
Only this and nothing more."

Q1: The poem begins with the narrator…

Ah, distinctly I remember it was in the bleak December;
And each separate dying ember wrought its ghost upon the floor.
Eagerly I wished the morrow; — vainly I had sought to borrow
From my books surcease[1] of sorrow — sorrow for the lost Lenore —
For the rare and radiant maiden whom the angels name Lenore —
Nameless here for evermore.

Q2: What is the speaker thinking about in this stanza?

And the silken, sad, uncertain rustling of each purple curtain
Thrilled me — filled me with fantastic terrors never felt before;
So that now, to still the beating of my heart, I stood repeating
"'Tis some visitor entreating entrance at my chamber door —
Some late visitor entreating entrance at my chamber door; —
This it is and nothing more."

Presently my soul grew stronger; hesitating then no longer,
"Sir," said I, "or Madam, truly your forgiveness I implore;
But the fact is I was napping, and so gently you came rapping,
And so faintly you came tapping, tapping at my chamber door,
That I scarce was sure I heard you" — here I opened wide the door; —
Darkness there and nothing more.

Q3: What happens when the narrator opens the door?

Deep into that darkness peering, long I stood there wondering, fearing,
Doubting, dreaming dreams no mortal ever dared to dream before;
But the silence was unbroken, and the stillness gave no token,
And the only word there spoken was the whispered word, "Lenore?"
This I whispered, and an echo murmured back the word, "Lenore!" —
Merely this and nothing more.

Back into the chamber turning, all my soul within me burning,
Soon again I heard a tapping somewhat louder than before.
"Surely," said I, "surely that is something at my window lattice;
Let me see, then, what thereat is, and this mystery explore —
Let my heart be still a moment and this mystery explore; —
'Tis the wind and nothing more!"

Open here I flung the shutter, when, with many a flirt and flutter,
In there stepped a stately Raven of the saintly days of yore;
Not the least obeisance[2.] made he; not a minute stopped or stayed he;
But, with mien[3.] of lord or lady, perched above my chamber door —
Perched upon a bust of Pallas[4.] just above my chamber door —
Perched, and sat, and nothing more.

Q4: What happens the second time the narrator opens the door?

Then this ebony bird beguiling[5.] my sad fancy into smiling,
By the grave and stern decorum of the countenance[6.] it wore,
"Though thy crest be shorn and shaven, thou," I said, "art sure no craven,[7.]
Ghastly grim and ancient Raven wandering from the Nightly shore —
Tell me what thy lordly name is on the Night's Plutonian shore!"[8.]
Quoth the Raven "Nevermore."

Much I marvelled this ungainly fowl to hear discourse so plainly,
Though its answer little meaning — little relevancy bore;
For we cannot help agreeing that no living human being
Ever yet was blessed with seeing bird above his chamber door —
Bird or beast upon the sculptured bust above his chamber door,
With such name as "Nevermore."

But the Raven, sitting lonely on the placid[9] bust, spoke only
That one word, as if his soul in that one word he did outpour.
Nothing farther then he uttered — not a feather then he fluttered —
Till I scarcely more than muttered "Other friends have flown before —
On the morrow he will leave me, as my Hopes have flown before."
Then the bird said "Nevermore."

Startled at the stillness broken by reply so aptly spoken,
"Doubtless," said I, "what it utters is its only stock and store
Caught from some unhappy master whom unmerciful Disaster
Followed fast and followed faster till his songs one burden bore —
Till the dirges[10] of his Hope that melancholy burden bore
Of 'Never — nevermore.'"

But the Raven still beguiling all my fancy into smiling,
Straight I wheeled a cushioned seat in front of bird, and bust and door;
Then, upon the velvet sinking, I betook myself to linking
Fancy unto fancy, thinking what this ominous[11] bird of yore —
What this grim, ungainly, ghastly, gaunt, and ominous bird of yore
Meant in croaking "Nevermore."

This I sat engaged in guessing, but no syllable expressing
To the fowl whose fiery eyes now burned into my bosom's core;
This and more I sat divining, with my head at ease reclining
On the cushion's velvet lining that the lamp-light gloated o'er,
But whose velvet-violet lining with the lamp-light gloating o'er,
She shall press, ah, nevermore!

Q5: Which of the phrases best describes the narrator's attitude toward the raven?

A. curiosity and confusion
B. fury and hatred
C. sadness and sympathy
D. anger and misunderstanding

Then, methought, the air grew denser, perfumed from an unseen censer[12.]
Swung by Seraphim[13.] whose foot-falls tinkled on the tufted floor.
"Wretch," I cried, "thy God hath lent thee — by these angels he hath sent thee
Respite — respite and nepenthe[14.] from thy memories of Lenore;
Quaff,[15.] oh quaff this kind nepenthe and forget this lost Lenore!"
Quoth the Raven "Nevermore."

Q6: The narrator thinks that the bird might be sent by God to…

"Prophet!" said I, "thing of evil! — prophet still, if bird or devil! —
Whether Tempter[16.] sent, or whether tempest[17.] tossed thee here ashore,
Desolate yet all undaunted, on this desert land enchanted —
On this home by Horror haunted — tell me truly, I implore —
Is there — is there balm in Gilead? [18.]— tell me — tell me, I implore!"
Quoth the Raven "Nevermore."

"Prophet!" said I, "thing of evil! — prophet still, if bird or devil!
By that Heaven that bends above us — by that God we both adore —
Tell this soul with sorrow laden if, within the distant Aidenn,[19.]
It shall clasp a sainted maiden whom the angels name Lenore —
Clasp a rare and radiant maiden whom the angels name Lenore."
Quoth the Raven "Nevermore."

"Be that word our sign of parting, bird or fiend!" I shrieked, upstarting —
"Get thee back into the tempest and the Night's Plutonian shore!
Leave no black plume as a token of that lie thy soul hath spoken!
Leave my loneliness unbroken! — quit the bust above my door!
Take thy beak from out my heart, and take thy form from off my door!"
Quoth the Raven "Nevermore."

Q7: The narrator becomes angry with the raven when…

And the Raven, never flitting, still is sitting, still is sitting
On the pallid[20.] bust of Pallas just above my chamber door;
And his eyes have all the seeming of a demon's that is dreaming,
And the lamp-light o'er him streaming throws his shadow on the floor;
And my soul from out that shadow that lies floating on the floor
Shall be lifted — nevermore!

Q8: At the end of the poem, the raven…

1. PART A: Which of the following best explains the relationship between the speaker and Lenore?
   A. Lenore was the speaker's girlfriend who broke up with him.
   B. Lenore was the speaker's lover but she has recently died.
   C. Lenore is the speaker's friend whom the speaker is currently in love with.
   D. Lenore and the speaker are enemies; the speaker believes she has cursed him.

2. PART B: Which phrase from the poem best supports the answer to Part A?
    A. "vainly I had sought to borrow / From my books surcease of sorrow" (Lines 9-10)
    B. "the rare and radiant maiden" (Line 11)
    C. "maiden whom the angels name Lenore — / Nameless here for evermore" (Lines 11-12)
    D. "respite and nepenthe from thy memories of Lenore" (Line 82)

3. PART A: Which of the following best describes a central theme of the text?
    A. Loss and grief can have powerful effects on the mind.
    B. The supernatural is proof that death is not the end.
    C. Fear is only a state of mind, and cannot significantly harm anyone.
    D. Evil deeds will always come back to haunt us.

4. PART B: Which TWO of the following quotes best support the answer to Part A?
    A. "'Tis some visitor,' I muttered, 'tapping at my chamber door — / Only this and nothing more.'" (Lines 5-6)
    B. "Eagerly I wished the morrow; — vainly I had sought to borrow / From my books surcease of sorrow — sorrow for the lost Lenore — " (Lines 9-10)
    C. "Then, upon the velvet sinking, I betook myself to linking / Fancy unto fancy, thinking what this ominous bird of yore — / What this grim, ungainly, ghastly, gaunt, and ominous bird of yore / Meant in croaking 'Nevermore.'" Lines 69-72)
    D. "Then, methought, the air grew denser, perfumed from an unseen censer / Swung by Seraphim whose foot-falls tinkled on the tufted floor." (Lines 79-80)
    E. "'Prophet!' said I, 'thing of evil! — prophet still, if bird or devil! — / Whether Tempter sent, or whether tempest tossed thee here ashore'" (Lines 85-86)
    F. "And his eyes have all the seeming of a demon's that is dreaming, / And the lamp-light o'er him streaming throws his shadow on the floor; / And my soul from out that shadow that lies floating on the floor / Shall be lifted — nevermore!" (Lines 105-108)

5. How do the allusions, or references, made to Pallas (Athena) and Pluto (Hades) inform the character of the raven?
    A. These allusions make the raven seem otherworldly and informs his symbolic nature as a possible messenger from the afterlife.
    B. These allusions imply that the raven is far more powerful than it at first seems and it is there to cast judgement on the speaker.
    C. These allusions contribute to the raven's characterization as the speaker's punishment, as classical gods were often seen as cruel and petty.
    D. These allusions remind the reader that the speaker is mentally unbalanced and mistaking a raven for a god.

6. Why does the speaker react poorly to the raven's response of "Nevermore" in stanzas 15-16?
    A. The speaker is unsettled by the raven's repetition of "Nevermore" because he believes the raven learned it from a depressed former master and intends to make him his new owner.
    B. The speaker begs the raven to leave, to which the raven responds "Nevermore"; the speaker becomes frustrated in these stanzas as he attempts to make it leave.
    C. C.In these stanzas, the speaker asks the raven if there is an afterlife and if he will be reunited with Lenore there, to which the raven answers "Nevermore"; the speaker takes these answers seriously and thus becomes upset.
    D. The speaker is frustrated by the bird's catchphrase and begs it to stop talking.

7. How does the overall use of repetition in the poem contribute to its mood?
    A. The poem's repetitive and rigid structure contrasts the speaker's declining mental state, thus contributing to the crazed mood of the poem.
    B. The poem's repetition of the negative response "Nevermore" contributes to the lethargic and dispassionate mood of the poem.
    C. The poem's use of repetition and alliteration creates a dreamy mood, as the author thinks of his love, Lenore.
    D. The poem's use of repetition — namely the tapping, the narrator's calls for Lenore, and the raven's catchphrase of "Nevermore" — contributes to the overall suspenseful, eerie mood.

DISCUSSION:

How do we deal with grief? Find evidence from the poem, from your experience, and from other works of literature or art.

NOTES

1. **surcease**: the act or process of being brought to an end
2. **obeisance**: acknowledgement of another's superiority, such as in the form of a bow
3. **mien**: a demeanor or air
4. **Pallas**: Athena, the Greek goddess of wisdom
5. **beguile** *(verb) :* to charm or enchant, often in a deceptive way
6. **countenance** *(noun) :* a person's face or facial expression
7. **craven**: a coward
8. **Plutonian shore**: a reference to the afterlife or underworld. Pluto is the Roman god of death, also known as Hades in Greek mythology.
9. **placid** *(adjective) :* not easily upset or excited; involving little movement or activity
10. **dirges**: mournful songs or poems
11. **ominous** *(adjective) :* suggesting that something bad is going to happen
12. **censer**: a vessel for burning incense
13. **Seraphim**: an order of angels
14. **nepenthe**: refers to a substance capable of causing forgetfulness of pain and sorrow
15. **quaff**: to drink deeply
16. **Tempter**: also known as "the Devil"
17. **tempest** *(noun) :* a violent, windy storm
18. **"Is there blam in Gilead?"**: This is a reference to the Biblical quote from Jeremiah 8:22 — "Is there no balm in Gilead; is there no physician there?"
19. **Aidenn**: a variant spelling of the Biblical Eden
20. **pallid** *(adjective) :* pale or white

Grade 7 ELA

Apollo and Hyacinthus by Thomas Bullfinch 1855

Thomas Bulfinch (1796-1867) was an American writer best known for his book *Bulfinch's Mythology*, a compilation of his earlier works. In this short story, Bulfinch retells the classic myth about Apollo, the god of music, and his affection for a young man named Hyacinthus.

As you read, take notes on what figurative language the author uses to describe Hyacinthus.

---

1. Apollo was passionately fond of a youth named Hyacinthus. He accompanied him in his sports, carried the nets when he went fishing, led the dogs when he went to hunt, followed him in his **excursions**[1] in the mountains, and neglected for him his **lyre**[2] and his arrows. One day they played a game of **quoits**[3] together, and Apollo, heaving aloft the **discus**,[4] with strength mingled with skill, sent it high and far. Hyacinthus watched it as it flew and excited with the sport, ran forward to seize it, eager to make his throw, when the quoit bounded from the earth and stuck him in the forehead. He fainted and fell. The god, as pale as himself, raised him and tried all his art to **stanch**[5] the wound and retain the flitting life, but all in vain; the hurt was past the power of medicine.

Q1: How is Hyacinthus injured?

As, when one has broken the stem of a lily in the garden, it hangs its head and turns its flowers to the earth, so the head of the dying boy, as if too heavy for his neck, fell over on his shoulder. "Thou diest, Hyacinth," so spoke **Phoebus**,[6] "robbed of thy youth by me. Thine is the suffering, mine the crime. Would that I could die for thee! But since that may not be thou shalt live with me in memory and in song. My lyre shall celebrate thee, my song shall tell thy fate, and thou shalt become a flower inscribed with my regret." While Apollo spoke, behold the blood which had flowed of hue more beautiful than the **Tyrian**[7] sprang up, resembling the lily, if it were not that this is purple and that **silvery white**.[8] And this was not enough for Phoebus; but to confer still greater honor, he marked the petals with his sorrow, and inscribed "Ah! Ah!" upon them, as we see to this day. The flower bears the name of Hyacinthus, and with every returning spring revives the memory of his fate.

Q2: Apollo turns Hyacinthus into a flower because…

NOTES

1. **excursion** (noun): a short journey or trip
2. **lyre**: a stringed instrument, similar to a harp
3. **quoits**: a game in which rings or rope or flattened metal are thrown at an upright peg, with the intention being to hook it or get as close to it as possible
4. **discus**: a heavy disc thrown by athletes
5. **stanch***(verb) :* to stop the flow of blood from a wound
6. **Phoebus***:* another name for Apollo
7. **Tyrian**: expensive purple dye
8. **silvery white**: It is evidently not our modern hyacinth that is here described. It is perhaps some species of iris, or perhaps larkspur, or of pansy.

Grade 7 ELA

1. PART A: What does the phrase “flitting life” imply in “Apollo and Hyacinthus”?
    A. Hyacinthus wants to play a different sport.
    B. Hyacinthus is a faster runner than Apollo.
    C. Hyacinthus is so badly injured he might die.
    D. Hyacinthus is injured but able to play again.

2. PART B: Which TWO phrases help the reader understand the meaning of “flitting life” in “Apollo and Hyacinthus”?
    A. “strength mingled with skill”
    B. “bounded from the earth”
    C. “The god, as pale as himself”
    D. “stanch the wound and retain”
    E. “the hurt was past the power of medicine.”
    F. “its flowers to the earth”

3. Which phrase best captures the symbolic meaning of “flitting life”?
    A. “broken the stem of a lily”
    B. “the head of the dying boy”
    C. “‘mine the crime.’”
    D. “‘I could die for thee!’”

4. PART A: Which phrase states a central idea in “Apollo and Hyacinthus”?
    A. resolving family conflict
    B. coping with grief and loss
    C. finding one’s calling
    D. facing one’s fears

5. PART B: Which piece of evidence from paragraph 1 of the myth supports the answer to Part A?
    A. “Hyacinthus watched it as it flew, and excited with the sport, ran forward to seize it.”
    B. “‘My lyre shall celebrate thee… and thou shalt become a flower inscribed with my regrets.’”
    C. “but a flower of hue more beautiful than the Tyrian sprang up”
    D. “It is perhaps some species of iris, or perhaps of larkspur.”

DISCUSSION: use evidence from the reading to support your response.

What lesson is to be learned from this myth?

GRADES 6-8 SCIENCE! (ESPAÑOL P. 10-19)

MAY 4-MAY 14

USE THIS TIME TO MAKE SURE ALL YOUR WORK IS COMPLETED. BE SURE TO FINISH YOUR PROJECTS AND ANSWER ALL THE QUESTIONS IN YOUR PACKET.

IF YOU HAVE ALREADY FINISHED, YAY! HERE ARE SOME EXPERIMENTS YOU SHOULD TRY AT HOME. ANSWER THE QUESTIONS ABOUT EACH EXPERIMENT YOU CONDUCT.

SKITTLE SWIRL:
This experiment is all about concentration gradients. This is the idea that liquids and gases will move from high concentration towards low concentration.

You will need:
- A small plate (white plates work best)
- Skittles
- Water
- Sugar cube (optional)

Methods:
1. Pour just enough water to cover the bottom of your plate.
2. Place 3 skittles in a triangle on the plate (about 1-2 inches apart from each other)
3. Write down your observations. Describe what you see.

4. If you have a sugar cube, place it in the center of the skittle triangle.
5. Write down your observations. Describe what you see.

Extra option:
On a clean plate, place a ring of skittles all around the inside edge of the plate. Then, slowly pour warm water on the plate. What happens?

Think about it!
Alejandra sprays perfume in a room, the concentration of perfume is very high near her when she sprays it. Over time, more people in the same room can smell it.

Over a short amount of time, what happens to the concentration of perfume next to Alejandra? (hint: think about how *strong* the smell is)

What happens to the concentration of perfume in the room?

How does the skittle experiment help you understand how concentration changes over time?

GROWING CRYSTALS:

A solution is a homogeneous (equally distributed) mixture of two or more substances. A solution may exist in any phase.

A solution consists of a solute and a solvent. The solute is the substance that is dissolved in the solvent. The amount of solute that can be dissolved in solvent is called its solubility. For example, in a saline (saltwater) solution, salt is the solute dissolved in water as the solvent.

Unsaturated	Saturated	Supersaturated
A solution that contains enough solvent to completely dissolve the solute, leaving no remaining substances.	A solution that contains so much solute that it is unable to dissolve anymore, leaving the undissolved solute at the bottom of the container.	A solution with more solute than the saturated solution. Since it contains more undissolved solute than the saturated solution it has the tendency to crystallize.

Materials:

- Clean wooden skewer or chopstick
- Clothespin or other clip
- 1 cup water
- 2-3 cups sugar
- Tall narrow glass or jar
- Food coloring (optional)

Methods:

1. Clip the wooden skewer into the clothespin so that it hangs down inside the glass and is about 1 inch (2.5 cm) from the bottom of the glass.
2. Remove the skewer and clothespin and put them aside for now.
3. Get a helpful adult!
4. Pour the water into a pan and bring it to boil.
5. Pour about 1/4 cup of sugar into the boiling water, stirring until it dissolves. Add 4-5 drops of food coloring (optional).
6. Keep adding more and more sugar, each time stirring it until it dissolves, until no more will dissolve. This will take time and patience and it will take longer for the sugar to dissolve each time.Be sure you don't give up too soon. Once no more sugar will dissolve, remove it from heat and allow it to cool for at least 20 minutes.
7. NOTE: While it is cooling, some people like to dip half of the skewer in the sugar solution and then roll it in some sugar to help jump start the crystal growth. If you do this, be sure to let the skewer cool completely so that sugar crystals do not fall off when you place it back in the glass
8. Have your friendly ADULT carefully pour the sugar solution into the jar almost to the top. Then submerge the skewer back into the glass making sure that it is hanging straight down the middle without touching the sides.
9. Allow the jar to fully cool and put it someplace where it will not be disturbed.
10. Now just wait. The sugar crystals will grow over the next 3-7 days. Then you can eat it!

While you wait:
Each day, look at your jar (don't shake it!) and record your observations below:

Day 1	Day 2	Day 3	Day 4	Day 5, etc.

What was the solvent in this experiment? How do you know?

What was the solute in this experiment? How do you know?

What type of solution did you create? How do you know?

BALLOON ROCKET:

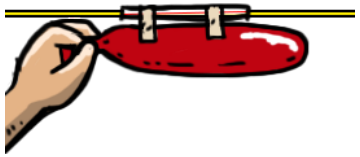
Newton's Third Law of Motion states that "for every action, there is an equal and opposite reaction." In this experiment you will observe how a balloon losing air out the back of the balloon creates "thrust" in the forward direction. Thrust is a pushing force created by energy. In the balloon experiment, our thrust comes from the energy of the balloon forcing the air out. In a real rocket, thrust is created by the force of burning rocket fuel as it blasts from the rockets engine – as the engines blast down, the rocket goes up!

Materials:

- 1 balloon (round ones will work, but the longer "airship" balloons work best)
- 1 long piece of string (about 10-15 feet long)
- 1 plastic straw
- tape

Methods:

1. Tie one end of the string to a chair, door knob, or other support.
2. Put the other end of the string through the straw.
3. Pull the string tight and tie it to another support in the room (bed frame, dresser knob, etc.).
4. Blow up the balloon (but don't tie it.) Pinch the end of the balloon and tape the balloon to the straw as shown. You're ready for launch.



5. Let go and watch the rocket fly!

Questions to answer:

1. Measure: how far did the rocket fly? How much time did it take to stop?

2. If you have another balloon with a different shape, try the experiment again. Does the shape of the balloon affect how far (or fast) the rocket travels?

3. Cut the straw to make a shorted straw and redo the experiment. Does the length of the straw affect how far (or fast) the rocket travels?

4. Does the type of string affect how far (or fast) the rocket travels? (try fishing line, nylon string, cotton string, etc.)

5. Does the angle of the string affect how far (or fast) the rocket travels?

FOOD SCRAP GARDEN:

America has more than enough food to feed everyone. But each year, an enormous amount of food is wasted in the United States. Each year, 72 billion pounds of food goes to waste while 37 million Americans struggle with hunger.
This amount of waste has far-reaching impacts on food security, resource conservation and climate change:

- Wholesome food that could have helped feed families in need is sent to landfills.
- The land, water, labor, energy and other inputs used in producing, processing, transporting, preparing, storing, and disposing of discarded food are pulled away from uses that may have been more beneficial to society – and generate impacts on the environment that may endanger the long-run health of the planet.
- Food waste, which is the single largest component going into municipal landfills, quickly generates methane, helping to make landfills the third largest source of methane in the United States.

Here are some ways to reduce food waste:

- Make a meal plan and buy exactly what you need
- Compost your leftover food
- Make sure your refrigerator is at the right temperature
- Pickle or can leftover items
- Make a big batch and freeze individual portions

We can also reduce food waste by growing food from our scraps. Several foods can be grown from the food pieces we normally throw away.

Materials:

- Clear cups or glass jars (any size)
- Water
- Scraps from any of these vegetables:
    - Green onions (the white rooty part)
    - Celery (the bottom part)
    - Garlic
    - Romaine lettuce (the "core")
    - Bok Choy (the bottom part)
    - (lots more, but we'll start here!)

Methods:

1. Get a jar/glass for each type of scrap you will plant.
2. Place the food scrap in a jar with the "bottom" of the plant down.
3. Place water in the jar until it covers the bottom part of the food scrap.
4. Change the water every 2-3 days and replace with fresh water.
5. Once your scraps begin to grow, you can keep them in jars and keep replacing the water, or plant them in a pot with soil.
6. Record observations & measure your plants every day for 3 weeks.
7. Watch your veggies grow and then eat them!

Observations:

Plant Type	Week 1 observations	Week 2 observations	Week 3 observations

Create a data table below to record the growth of your plants each day. You should use millimeters or centimeters to measure your plants, NOT inches.

Which plant grew the fastest?

How does regrowing food scraps impact food security, resource conservation and climate change?

HAVE A WONDERFUL SUMMER! WE HOPE YOU HAVE FUN AND STAY SAFE!

"WHERE THERE'S HOPE, THERE'S LIFE.
IT FILLS US WITH FRESH COURAGE AND MAKES US STRONG AGAIN."
— ANNE FRANK, THE DIARY OF A YOUNG GIRL

CIENCIAS GTO-8VO GRADO!
4 AL 14 DE MAYO

USA ESTE TIEMPO PARA ASEGURARTE DE QUE TODAS TUS TAREAS ESTÉN COMPLETAS. ASEGURATE DE COMPLETAR TUS PROYECTOS Y TODAS LAS PREGUNTAS EN TU PAQUETE.

SI YA TERMINASTE, YUPI! AQUÍ HAY ALGUNOS EXPERIMENTOS QUE PUEDES INTENTAR EN CASA. RESPONDE A LAS PREGUNTAS SOBRE CADA EXPERIMENTO QUE HAGAS.

REMOLINO DE SKITTLES:
Este experimento nos enseña sobre los gradientes de concentración. Esta es la idea de que los líquidos y gases se mueven desde altas concentraciones hacia bajas concentraciones.

Necesitas:
- Un plato pequeno (un plato blanco es ideal)
- Skittles
- Agua
- Cubo de azucar (opcional)

Experimento:
1. Vierte agua en un plato, suficiente para cubrir solo el fondo.
2. Coloca 3 Skittles en el plato en forma de triángulo (a 1-2 pulgadas de distancia uno del otro)
3. Escribe tus observaciones. Describe lo que ves.

4. Si tienes un cubo de azúcar, colócalo en el centro del triángulo de Skittles.
5. Escribe tus observaciones. Describe lo que ves.

Opción adicional:
En un plato limpio, coloca un anillo de Skittles alrededor del borde inferior del plato. Luego, vierte agua tibia en el plato lentamente. Qué sucede?

Analiza!
Si Alejandra rocía perfume en una habitación, la concentración de perfume es muy alta cerca de ella cuando lo roció. Al pasar el tiempo, más personas en el mismo lugar lo pueden oler..

Qué sucede con la concentración de perfume junto a Alejandra en un periodo corto de tiempo? (Una pista: piensa en que tan fuerte el olor es).

Qué sucede con la concentración de perfume en la habitación?

De qué manera(s) te ayuda el experimento de Skittles a entender como la concentración cambia a través del tiempo?

CULTIVO DE CRISTALES:

Una solución es una mezcla homogénea (distribuida a partes iguales) de dos o más sustancias. Las soluciones pueden existir en cualquier fase.

Una solución consiste en solvente y soluto. El soluto es la sustancia disuelta en el solvente. La cantidad de soluto que puede ser disuelta en el solvente se le llama solubilidad. Por ejemplo, en una solución salina (agua salada) la sal es el soluto disuelta en agua, que actúa como solvente.

Insaturada	Saturada	Supersaturada
Una solución que contiene suficiente solvente para disolver completamente el soluto, sin dejar residuos.	Una solución que contiene tanto soluto que no puede disolverse más, dejando el soluto no disuelto en el fondo del recipiente.	Una solución con más soluto que la solución saturada. Como contiene más soluto no disuelto que la solución saturada, estas soluciones tienden a cristalizarse.

Materiales:
- Pincho limpio de madera o palito chino.
- Clip u otro gancho
- 1 taza de agua
- 2-3 tazas de azúcar
- Recipiente de vidrio alto y estrecho
- Colorante (opcional)

Experimento:
1. Sostén el pincho de madera con el gancho o clip, de forma que cuelgue dentro del recipiente de vidrio y quede a más o menos una pulgada (2.5 cms) del fondo del recipiente.
2. Remueve el pincho y el gancho y colocalos aparte por el momento.
3. Pide a un adulto que te ayude!

4. Coloca el agua en una olla a fuego bajo en la estufa/cocina hasta que hierva.
5. Vierte alrededor de ¼ de taza de azúcar en el agua hirviendo, mezclando hasta que se disuelva. Agrega 4-5 gotas de colorante (opcional).
6. Continúa agregando más y más azúcar, revolviendo hasta que se disuelva. Agrega azúcar hasta que no se disuelva más. Esta parte toma tiempo y paciencia, y cada vez tomará más tiempo para disolver el azúcar a medida que la agregas. No te rindas demasiado rapido! Una vez que no puedas disolver más azúcar, retira del fuego y deja refrescar por al menos 20 minutos.
7. NOTA: Mientras la mezcla se enfría, algunas personas sumergen la mitad del pincho de madera en la solucion de azucar y luego cubrirlo con azúcar para acelerar el cultivo de los cristales. Si haces esto, asegúrate de dejar que el pincho de madera se enfríe completamente, para que los cristales de azúcar no se caigan cuando coloques el pincho en el recipiente de vidrio.
8. Pídele a tu ayudante ADULTO que con mucho cuidado vierta la solución de azúcar en el recipiente hasta casi el tope. Luego, sumerge el pincho de madera en el recipiente, asegurandote de que cuelgue justo en el medio, sin tocar los lados. .
9. Deja que el recipiente se enfríe completamente y colocalo en un lugar donde no se mueva..
10. Ahora, solo falta esperar. Los cristales de azúcar se cultivan en 3-7 días. Cuando estén listos, te los puedes comer!

Mientras esperas...
Observa el recipiente cada dia (no lo revuelvas ni lo muevas!) y anota tus observaciones aquí:

Dia 1	Dia 2	Dia 3	Dia 4	Dia 5, etc.

Que sustancia actúa como solvente en este experimento? Como lo sabes?

Que sustancia actúa como soluto en este experimento? Como lo sabes?

Que tipo de solución creaste? Como lo sabes?

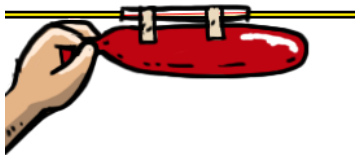
COHETE CON GLOBOS:

La Tercera Ley de Newton, también conocida como el Principio de Accion y Reaccion, dice “si un cuerpo ejerce una acción sobre otro, este realizará una acción igual en sentido contrario“. En este experimento, observaremos como un globo perdiendo aire desde atrás crea “impulso“ en dirección delantera. El impulso es una fuerza de empuje creada usando energía. En este experimento con un globo, el impulso viene de la energía que el globo realiza para expulsar el aire. En un cohete de verdad, el impulso se crea por la fuerza generada al quemar combustible que explota desde el motor del cohete - a medida que los motores arrancan, el cohete se eleva!

Materiales:
- 1 globo (los redondos funcionan, pero los mejores para este experimento son los más largos, también conocidos como globos dirigibles)
- 1 pedazo largo de hilo o cuerda (10-15 pies de largo) long piece of string
- 1 sorbete o pajilla de plastico
- Cinta adhesiva

Experimento:
1. Amarra uno de los dos extremos del hilo o cuerda a una silla, manubrio de una puerta, o cualquier otro apoyo.
2. Pasa el otro extremo del hilo o cuerda a través de la pajilla o sorbete de plástico. .
3. Hala el hilo o cuerda con fuerza y amarralo a otro soporte en el cuarto (marco de cama, perilla de tocador, etc.)

4. Infla el globo (pero no lo amarres). Sostén el globo entre tus dedos y usa cinta adhesiva para pegar la pajilla al globo como en el dibujo. Estás listo para lanzamiento..



5. Suelta el globo y observa el cohete volar!

Preguntas:

1. Medida: qué distancia ha recorrido el cohete? Cuánto tiempo tomó para que se detuviera?
2. Si tienes otro globo con otra forma, intenta el experimento otra vez. Tiene algún efecto la forma del globo en la distancia que recorre el cohete, o qué tan rápido se mueve?

3. Corta la pajilla o sorbete para hacerla más corta y repite el experimento. Tiene algún efecto el largo de la pajilla o sorbete en la distancia o velocidad del cohete?

4. Explica si el tipo de cuerda o hilo afecta la distancia o velocidad del cohete. (Intenta el experimento con sedal, hilo de nylon, hilo de algodon, etc.)

5. Hay alguna diferencia en la distancia o velocidad del cohete dependiendo del ángulo del hilo o cuerda?

JARDIN DE SOBRAS DE ALIMENTOS:

Los Estados Unidos tiene más que suficiente comida para alimentar a todos sus habitantes. Pero cada año, una cantidad enorme de comida se echa a perder en los Estados Unidos. Mientras 37 millones de estadounidenses padecen de hambre, cada año en los Estados Unidos se desechan 70 mil millones de toneladas de alimentos. Esta cantidad de comida desperdiciada tiene impactos significativos en la seguridad alimentaria, preservación de recursos y cambio climático en el país:

- Alimentos nutritivos que podrían haber ayudado a alimentar familias son enviados a los vertederos.
- La tierra, el agua, la mano de obra, energía y otros insumos que se usan en producir, procesar, transportar, preparar, almacenar, y descartar estos alimentos se podrían usar de formas más beneficiosas para la sociedad - y generan un impacto ambiental que puede poner en peligro la salud del planeta a largo plazo.
- El desperdicio de comida, ques es hoy día el mayor componente de los desperdicios en los vertederos municipales, genera metano muy

rápidamente, convirtiendo los vertederos en la tercera mayor fuente de metano en los Estados Unidos.

Estas son algunas maneras de reducir tu desperdicio de alimentos:

- Haz un plan con lo que vas a preparar para cada una de tus comidas y compra exactamente lo que necesitas.
- Colecta las sobras de tus alimentos para compostaje (compost)
- Revisa la temperatura de tu refrigerador - asegúrate que esté a la temperatura correcta.
- Prepara alimentos en conservas.
- Prepara porciones grandes de tus platos favoritos y congela porciones individuales.

Otra forma de reducir nuestro desperdicio de alimentos es cultivando hortalizas usando sobras. Varios vegetales se pueden replantar a partir de las piezas que normalmente echamos a la basura. .

Materiales:

- Tazas o jarros transparentes o de vidrio (de cualquier tamaño)
- Agua
- Sobras de cualquiera de estos vegetales:
    - Cebollinos o chalotes (la parte blanca con las raíces)
    - Apio (la parte de abajo)
    - Ajo
    - Lechuga romana (el corazon)
    - Bok Choy o repollo chino (la parte de abajo)
    - (hay muchos más pero por algo se empieza!)

Experimento:

1. Usa un jarro o vaso por cada tipo de sobra que vayas a plantar.
2. Coloca el pedazo del vegetal en un jarro con la raíz o cepa (la parte de abajo) hacia abajo.
3. Coloca agua en el vaso o jarro hasta que cubra la parte inferior del pedazo de vegetal. Cambia el agua cada 2-3 días y reemplaza con agua fresca.
4. Una vez que las sobras empiecen a crecer, las puedes dejar en el vaso o jarro, o plantarlas en una maceta con tierra.
5. Anota tus observaciones y mide tus plantas cada dia por 3 semanas.
6. Observa tus vegetales crecer y disfruta tu cosecha!

Observaciones:

Tipo de Planta	Semana 1 - observaciones	Semana 2 - observaciones	Semana 3 - observaciones

Crea un cuadro de datos debajo para registrar el crecimiento de tus plantas cada dia. Usa milimetros o centimetros para medir tus plantas, NO pulgadas.

7th Grade, Social Studies, At Home Activities and Resources

Directions:

- For the instructional weeks of April 20-May 1 students received a large packet of Social Studies materials. Make sure the packet is complete prior to moving on to these activities.
- Activities 1-4, 6, and 8 are multi-day activities; numbers 5 and 7 can be done in one day.

Activity 1	Historical Narrative	Create a Historical Narrative: Students can: 1) research a topic 2) examine the who, what, when, where and why about the event 3) Create a storyboard of the ideas using sensory details 4) Write a rough draft and 5) Edit and revise the story. Click here for detailed directions and a sample. https://drive.google.com/file/d/12YAEip4J1KYAbRLySkrBmCslaRNJ_7_J/view
Activity 2	Editorial	Write an Editorial: This is a writing style in which students share their opinion on an important topic. To complete this activity students should 1) research a topic, 2) identify their opinion and reasons to support their ideas 3) write a paper that explains your opinion and provides evidence. A packet with student directions and a sample editorial can be found here. https://drive.google.com/file/d/1VJbs00M_6iEh6aM775_0gOLyHK_uH3-C/view
Activity 3	Oral History	Write an Oral History: An oral history is the act of recording an interpretation of past events. In this writing assignment students should 1) choose a topic 2) select individuals to interview 3) write questions 4) conduct the interview and 5) write a summary and analysis of the interview. Here is a packet with student directions and a sample. https://drive.google.com/file/d/1APzqtUQ1bBtIf59W_8PmpgaQgIXI49Bd/view
Activity 4	Letter of Concern	Letter of Concern to a Government Official- Research a major issue and write a letter explaining how you would like the government leader to react. The letter should include

		important facts that support your ideas. Directions and a writing sample can be found here. https://drive.google.com/file/d/1yWdo8nRIbFcIBxsDoarkfi3moXLYo9za/view
Activity 5	Home Map & Scavenger Hunt	First, make a map of your home. Next, divide it up into a grid and use cardinal directions to label each section of the grid. Then leave clues on pieces of paper in different parts of the grid that lead the student to the next clue. The hunt should end in a specific object or a piece of candy. For example, the first piece of paper would say, “look under the chair that’s in the SE square of the home.” Then under the chair would be another piece of paper that says, “look inside the shoe that’s in the NW part of the home.” And so on, until all clues are found.
Activity 6	Comparing Memories and Stories	Think about a specific memory you have with your family. Summarize the specific memory. Now, interview each family member about the same memory. Detail the account of each person and compile all the information you can. In the end, examine the final body of work. Compare and contrast the different accounts about the same event. Why are there differences? What made similarities possible? What does this tell us about larger historical events? How will this impact how you analyze other parts of history or current events?
Activity 7	Journaling	Journaling can provide you with opportunities for private reflection and help them process their thoughts, feelings, and uncertainties during these difficult times. Respond to a journal prompt on the coronavirus outbreak. 1. How can we help each other during this crisis? 2. What does it mean to stay away from each other physically but still work together?
Activity 8	What a Time!	Did you know that you are living through a historic time? In future decades, like the 2030s, researchers will research the COVID-19 pandemic.. They will look to primary sources, first-hand accounts or other data sources to learn how people were affected by this pandemic. To support them: 1. Write down what news you are hearing every day, noting the changes that are taking place, for one week. 2. Provide your perspective and personal experiences to the news you are hearing.

Number Correct: _____

Fractional Percents—Round 1

Directions: Find the part that corresponds with each percent.

1.	1% of 100	
2.	1% of 200	
3.	1% of 400	
4.	1% of 800	
5.	1% of 1,600	
6.	1% of 3,200	
7.	1% of 5,000	
8.	1% of 10,000	
9.	1% of 20,000	
10.	1% of 40,000	
11.	1% of 80,000	
12.	$\frac{1}{2}$% of 100	
13.	$\frac{1}{2}$% of 200	
14.	$\frac{1}{2}$% of 400	
15.	$\frac{1}{2}$% of 800	
16.	$\frac{1}{2}$% of 1,600	
17.	$\frac{1}{2}$% of 3,200	
18.	$\frac{1}{2}$% of 5,000	
19.	$\frac{1}{2}$% of 10,000	
20.	$\frac{1}{2}$% of 20,000	
21.	$\frac{1}{2}$% of 40,000	
22.	$\frac{1}{2}$% of 80,000	

23.	$\frac{1}{4}$% of 100	
24.	$\frac{1}{4}$% of 200	
25.	$\frac{1}{4}$% of 400	
26.	$\frac{1}{4}$% of 800	
27.	$\frac{1}{4}$% of 1,600	
28.	$\frac{1}{4}$% of 3,200	
29.	$\frac{1}{4}$% of 5,000	
30.	$\frac{1}{4}$% of 10,000	
31.	$\frac{1}{4}$% of 20,000	
32.	$\frac{1}{4}$% of 40,000	
33.	$\frac{1}{4}$% of 80,000	
34.	1% of 1,000	
35.	$\frac{1}{2}$% of 1,000	
36.	$\frac{1}{4}$% of 1,000	
37.	1% of 4,000	
38.	$\frac{1}{2}$% of 4,000	
39.	$\frac{1}{4}$% of 4,000	
40.	1% of 2,000	
41.	$\frac{1}{2}$% of 2,000	
42.	$\frac{1}{4}$% of 2,000	
43.	$\frac{1}{2}$% of 6,000	
44.	$\frac{1}{4}$% of 6,000	

Number Correct: _____

Improvement: _____

Fractional Percents—Round 2

Directions: Find the part that corresponds with each percent.

1.	10% of 30	
2.	10% of 60	
3.	10% of 90	
4.	10% of 120	
5.	10% of 150	
6.	10% of 180	
7.	10% of 210	
8.	20% of 30	
9.	20% of 60	
10.	20% of 90	
11.	20% of 120	
12.	5% of 50	
13.	5% of 100	
14.	5% of 200	
15.	5% of 400	
16.	5% of 800	
17.	5% of 1,600	
18.	5% of 3,200	
19.	5% of 6,400	
20.	5% of 600	
21.	10% of 600	
22.	20% of 600	

23.	$10\frac{1}{2}$% of 100	
24.	$10\frac{1}{2}$% of 200	
25.	$10\frac{1}{2}$% of 400	
26.	$10\frac{1}{2}$% of 800	
27.	$10\frac{1}{2}$% of 1,600	
28.	$10\frac{1}{2}$% of 3,200	
29.	$10\frac{1}{2}$% of 6,400	
30.	$10\frac{1}{4}$% of 400	
31.	$10\frac{1}{4}$% of 800	
32.	$10\frac{1}{4}$% of 1,600	
33.	$10\frac{1}{4}$% of 3,200	
34.	10% of 1,000	
35.	$10\frac{1}{2}$% of 1,000	
36.	$10\frac{1}{4}$% of 1,000	
37.	10% of 2,000	
38.	$10\frac{1}{2}$% of 2,000	
39.	$10\frac{1}{4}$% of 2,000	
40.	10% of 4,000	
41.	$10\frac{1}{2}$% of 4,000	
42.	$10\frac{1}{4}$% of 4,000	
43.	10% of 5,000	
44.	$10\frac{1}{2}$% of 5,000	

Lesson Video

Lección 16: Problemas de población

Trabajo en clase

Ejercicio inicial

Número de niñas en el salón de clases:	Número de niños en el salón de clases:	Número total de estudiantes en el salón de clases:
Porcentaje del número total de estudiantes que son niñas:	Porcentaje del número total de estudiantes que son niños:	Porcentaje de niños y niñas en el salón de clases:
Número de niñas cuyos nombres comienzan con una vocal:	Número de niños cuyos nombres comienzan con una vocal:	Número de estudiantes cuyos nombres comienzan con una vocal:
Porcentaje de niñas cuyos nombres comienzan con una vocal:	Porcentaje de niños cuyos nombres comienzan con una vocal:	
Porcentaje del número total de estudiantes que son niñas cuyos nombres comienzan con una vocal:	Porcentaje del número total de estudiantes que son niños cuyos nombres comienzan con una vocal:	Porcentaje de los estudiantes cuyos nombres comienzan con una vocal:

Ejemplo 1

Una escuela tiene 60% niños y 40% niñas. Si 20% de las niñas llevan gafas y 40% de los niños llevan gafas, ¿qué porcentaje de todos los estudiantes lleva gafas?

Ejercicio 1

¿De qué manera cambia el porcentaje de estudiantes que usan gafas si el porcentaje de hombres y mujeres sigue siendo el mismo (es decir, 60% niños y 40% niñas), pero 20% de los niños llevan gafas y 40% de las niñas llevan gafas?

Ejercicio 2

¿Cómo cambia el porcentaje de estudiantes que usan gafas si el porcentaje de niñas es 40% de la escuela y el porcentaje de niños es 60% de la escuela y 40% de las niñas usan gafas y 20% de los niños usan gafas? ¿Por qué?

Ejemplo 2

El peso del primero de tres contenedores es 12% más que el segundo y el tercer contenedor es 20% más ligero que el segundo. ¿En qué porcentaje el primer contenedor es más pesado que el tercer contenedor?

Ejercicio 3

El perro de Mateo es 7% más pesado que el perro de Harrison y el perro de Janice es 20% más ligero que el de Harrison. ¿En qué porcentaje el perro de Mateo es más pesado que el de Janice?

Ejemplo 3

En el plazo de un año, 20% de las inversiones de la Srta. McElroy han incrementado en 5%, 30% de sus inversiones disminuyeron en 5% y 50% de sus inversiones aumentaron en 3%. ¿En qué porcentaje aumentó el total de sus inversiones?

Ejercicio 4

Un concierto tuvo 6,000 miembros en la audiencia en la primera noche y lo mismo en la segunda noche. En la primera noche, el concierto superó la asistencia esperada por 20%, mientras que en la segunda noche estaba por debajo de la asistencia esperada de 20%. ¿Cuál fue la diferencia en porcentaje de los asistentes al concierto y los asistentes esperados para las dos noches juntas?

Lección 17: Problemas de mezcla

Lesson Video

Trabajo en clase

Ejercicio inicial

Imagina que tienes dos contenedores de igual tamaño. Uno de ellos es de agua pura y el otro es 50% agua y 50% jugo. Si los combinas, ¿qué porcentaje de jugo tendrías?

	1º líquido	2º líquido	Líquido resultante
Cantidad de líquido (galones)			
Cantidad de jugo puro (galones)			

Si se añade un contenedor de 2 galones de jugo puro a 3 de galones de agua, ¿qué porcentaje de la mezcla es puro jugo?

	1º líquido	2º líquido	Líquido resultante
Cantidad de líquido (galones)			
Cantidad de jugo puro (galones)			

Si un contenedor de 2 galones de la mezcla de jugo que es 40% puro jugo se añade a 3 galones de agua, ¿qué porcentaje de la mezcla es puro jugo?

	1º líquido	2º líquido	Líquido resultante
Cantidad de líquido (galones)			
Cantidad de jugo puro (galones)			

Si un cóctel de jugo de 2 galones que es 40% de puro jugo se añade a 3 galones de puro jugo, ¿qué porcentaje de la mezcla resultante es puro jugo?

	1º líquido	2º líquido	Líquido resultante
Cantidad de líquido (galones)			
Cantidad de jugo puro (galones)			

Ejemplo 1

Un contenedor de 5 galones de mezcla de frutas secas tiene 20% de nueces. Otra mezcla de frutas secas se añade al mismo, lo que resulta en un contenedor de 12 galones de mezcla de frutas secas que tiene 40% de nueces.

a. Escribe una ecuación para describir las relaciones en esta situación.

b. Explica con palabras cómo cada parte de la ecuación se refiere a la situación.

c. ¿Qué porcentaje de la segunda mezcla de frutas secas con nueces?

Ejercicio 1

Representa cada situación utilizando una ecuación y muestra todos los pasos en el proceso de solución.

a. Una mezcla de 6 pintas que tiene 25% de aceite se agrega a una mezcla de 3 pintas que tiene 40% de aceite. ¿Qué porcentaje de la mezcla resultante es aceite?

b. Una cadena de oro de 11 onzas con 24% de oro se hizo de un talismán fundido de 4 onzas con 50% de oro y un relicario de oro. ¿Qué porcentaje del relicario era de oro puro?

c. En un laboratorio de ciencias, dos contenedores están llenos de mezclas. El primer contenedor se llena con una mezcla que es 30% ácido. El segundo contenedor se llena con una mezcla que es 50% ácido y el segundo contenedor es 50% más grande que el primero. El primer y segundo contenedor se vacían en un tercer contenedor. ¿Qué porcentaje de ácido está en el tercer contenedor?

Ejemplo 2

La tierra que contiene la 30% de arcilla se agrega a la tierra que contiene 70% de arcilla para crear 10 galones de tierra con 50% de arcilla. ¿Cuánto de cada una de las tierras se combinó?

Ejercicio 2

La ecuación $(0.2)(x) + (0.8)(6 - x) = (0.4)(6)$ se utiliza para modelar un problema de mezcla.

a. ¿Cuántas unidades se encuentran en la mezcla total?

b. ¿Qué porcentajes relacionan las dos soluciones que se combinan para hacer la mezcla final?

c. ¿Las dos soluciones se combinan para hacer 6 unidades de qué porcentaje de solución?

d. Cuando se da la cantidad de una solución resultante (por ejemplo, 4 galones) pero las cantidades de las soluciones de mezcla son desconocidas, ¿cómo se representan las cantidades de las soluciones de la mezcla?

Lección 18: Problemas de conteo

Trabajo en clase

Lesson Video

Ejercicio inicial

Estás a punto de cambiar tus libros en tu casillero durante el periodo de cambio de clase, pero olvidaste poner en orden la combinación de tu casillero. Sabes que son los números 3, 16 y 21 en algún orden. ¿Cuál es el porcentaje de combinaciones para casilleros que comienzan con 3?

Posibilidades de combinación del casillero:

3, 16, 21

21, 16, 3

16, 21, 3

21, 3, 16

16, 3, 21

3, 21, 16

Ejemplo 1

Todas las contraseñas de 3 letras que se pueden formar usando las letras A y B son las siguientes: AAA, AAB, ABA, ABB, BAA, BAB, BBA, BBB.

a. ¿Qué porcentaje de las contraseñas contienen al menos dos B?

b. ¿Qué porcentaje de las contraseñas no contienen una A?

Ejercicios 1–2

1. ¿Cuántas contraseñas de 4 letras se pueden formar usando las letras A y B?

2. ¿Qué porcentaje de contraseñas de 4 letras contienen
   a. Ninguna A?
   b. Exactamente una A?
   c. Exactamente dos A?
   d. Exactamente tres A?
   e. Cuatro A?
   f. El mismo número de A y B?

Ejemplo 2

En un conjunto de contraseñas con 3 letras, 40% de las contraseñas contienen la letra B y dos de otra letra. ¿Cuál de los dos conjuntos a continuación cumple con los criterios? Explica cómo llegaste a tu respuesta.

Conjunto 1

BBB	AAA	CAC
CBC	ABA	CCC
BBC	CCB	CAB
AAB	AAC	BAA
ACB	BAC	BCC

Conjunto 2

CEB	BBB
EBE	CCC
CCC	EEE
EEB	CBC
CCB	ECE

Ejercicios 3-4

3. Shana lee el siguiente problema:

> "¿Cuántas combinaciones de letras se pueden formar a partir de la palabra en inglés *triangle* que tengan dos vocales y dos consonantes (el orden no importa)?"

Ella respondió que existen 30 combinaciones de letras.

El veinte por ciento de las combinaciones de letras que comenzaron con una vocal de hecho tenía definiciones en inglés. ¿Cuántas combinaciones de letras que comienzan con una vocal tienen definiciones en inglés?

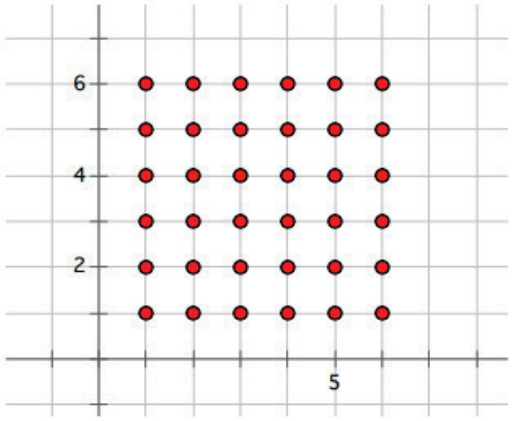
A partir de tres claves diferentes en un piano, un compositor hace el inicio de su melodía con tres notas, C, E y G: CCE, EEE, EGC, GCE, CEG, GEE, CGE, GGE, EGG, EGE, GCG, EEC, ECC, ECG, GGG, GEC, CCG, CEE, CCC, GEG, CGC.

a. De la lista anterior, ¿cuál es el porcentaje de melodías con las tres notas diferentes?

b. De la lista anterior, ¿cuál es el porcentaje de melodías que tienen tres de las mismas notas?

Ejemplo 3

Ve los 36 puntos en el plano de coordenadas con las coordenadas de números enteros entre 1 y 6, incluyendo 1 y 6.



a. Dibuja una línea a través de cada uno de los puntos que tengan una coordenada x y una coordenada y que sumen 7.
Dibuja una línea a través de cada uno de los puntos que tengan una coordenada x y una coordenada y que sumen 6.
Dibuja una línea a través de cada uno de los puntos que tengan una coordenada x y una coordenada y que sumen 5.
Dibuja una línea a través de cada uno de los puntos que tengan una coordenada x y una coordenada y que sumen 4.
Dibuja una línea a través de cada uno de los puntos que tengan una coordenada x y una coordenada y que sumen 3.
Dibuja una línea a través de cada uno de los puntos que tengan una coordenada x y una coordenada y que sumen 2.
Dibuja una línea a través de cada uno de los puntos que tengan una coordenada x y una coordenada y que sumen 8.
Dibuja una línea a través de cada uno de los puntos que tengan una coordenada x y una coordenada y que sumen 9.
Dibuja una línea a través de cada uno de los puntos que tengan una coordenada x y una coordenada y que sumen 10.
Dibuja una línea a través de cada uno de los puntos que tengan una coordenada x y una coordenada y que sumen 11.
Dibuja una línea a través de cada uno de los puntos que tengan una coordenada x y una coordenada y que sumen 12.

b. ¿Qué porcentaje de los 36 puntos tienen coordenadas que suman 7?

c. Escribe una expresión numérica que podría ser utilizada para determinar el porcentaje de los 36 puntos que tienen coordenadas que suman 7.

d. ¿Qué porcentaje de los 36 puntos tienen una suma de coordenadas de 5 o menos?

e. ¿ Qué porcentaje de los 36 puntos tienen una suma de coordenadas de 4 o 10?

Lección 1: Experimentos aleatorios

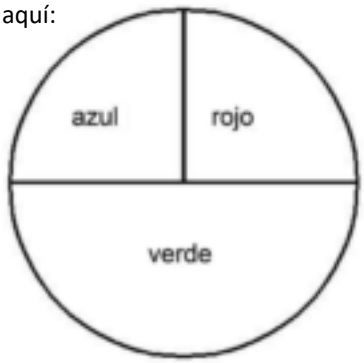
Lesson Video

Trabajo en clase

¿Alguna vez has oído al meteorólogo decir que hay un 40% de probabilidad de que mañana llueva o a un árbitro de fútbol decirle a un equipo que existe $50/50$ de probabilidad de obtener cara al lanzar la moneda para determinar qué equipo comenzará el juego? Estos son enunciados de probabilidad. En esta lección, vas a investigar la probabilidad y qué tan probable es que algunos sucesos ocurran.

Ejemplo 1: Juego de la Ruleta

Supongamos que tú y tu amigo están a punto de jugar usando la ruleta mostrada aquí:



Reglas del juego:

1. Decidan quién irá primero.
2. Cada persona elige un color. Los jugadores no pueden elegir el mismo color.
3. Cada persona toma un turno para girar la ruleta y escribir en qué color se detiene la ruleta. El ganador es la persona cuyo color salga primero 10 veces.

Juega y recuerda escribir el color en que la ruleta se detiene en cada giro.

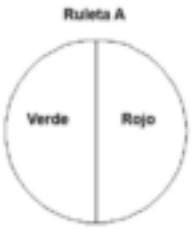
Ejercicios 1–4

1. ¿Qué color salió primero 10 veces?

2. ¿Crees que hará una diferencia quién elija primero el color?

3. ¿Qué color elegirías para tener la mejor oportunidad de ganar el juego? ¿Por qué elegirías ese color?

4. A continuación se presentan tres ruletas diferentes. ¿En qué ruleta el verde tiene más probabilidades de ganar, poca probabilidad de ganar y la misma probabilidad de ganar?



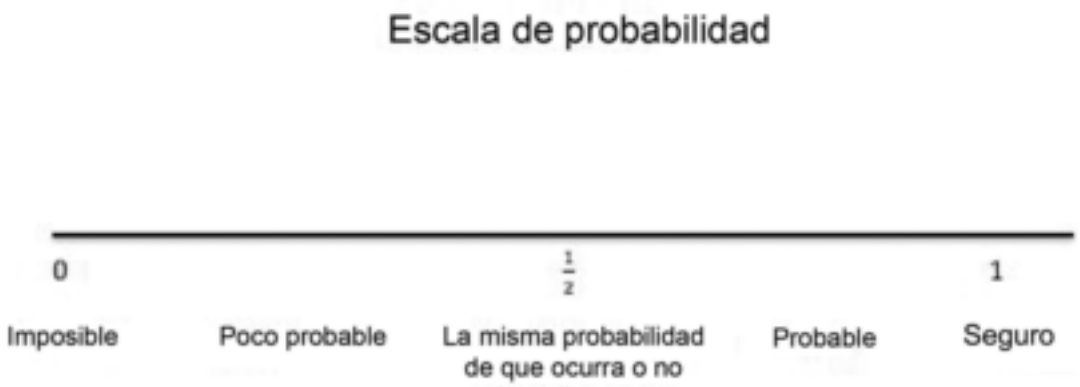
Ejemplo 2: ¿Qué es la probabilidad?

La *probabilidad* es una medida de qué tan probable es que un suceso ocurra. Una probabilidad se indica mediante un número entre 0 y 1. Algunos sucesos es seguro que ocurran, mientras que otros son imposibles. En la mayoría de los casos, la probabilidad de que ocurra un suceso está entre seguro e imposible.

Por ejemplo, considera una bolsa que contiene solo cubos rojos. Si seleccionas un cubo de la bolsa, estás seguro de elegir uno rojo. Podemos decir que la posibilidad de que un suceso ocurra tiene una probabilidad de 1. Si vamos a meter la mano en la misma bolsa de cubos, es imposible seleccionar un cubo amarillo. Un suceso imposible tiene una probabilidad de 0.

Descripción	Ejemplo	Explicación:
Algunos sucesos son *imposibles*. Estos sucesos tienen una probabilidad de $\mathbf{0}$.	Tienes una bolsa con dos cubos de color verde y seleccionas uno al azar. Seleccionar un cubo azul es un suceso imposible.	No hay manera de seleccionar un cubo azul si no hay cubos de color azul en la bolsa.
Algunos sucesos son *seguros*. Estos sucesos tienen una probabilidad de $\mathbf{1}$.	Tienes una bolsa con dos cubos de color verde y seleccionas uno al azar. Seleccionar un cubo verde es un suceso seguro.	Siempre obtendrás un cubo verde si solo hay cubos verdes en la bolsa.
Algunos sucesos se clasifican como *la misma probabilidad de que ocurran o no*. Estos sucesos tienen una probabilidad de $\frac{\mathbf{1}}{\mathbf{2}}$.	Tienes una bolsa con un cubo azul y un cubo rojo y escoges aleatoriamente uno. Seleccionar un cubo azul es igualmente probable que ocurra o no.	Dado que exactamente la mitad de la bolsa tiene cubos azules y exactamente la mitad de la bolsa tiene cubos rojos, hay una posibilidad de $\mathbf{50/50}$ (la misma probabilidad) de seleccionar un cubo azul y una posibilidad de $\mathbf{50/50}$ (la misma probabilidad) de NO seleccionar un cubo azul.
Algunos sucesos son más probables de ocurrir que de no ocurrir. Estos sucesos tienen una probabilidad mayor que $\mathbf{0.5}$. Estos sucesos podrían ser descritos como *probables* de ocurrir.	Si tienes una bolsa que contiene ocho cubos azules y dos cubos de color rojo y seleccionas uno al azar, es probable que obtengas un cubo azul.	A pesar de que no es seguro que obtendrás un cubo azul, un cubo azul podría ser seleccionado la mayor parte del tiempo, porque hay más cubos azules que cubos rojos.
Algunos sucesos son menos probables de ocurrir que de no ocurrir. Estos sucesos tienen una probabilidad que es menor que $\mathbf{0.5}$. Estos sucesos podrían ser descritos como *improbables* de ocurrir.	Si tienes una bolsa que contiene ocho cubos azules y dos cubos de color rojo y seleccionas uno al azar, es improbable que obtengas un cubo rojo.	A pesar de que no es imposible obtener un cubo rojo, un cubo rojo no se seleccionaría muy a menudo porque hay más cubos azules que cubos rojos.

La siguiente figura muestra la escala de probabilidad.



Ejercicios 5–10

5. Decide dónde se encuentra cada suceso en la escala anterior. Coloca la letra para cada suceso en el lugar apropiado en la escala de probabilidad.

   Suceso:

   A. Verás un dinosaurio vivo en el camino a casa desde la escuela, hoy.

   B. Una roca sólida que se dejó caer en el agua se hundirá.

   C. Un disco redondo con un lado rojo y otro amarillo caerá con el lado amarillo arriba al aterrizar.

   D. Una ruleta con cuatro partes iguales numeradas 1–4 se detendrá en el 4 en el siguiente giro.

   E. Tu nombre completo se sacará cuando se seleccione un nombre completo al azar de una bolsa que contiene los nombres completos de todos los estudiantes en tu clase.

   F. Se sacará un cubo rojo al seleccionar un cubo de una bolsa que tiene cinco cubos azules y cinco cubos rojos.

   G. Mañana la temperatura exterior será de -250 grados.

6. Diseña una ruleta de modo que la probabilidad de obtener verde al girarla sea 1.

7. Diseña una ruleta de modo que la probabilidad de obtener verde al girarla sea 0.

8. Diseña una ruleta con dos resultados en los que es igualmente probable que se detenga en las partes roja y verde.

Un suceso que es imposible tiene una probabilidad de ocurrir de 0 y nunca ocurrirá, sin importar cuantas observaciones se realicen. Esto significa que en una larga secuencia de observaciones ocurrirá 0% del tiempo. Un suceso que es seguro tiene una probabilidad de ocurrir de 1 y siempre ocurrirá. Esto significa que en una larga secuencia de observaciones ocurrirá 100% del tiempo.

9. ¿Qué crees que significa que un suceso tenga la probabilidad de $\frac{1}{2}$?

10. ¿Qué crees que significa que un suceso tenga la probabilidad de $\frac{1}{4}$?

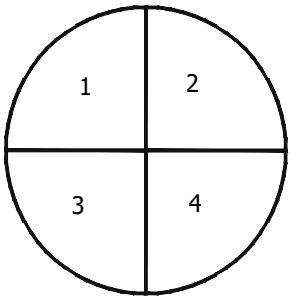
Lección 2: Estimar las probabilidades recolectando datos

Lesson Video

Trabajo en clase

Ejercicios 1–8: Juego del carnaval

En el carnaval de la escuela, hay un juego en el que los estudiantes hacen girar una gran ruleta. La ruleta tiene cuatro secciones iguales numeradas 1–4 como se muestra a continuación. Para jugar, un estudiante hace girar la ruleta dos veces y suma los dos números que salen en la ruleta. Si la suma es mayor que o igual a 5, el estudiante gana un premio.



Juega con tu compañero 15 veces. Registra el resultado de cada giro en la tabla siguiente.

Giro	Resultados del 1° giro	Resultados del 2° giro	Suma
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

1. En los 15 giros, ¿cuántas veces la suma fue mayor que o igual a 5?

2. ¿Qué suma se produjo con más frecuencia?

3. ¿Qué suma se produjo con menos frecuencia?

4. Si los estudiantes jugaran varias veces, ¿qué fracción de juegos ganarían? Explica tu respuesta.

5. Nombra una suma que sería imposible de conseguir durante el juego.

6. ¿Qué suceso es seguro que ocurra durante el juego?

Cuando estabas girando la ruleta y registrando los resultados, estabas realizando un *experimento aleatorio*. Se pueden utilizar los resultados de un experimento aleatorio para estimar la probabilidad de un suceso. En el Ejercicio 1, giraste la ruleta 15 veces y contaste cuántas veces la suma fue mayor o igual a 5. Un estimado de la probabilidad de una suma mayor o igual a 5 es

$$P(\text{suma } \geq 5) = \frac{\text{Número de ocurrencias observadas del suceso}}{\text{Número total de observaciones}}.$$

7. Basándote en tu experiencia del juego, ¿cuál es tu estimado de la probabilidad de obtener una suma de 5 o más?

8. Basándote en tu experiencia del juego, ¿cuál es tu estimado de la probabilidad de obtener una suma de 5 exactamente?

Ejemplo 2: Galletas de animales

Un estudiante trajo un gran frasco de galletas de animales para compartir con los estudiantes en la clase. En lugar de contar y clasificar todos los diferentes tipos de galletas, el estudiante sacó al azar 20 galletas y obtuvo el siguiente recuento de los diferentes tipos de galletas de animales. Estima la probabilidad de sacar una cebra.

Animal	Número seleccionado
León	2
Camello	1
Mono	4
Elefante	5
Cebra	3
Pingüino	3
Tortuga	2
	Total 20

Ejercicios 9 a 15

Si un estudiante sacó al azar una galleta de un frasco grande:

9. ¿Cuál es tu estimado de la probabilidad de sacar un león?

10. ¿Cuál es tu estimado de la probabilidad de sacar un mono?

11. ¿Cuál es tu estimado de la probabilidad de sacar un pingüino o un camello?

12. ¿Cuál es tu estimado de la probabilidad de sacar un conejo?

13. ¿Existe el mismo número de cada tipo de galleta de animal en el frasco? Explica tu respuesta.

14. ¿Si el estudiante saca al azar otras 20 galletas de animales, se producirían los mismos resultados? ¿Por qué sí o por qué no?

15. Si hay 500 galletas de animales en el frasco, aproximadamente ¿cuántos elefantes hay en el frasco? Explica tu respuesta.

Number Correct: _____

Fractional Percents—Round 1

Directions: Find the part that corresponds with each percent.

1.	1% of 100	
2.	1% of 200	
3.	1% of 400	
4.	1% of 800	
5.	1% of 1,600	
6.	1% of 3,200	
7.	1% of 5,000	
8.	1% of 10,000	
9.	1% of 20,000	
10.	1% of 40,000	
11.	1% of 80,000	
12.	$\frac{1}{2}$% of 100	
13.	$\frac{1}{2}$% of 200	
14.	$\frac{1}{2}$% of 400	
15.	$\frac{1}{2}$% of 800	
16.	$\frac{1}{2}$% of 1,600	
17.	$\frac{1}{2}$% of 3,200	
18.	$\frac{1}{2}$% of 5,000	
19.	$\frac{1}{2}$% of 10,000	
20.	$\frac{1}{2}$% of 20,000	
21.	$\frac{1}{2}$% of 40,000	
22.	$\frac{1}{2}$% of 80,000	

23.	$\frac{1}{4}$% of 100	
24.	$\frac{1}{4}$% of 200	
25.	$\frac{1}{4}$% of 400	
26.	$\frac{1}{4}$% of 800	
27.	$\frac{1}{4}$% of 1,600	
28.	$\frac{1}{4}$% of 3,200	
29.	$\frac{1}{4}$% of 5,000	
30.	$\frac{1}{4}$% of 10,000	
31.	$\frac{1}{4}$% of 20,000	
32.	$\frac{1}{4}$% of 40,000	
33.	$\frac{1}{4}$% of 80,000	
34.	1% of 1,000	
35.	$\frac{1}{2}$% of 1,000	
36.	$\frac{1}{4}$% of 1,000	
37.	1% of 4,000	
38.	$\frac{1}{2}$% of 4,000	
39.	$\frac{1}{4}$% of 4,000	
40.	1% of 2,000	
41.	$\frac{1}{2}$% of 2,000	
42.	$\frac{1}{4}$% of 2,000	
43.	$\frac{1}{2}$% of 6,000	
44.	$\frac{1}{4}$% of 6,000	

Number Correct: _____

Improvement: _____

Fractional Percents—Round 2

Directions: Find the part that corresponds with each percent.

1.	10% of 30	
2.	10% of 60	
3.	10% of 90	
4.	10% of 120	
5.	10% of 150	
6.	10% of 180	
7.	10% of 210	
8.	20% of 30	
9.	20% of 60	
10.	20% of 90	
11.	20% of 120	
12.	5% of 50	
13.	5% of 100	
14.	5% of 200	
15.	5% of 400	
16.	5% of 800	
17.	5% of 1,600	
18.	5% of 3,200	
19.	5% of 6,400	
20.	5% of 600	
21.	10% of 600	
22.	20% of 600	

23.	$10\frac{1}{2}$% of 100	
24.	$10\frac{1}{2}$% of 200	
25.	$10\frac{1}{2}$% of 400	
26.	$10\frac{1}{2}$% of 800	
27.	$10\frac{1}{2}$% of 1,600	
28.	$10\frac{1}{2}$% of 3,200	
29.	$10\frac{1}{2}$% of 6,400	
30.	$10\frac{1}{4}$% of 400	
31.	$10\frac{1}{4}$% of 800	
32.	$10\frac{1}{4}$% of 1,600	
33.	$10\frac{1}{4}$% of 3,200	
34.	10% of 1,000	
35.	$10\frac{1}{2}$% of 1,000	
36.	$10\frac{1}{4}$% of 1,000	
37.	10% of 2,000	
38.	$10\frac{1}{2}$% of 2,000	
39.	$10\frac{1}{4}$% of 2,000	
40.	10% of 4,000	
41.	$10\frac{1}{2}$% of 4,000	
42.	$10\frac{1}{4}$% of 4,000	
43.	10% of 5,000	
44.	$10\frac{1}{2}$% of 5,000	

Lesson 16: Population Problems

Lesson Video

Classwork

Opening Exercise

Number of girls in classroom:	Number of boys in classroom:	Total number of students in classroom:
Percent of the total number of students that are girls:	Percent of the total number of students that are boys:	Percent of boys and girls in the classroom:
Number of girls whose names start with a vowel:	Number of boys whose names start with a vowel:	Number of students whose names start with a vowel:
Percent of girls whose names start with a vowel:	Percent of boys whose names start with a vowel:	
Percent of the total number of students who are girls whose names start with a vowel:	Percent of the total number of students who are boys whose names start with a vowel:	Percent of students whose names start with a vowel:

Example 1

A school has 60% girls and 40% boys. If 20% of the girls wear glasses and 40% of the boys wear glasses, what percent of all students wears glasses?

Exercise 1

How does the percent of students who wear glasses change if the percent of girls and boys remains the same (that is, 60% girls and 40% boys), but 20% of the boys wear glasses and 40% of the girls wear glasses?

Exercise 2

How would the percent of students who wear glasses change if the percent of girls is 40% of the school and the percent of boys is 60% of the school, and 40% of the girls wear glasses and 20% of the boys wear glasses? Why?

Example 2

The weight of the first of three containers is 12% more than the second, and the third container is 20% lighter than the second. By what percent is the first container heavier than the third container?

Exercise 3

Matthew's pet dog is 7% heavier than Harrison's pet dog, and Janice's pet dog is 20% lighter than Harrison's. By what percent is Matthew's dog heavier than Janice's?

Example 3

In one year's time, 20% of Ms. McElroy's investments increased by 5%, 30% of her investments decreased by 5%, and 50% of her investments increased by 3%. By what percent did the total of her investments increase?

Exercise 4

A concert had $6{,}000$ audience members in attendance on the first night and the same on the second night. On the first night, the concert exceeded expected attendance by 20%, while the second night was below the expected attendance by 20%. What was the difference in percent of concert attendees and expected attendees for both nights combined?

Lesson 17: Mixture Problems

Lesson Video

Classwork

Opening Exercise

Imagine you have two equally-sized containers. One is pure water, and the other is 50% water and 50% juice. If you combined them, what percent of juice would be the result?

	1st Liquid	2nd Liquid	Resulting Liquid
Amount of Liquid (gallons)			
Amount of Pure Juice (gallons)			

If a 2-gallon container of pure juice is added to 3 gallons of water, what percent of the mixture is pure juice?

	1st Liquid	2nd Liquid	Resulting Liquid
Amount of Liquid (gallons)			
Amount of Pure Juice (gallons)			

If a 2-gallon container of juice mixture that is 40% pure juice is added to 3 gallons of water, what percent of the mixture is pure juice?

	1st Liquid	2nd Liquid	Resulting Liquid
Amount of Liquid (gallons)			
Amount of Pure Juice (gallons)			

If a 2-gallon juice cocktail that is 40% pure juice is added to 3 gallons of pure juice, what percent of the resulting mixture is pure juice?

	1st Liquid	2nd Liquid	Resulting Liquid
Amount of Liquid (gallons)			
Amount of Pure Juice (gallons)			

Example 1

A 5-gallon container of trail mix is 20% nuts. Another trail mix is added to it, resulting in a 12-gallon container of trail mix that is 40% nuts.

a. Write an equation to describe the relationships in this situation.

b. Explain in words how each part of the equation relates to the situation.

c. What percent of the second trail mix is nuts?

Exercise 1

Represent each situation using an equation, and show all steps in the solution process.

a. A 6-pint mixture that is 25% oil is added to a 3-pint mixture that is 40% oil. What percent of the resulting mixture is oil?

b. An 11-ounce gold chain of 24% gold was made from a melted down 4-ounce charm of 50% gold and a golden locket. What percent of the locket was pure gold?

c. In a science lab, two containers are filled with mixtures. The first container is filled with a mixture that is 30% acid. The second container is filled with a mixture that is 50% acid, and the second container is 50% larger than the first. The first and second containers are then emptied into a third container. What percent of acid is in the third container?

Example 2

Soil that contains 30% clay is added to soil that contains 70% clay to create 10 gallons of soil containing 50% clay. How much of each of the soils was combined?

Exercise 2

The equation $(0.2)(x) + (0.8)(6 - x) = (0.4)(6)$ is used to model a mixture problem.

a. How many units are in the total mixture?

b. What percents relate to the two solutions that are combined to make the final mixture?

c. The two solutions combine to make 6 units of what percent solution?

d. When the amount of a resulting solution is given (for instance, 4 gallons) but the amounts of the mixing solutions are unknown, how are the amounts of the mixing solutions represented?

Lesson 18: Counting Problems

Lesson Video

Classwork

Opening Exercise

You are about to switch out your books from your locker during passing period but forget the order of your locker combination. You know that there are the numbers 3, 16, and 21 in some order. What is the percent of locker combinations that start with 3?

Locker Combination Possibilities:

3, 16, 21

21, 16, 3

16, 21, 3

21, 3, 16

16, 3, 21

3, 21, 16

Example 1

All of the 3-letter passwords that can be formed using the letters A and B are as follows: AAA, AAB, ABA, ABB, BAA, BAB, BBA, BBB.

a. What percent of passwords contain at least two B's?

b. What percent of passwords contain no A's?

Exercises 1–2

1. How many 4-letter passwords can be formed using the letters A and B?

2. What percent of the 4-letter passwords contain
   a. No A's?
   b. Exactly one A?
   c. Exactly two A's?
   d. Exactly three A's?
   e. Four A's?
   f. The same number of A's and B's?

Example 2

In a set of 3-letter passwords, 40% of the passwords contain the letter B and two of another letter. Which of the two sets below meets the criteria? Explain how you arrived at your answer.

Set 1

BBB	AAA	CAC
CBC	ABA	CCC
BBC	CCB	CAB
AAB	AAC	BAA
ACB	BAC	BCC

Set 2

CEB	BBB
EBE	CCC
CCC	EEE
EEB	CBC
CCB	ECE

Exercises 3–4

3. Shana read the following problem:

   "How many letter arrangements can be formed from the word *triangle* that have two vowels and two consonants (order does not matter)?"

   She answered that there are 30 letter arrangements.

   Twenty percent of the letter arrangements that began with a vowel actually had an English definition. How many letter arrangements that begin with a vowel have an English definition?

4. Using three different keys on a piano, a songwriter makes the beginning of his melody with three notes, C, E, and G:

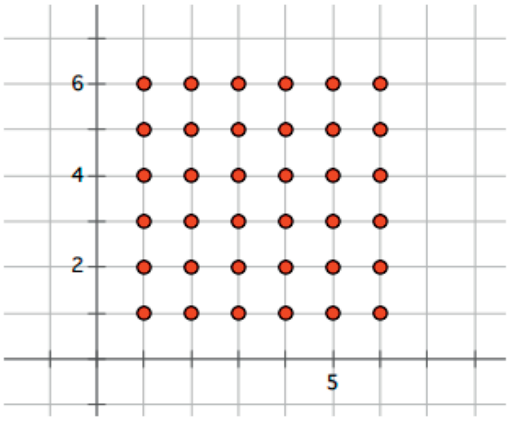
   CCE, EEE, EGC, GCE, CEG, GEE, CGE, GGE, EGG, EGE, GCG, EEC, ECC, ECG, GGG, GEC, CCG, CEE, CCC, GEG, CGC.

   a. From the list above, what is the percent of melodies with all three notes that are different?

   b. From the list above, what is the percent of melodies that have three of the same notes?

Example 3

Look at the 36 points on the coordinate plane with whole number coordinates between 1 and 6, inclusive.



a. Draw a line through each of the points which have an x-coordinate and y-coordinate sum of 7.
Draw a line through each of the points which have an x-coordinate and y-coordinate sum of 6.
Draw a line through each of the points which have an x-coordinate and y-coordinate sum of 5.
Draw a line through each of the points which have an x-coordinate and y-coordinate sum of 4.
Draw a line through each of the points which have an x-coordinate and y-coordinate sum of 3.
Draw a line through each of the points which have an x-coordinate and y-coordinate sum of 2.
Draw a line through each of the points which have an x-coordinate and y-coordinate sum of 8.
Draw a line through each of the points which have an x-coordinate and y-coordinate sum of 9.
Draw a line through each of the points which have an x-coordinate and y-coordinate sum of 10.
Draw a line through each of the points which have an x-coordinate and y-coordinate sum of 11.
Draw a line through each of the points which have an x-coordinate and y-coordinate sum of 12.

b. What percent of the 36 points have coordinate sum 7?

c. Write a numerical expression that could be used to determine the percent of the 36 points that have a coordinate sum of 7.

d. What percent of the 36 points have coordinate sum 5 or less?

e. What percent of the 36 points have coordinate sum 4 or 10?

Lesson 1: Chance Experiments

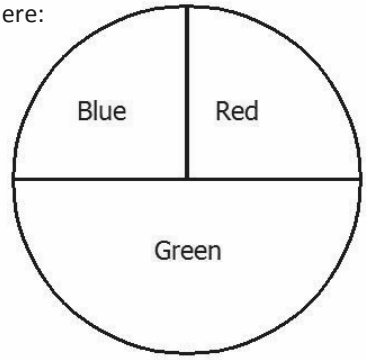
Lesson Video

Classwork

Have you ever heard a weather forecaster say there is a 40% chance of rain tomorrow or a football referee tell a team there is a $50/50$ chance of getting a heads on a coin toss to determine which team starts the game? These are probability statements. In this lesson, you are going to investigate probability and how likely it is that some events will occur.

Example 1: Spinner Game

Suppose you and your friend are about to play a game using the spinner shown here:



Rules of the game:

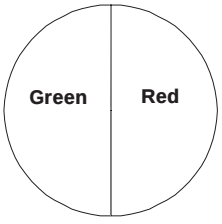
1. Decide who will go first.
2. Each person picks a color. Both players cannot pick the same color.
3. Each person takes a turn spinning the spinner and recording what color the spinner stops on. The winner is the person whose color is the first to happen 10 times.

Play the game, and remember to record the color the spinner stops on for each spin.

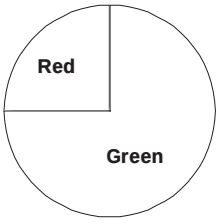
Exercises 1–4

1. Which color was the first to occur 10 times?
2. Do you think it makes a difference who goes first to pick a color?
3. Which color would you pick to give you the best chance of winning the game? Why would you pick that color?
4. Below are three different spinners. On which spinner is the green likely to win, unlikely to win, and equally likely to win?

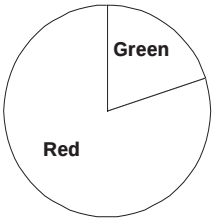
Spinner A



Spinner B



Spinner C



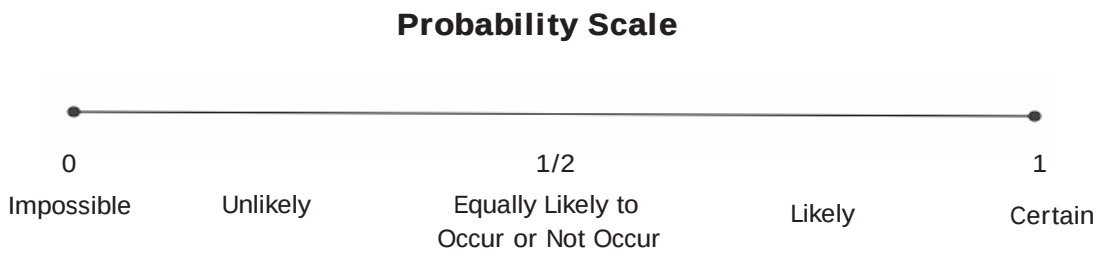
Example 2: What Is Probability?

Probability is a measure of how likely it is that an event will happen. A probability is indicated by a number between 0 and 1. Some events are certain to happen, while others are impossible. In most cases, the probability of an event happening is somewhere between certain and impossible.

For example, consider a bag that contains only red cubes. If you were to select one cube from the bag, you are certain to pick a red one. We say that an event that is certain to happen has a probability of 1. If we were to reach into the same bag of cubes, it is impossible to select a yellow cube. An impossible event has a probability of 0.

Description	Example	Explanation
Some events are *impossible*. These events have a probability of 0.	You have a bag with two green cubes, and you select one at random. Selecting a blue cube is an impossible event.	There is no way to select a blue cube if there are no blue cubes in the bag.
Some events are *certain*. These events have a probability of 1.	You have a bag with two green cubes, and you select one at random. Selecting a green cube is a certain event.	You will always get a green cube if there are only green cubes in the bag.
Some events are classified as *equally likely to occur or to not occur*. These events have a probability of $\frac{1}{2}$.	You have a bag with one blue cube and one red cube, and you randomly pick one. Selecting a blue cube is equally likely to occur or not to occur.	Since exactly half of the bag is made up of blue cubes and exactly half of the bag comprises red cubes, there is a $50/50$ chance (equally likely) of selecting a blue cube and a $50/50$ chance (equally likely) of NOT selecting a blue cube.
Some events are more likely to occur than not to occur. These events have a probability that is greater than 0.5. These events could be described as *likely* to occur.	If you have a bag that contains eight blue cubes and two red cubes and you select one at random, it is likely that you will get a blue cube.	Even though it is not certain that you will get a blue cube, a blue cube would be selected most of the time because there are many more blue cubes than red cubes.
Some events are less likely to occur than not to occur. These events have a probability that is less than 0.5. These events could be described as *unlikely* to occur.	If you have a bag that contains eight blue cubes and two red cubes and you select one at random, it is unlikely that you will get a red cube.	Even though it is not impossible to get a red cube, a red cube would not be selected very often because there are many more blue cubes than red cubes.

The figure below shows the probability scale.



Exercises 5–10

5. Decide where each event would be located on the scale above. Place the letter for each event in the appropriate place on the probability scale.

   Event:

   A. You will see a live dinosaur on the way home from school today.

   B. A solid rock dropped in the water will sink.

   C. A round disk with one side red and the other side yellow will land yellow side up when flipped.

   D. A spinner with four equal parts numbered 1–4 will land on the 4 on the next spin.

   E. Your full name will be drawn when a full name is selected randomly from a bag containing the full names of all of the students in your class.

   F. A red cube will be drawn when a cube is selected from a bag that has five blue cubes and five red cubes.

   G. Tomorrow the temperature outside will be -250 degrees.

6. Design a spinner so that the probability of spinning a green is 1.

7. Design a spinner so that the probability of spinning a green is 0.

8. Design a spinner with two outcomes in which it is equally likely to land on the red and green parts.

An event that is impossible has a probability of 0 and will never occur, no matter how many observations you make. This means that in a long sequence of observations, it will occur 0% of the time. An event that is certain has a probability of 1 and will always occur. This means that in a long sequence of observations, it will occur 100% of the time.

9. What do you think it means for an event to have a probability of $\frac{1}{2}$?

10. What do you think it means for an event to have a probability of $\frac{1}{4}$?

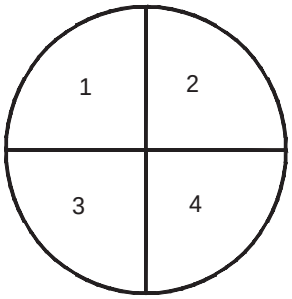
Lesson 2: Estimating Probabilities by Collecting Data

Lesson Video

Classwork

Exercises 1–8: Carnival Game

At the school carnival, there is a game in which students spin a large spinner. The spinner has four equal sections numbered 1–4 as shown below. To play the game, a student spins the spinner twice and adds the two numbers that the spinner lands on. If the sum is greater than or equal to 5, the student wins a prize.



Play this game with your partner 15 times. Record the outcome of each spin in the table below.

Turn	First Spin Results	Second Spin Results	Sum
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

1. Out of the 15 turns, how many times was the sum greater than or equal to 5?
2. What sum occurred most often?
3. What sum occurred least often?
4. If students were to play a lot of games, what fraction of the games would they win? Explain your answer.
5. Name a sum that would be impossible to get while playing the game.
6. What event is certain to occur while playing the game?

When you were spinning the spinner and recording the outcomes, you were performing a *chance experiment*. You can use the results from a chance experiment to estimate the probability of an event. In Exercise 1, you spun the spinner 15 times and counted how many times the sum was greater than or equal to 5. An estimate for the probability of a sum greater than or equal to 5 is

$$P(\text{sum } \geq 5) = \frac{\text{Number of observed occurrences of the event}}{\text{Total number of observations}}.$$

7. Based on your experiment of playing the game, what is your estimate for the probability of getting a sum of 5 or more?

8. Based on your experiment of playing the game, what is your estimate for the probability of getting a sum of exactly 5?

Example 2: Animal Crackers

A student brought a very large jar of animal crackers to share with students in class. Rather than count and sort all the different types of crackers, the student randomly chose 20 crackers and found the following counts for the different types of animal crackers. Estimate the probability of selecting a zebra.

Animal	Number Selected
Lion	2
Camel	1
Monkey	4
Elephant	5
Zebra	3
Penguin	3
Tortoise	2
	Total 20

Exercises 9–15

If a student randomly selected a cracker from a large jar:

9. What is your estimate for the probability of selecting a lion?

10. What is your estimate for the probability of selecting a monkey?

11. What is your estimate for the probability of selecting a penguin or a camel?

12. What is your estimate for the probability of selecting a rabbit?

13. Is there the same number of each kind of animal cracker in the jar? Explain your answer.

14. If the student randomly selected another 20 animal crackers, would the same results occur? Why or why not?

15. If there are 500 animal crackers in the jar, how many elephants are in the jar? Explain your answer.

Number Correct: _____

Integer Division—Round 1

Directions: Determine the quotient of the integers, and write it in the column to the right.

1.	$4 \div 1$	
2.	$4 \div (-1)$	
3.	$-4 \div (-1)$	
4.	$-4 \div 1$	
5.	$6 \div 2$	
6.	$-6 \div (-2)$	
7.	$-6 \div 2$	
8.	$6 \div -2$	
9.	$8 \div (-4)$	
10.	$-8 \div (-4)$	
11.	$-8 \div 4$	
12.	$8 \div 4$	
13.	$9 \div (-3)$	
14.	$-9 \div 3$	
15.	$-10 \div 5$	
16.	$10 \div (-2)$	
17.	$-10 \div (-2)$	
18.	$-10 \div (-5)$	
19.	$-14 \div 7$	
20.	$14 \div (-2)$	
21.	$-14 \div (-2)$	
22.	$-14 \div (-7)$	

23.	$-16 \div (-4)$	
24.	$16 \div (-2)$	
25.	$-16 \div 4$	
26.	$-20 \div 4$	
27.	$-20 \div (-4)$	
28.	$-28 \div 4$	
29.	$28 \div (-7)$	
30.	$-28 \div (-7)$	
31.	$-40 \div (-5)$	
32.	$56 \div (-7)$	
33.	$96 \div (-3)$	
34.	$-121 \div (-11)$	
35.	$169 \div (-13)$	
36.	$-175 \div 25$	
37.	$1 \div 4$	
38.	$-1 \div 4$	
39.	$-1 \div (-4)$	
40.	$-3 \div (-4)$	
41.	$-5 \div 20$	
42.	$6 \div (-18)$	
43.	$-24 \div 48$	
44.	$-16 \div 64$	

Number Correct: _____

Improvement: _____

Integer Division—Round 2

Directions: Determine the quotient of the integers, and write it in the column to the right.

1.	$5 \div 1$	
2.	$5 \div (-1)$	
3.	$-5 \div (-1)$	
4.	$-5 \div 1$	
5.	$6 \div 3$	
6.	$-6 \div (-3)$	
7.	$-6 \div 3$	
8.	$6 \div -3$	
9.	$8 \div (-2)$	
10.	$-8 \div (-2)$	
11.	$-8 \div 2$	
12.	$8 \div 2$	
13.	$-9 \div (-3)$	
14.	$9 \div 3$	
15.	$-12 \div 6$	
16.	$12 \div (-2)$	
17.	$-12 \div (-2)$	
18.	$-12 \div (-6)$	
19.	$-16 \div 8$	
20.	$16 \div (-2)$	
21.	$-16 \div (-2)$	
22.	$-16 \div (-8)$	

23.	$-18 \div (-9)$	
24.	$18 \div (-2)$	
25.	$-18 \div 9$	
26.	$-24 \div 4$	
27.	$-24 \div (-4)$	
28.	$-24 \div 6$	
29.	$30 \div (-6)$	
30.	$-30 \div (-5)$	
31.	$-48 \div (-6)$	
32.	$64 \div (-4)$	
33.	$105 \div (-7)$	
34.	$-144 \div (-12)$	
35.	$196 \div (-14)$	
36.	$-225 \div 25$	
37.	$2 \div 4$	
38.	$-2 \div 4$	
39.	$-2 \div (-4)$	
40.	$-4 \div (-8)$	
41.	$-5 \div 40$	
42.	$6 \div (-42)$	
43.	$-25 \div 75$	
44.	$-18 \div 108$	

Lección 3: Experimentos aleatorios con resultados equiprobables

Trabajo en clase

Ejercicios 1-6

Jamal, un estudiante de séptimo grado, quiere diseñar un juego que consiste en lanzar vasos de papel. Jamal tira un vaso de papel cinco veces y registra el resultado de cada lanzamiento. Un *resultado* es el resultado de un único ensayo del experimento.

Lesson Video

Estos son los resultados de cada lanzamiento:

Jamal observó que el vaso de papel podría aterrizar de una de tres maneras: de lado, boca arriba o boca abajo. La colección de estos tres resultados se llama el espacio muestral del experimento. El *espacio muestral* de un experimento es el conjunto de todos los posibles resultados de ese experimento.

Por ejemplo, el espacio muestral cuando se lanza una moneda es cara o cruz.

El espacio muestral para sacar un cubo de color de una bolsa que tiene 3 cubos rojos, 2 azules, 1 amarillo y 4 verdes es rojo, azul, amarillo, verde.

Para cada uno de los siguientes experimentos aleatorios, enumera el espacio muestral (es decir, todos los resultados posibles).

1. Sacar un cubo de color de una bolsa con 2 verdes, 1 rojo, 10 azules y 3 negros.

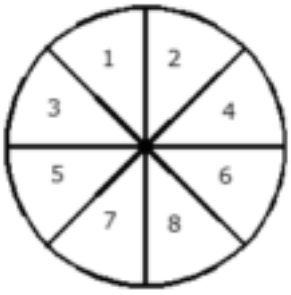
2. Lanzar una lata de sopa vacía para ver cómo aterriza.

3. Hacer un tiro libre en un partido de baloncesto.

4. Lanzar un dado con los números 1–6 en sus caras.

5. Seleccionar una letra de la palabra *probability.*

6. Hacer girar irar la ruleta:



Ejemplo 2: Resultados equiprobables

El espacio muestral para el lanzamiento del vaso de papel era de lado, boca arriba y boca abajo.

Los resultados de un experimento son equiprobables cuando la probabilidad de cada resultado es igual.

Lanza el vaso de papel 30 veces y registra los resultados de cada lanzamiento.

Lanzamiento	Resultado
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	

Ejercicios 7–12

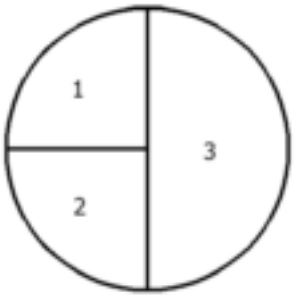
7. Utilizando los resultados de tu experimento, ¿cuál es tu estimado de la probabilidad de que un vaso de papel aterrice de lado?

8. Utilizando los resultados de tu experimento, ¿cuál es tu estimado de la probabilidad de que un vaso de papel de aterrice boca abajo?

9. Utilizando los resultados de tu experimento, ¿cuál es tu estimado de la probabilidad de que un vaso de papel aterrice boca arriba?

10. Basándote en tus resultados, ¿cree que los tres resultados son equiprobables?

11. Usa la ruleta a continuación y responde las siguientes preguntas.



a. ¿ Los sucesos de girar la ruleta y que caiga en 1 o 2 son equiprobables?

b. ¿ Los sucesos de girar la ruleta y que caiga en 2 o 3 son equiprobables?

c. ¿Cuántas veces predijiste que la ruleta caería en cada sección después de 100 giros?

12. Dibuja una ruleta que tenga 3 secciones que sean equiprobables de ocurrir cuando se gira la ruleta. ¿Cuántas veces crees que la ruleta caerá en cada sección después de 100 giros?

Lección 4: Calcular probabilidades para experimentos aleatorios con resultados equiprobables

Lesson Video

Trabajo en clase

Ejemplos: Probabilidad teórica

En una lección anterior, se vio que, para encontrar un estimado de la probabilidad de un suceso en un experimento aleatorio, se divide

$$P(\text{suceso}) = \frac{\text{Número de ocurrencias observadas del suceso}}{\text{Número total de observaciones}}.$$

Tu maestro tiene una bolsa con algunos cubos de colores amarillo, verde, azul y rojo. Los cubos son idénticos excepto por su color. Tu maestro llevará a cabo un experimento aleatorio sacando un cubo al azar con reemplazo en la bolsa. Registra el resultado de cada sorteo en la tabla siguiente.

Prueba	Resultado
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

1. Basándote en 20 ensayos, estima la probabilidad de
   a. Elegir un cubo amarillo.
   b. Elegir un cubo verde.
   c. Elegir un cubo rojo.
   d. Elegir un cubo azul.

2. Si hay 40 cubos en la bolsa, ¿cuántos cubos de cada color hay en la bolsa? Explica.

3. Si el maestro tuviera que sacar al azar otros 20 cubos, uno a la vez y con reemplazo en la bolsa, ¿verías exactamente los mismos resultados? Explica.

4. Encuentra la fracción de cada color de los cubos en la bolsa.

   Amarillo

   Verde

   Rojo

   Azul

Cada fracción es la *probabilidad teórica* de elegir un color particular de un cubo cuando un cubo se saca al azar de la bolsa.

Cuando todos los posibles resultados de un experimento son equiprobables, la probabilidad de cada resultado es

$$P(\text{resultado}) = \frac{1}{\text{Número de posibles resultados}}.$$

Un suceso es un conjunto de resultados, y cuando los resultados son equiprobables, la probabilidad teórica de un suceso puede ser expresada como

$$P(\text{suceso}) = \frac{\text{Número de resultados favorables}}{\text{Número de posibles resultados}}.$$

La probabilidad teórica de sacar un cubo azul es

$$P(\text{azul}) = \frac{\text{Número de cubos azules}}{\text{Número total de cubos}} = \frac{10}{40}.$$

5. ¿Cada color tiene la misma probabilidad de ser elegido? Explica tu respuesta.

6. ¿De qué manera las probabilidades teóricas de la elección de cada color del Ejercicio 4 se comparan con las probabilidades experimentales que encontraste en el Ejercicio 1?

7. Un experimento consistió en lanzar una moneda de cinco centavos (*nickel)* y una de diez centavos (*dime*). El primer paso para encontrar la probabilidad teórica de obtener una cara en el *nickel* y una cara en el *dime* es hacer una lista del espacio muestral. Para este experimento, completa el espacio muestral a continuación.

   Nickel Dime

   ¿Cuál es la probabilidad de lanzar y obtener dos caras?

Ejercicios 1–4

1. Considera un experimento aleatorio de lanzar un dado de seis caras con los números 1-6 en las caras.
   a. ¿Cuál es el espacio muestral? Enumera la probabilidad de cada resultado en el espacio muestral.

   b. ¿Cuál es la probabilidad de obtener un número impar?

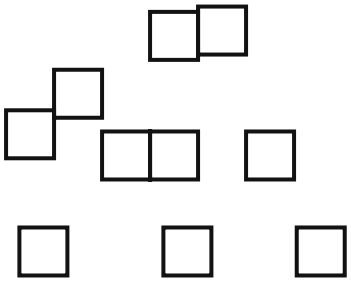
   c. ¿Cuál es la probabilidad de obtener un número menor a 5?

2. Considera un experimento aleatorio de seleccionar una letra de la palabra *number.*
   a. ¿Cuál es el espacio muestral? Enumera la probabilidad de cada resultado en el espacio muestral.

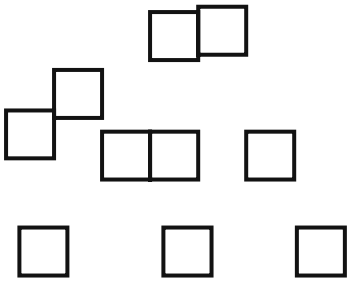
   b. ¿Cuál es la probabilidad de seleccionar una vocal?

   c. ¿Cuál es la probabilidad de seleccionar la letra z?

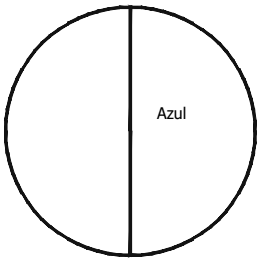
3. Considera un experimento aleatorio de seleccionar un cuadrado de una bolsa de 10 cuadrados.
   a. Colorea los cuadrados abajo para que la probabilidad de seleccionar un cuadrado azul sea $\frac{1}{2}$.

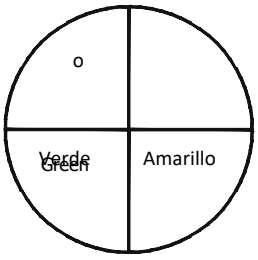


   b. Colorea los cuadrados abajo para que la probabilidad de seleccionar un cuadrado azul sea $\frac{4}{5}$.



4. Los estudiantes están en un juego que requiere girar dos ruletas que se muestran a continuación. Un estudiante gana el juego si ambos giros caen en rojo. ¿Cuál es la probabilidad de ganar el juego? Recuerda primero enumerar el espacio muestral y la probabilidad de cada resultado en el espacio muestral. Hay ocho posibles resultados en este experimento aleatorio.





Lección 5: Experimentos aleatorios con resultados que no son equiprobables

Lesson Video

Trabajo en clase

En las lecciones anteriores, aprendiste que cuando los resultados en un espacio muestral son equiprobables, la probabilidad de un suceso es el número de resultados en el suceso dividido entre el número de resultados en el espacio muestral. Sin embargo, cuando los resultados del espacio muestral *no* son equiprobables, tenemos que adoptar un enfoque diferente.

Ejemplo 1

Cuando Jenna va al mercado al aire libre, suele comprar plátanos. El número de plátanos que podría comprar y sus probabilidades se muestran en la siguiente tabla.

Número de plátanos	0	1	2	3	4	5
Probabilidad	0.1	0.1	0.1	0.2	0.2	0.3

a. ¿Cuál es la probabilidad de que Jenna compre exactamente 3 plátanos?

b. ¿Cuál es la probabilidad de que Jenna no compre ningún plátano?

c. ¿Cuál es la probabilidad de que Jenna compre más de 3 plátanos?

d. ¿Cuál es la probabilidad de que Jenna compre al menos 3 plátanos?

e. ¿Cuál es la probabilidad de que Jenna no compre exactamente 3 plátanos?

Observa que la suma de las probabilidades en la tabla es un entero $(0.1 + 0.1 + 0.1 + 0.2 + 0.2 + 0.3 = 1)$. Esto siempre es cierto; cuando sumamos las probabilidades de todos los posibles resultados, el resultado es siempre 1. Por lo tanto, tomar 1 y restar la probabilidad del suceso nos da la probabilidad de que algo *no* ocurra.

Ejercicios 1–2

El esposo de Jenna, Rick, está preocupado por su dieta. En un día cualquiera, come 0, 1, 2, 3, o 4 porciones de frutas y verduras. Las probabilidades se dan en la siguiente tabla.

Número de porciones de frutas y verduras	0	1	2	3	4
Probabilidad	0.08	0.13	0.28	0.39	0.12

1. Para un determinado día, calcula la probabilidad de que Rick coma
   a. Dos porciones de frutas y verduras
   b. Más de dos porciones de frutas y verduras
   c. Al menos dos porciones de frutas y verduras
2. Encuentra la probabilidad de que Rick no coma exactamente dos porciones de frutas y verduras.

Ejemplo 2

Luis trabaja en una oficina y suena el teléfono de vez en cuando. El número posible de llamadas telefónicas que recibe en una tarde y sus probabilidades se dan en la siguiente tabla.

Número de llamadas telefónicas	0	1	2	3	4
Probabilidad	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{2}{9}$	$\frac{1}{3}$	$\frac{1}{9}$

a. Encuentra la probabilidad de que Luis reciba 3 o 4 llamadas telefónicas.

b. Encuentra la probabilidad de que Luis reciba menos de 2 llamadas telefónicas.

c. Encuentra la probabilidad de que Luis reciba 2 o menos llamadas telefónicas.

d. Encuentra la probabilidad de que Luis no reciba 4 llamadas telefónicas.

Ejercicios 3–7

Cuando Jenna va al mercado al aire libre, también suele comprar un poco de brócoli. El número posible de cabezas de brócoli que compra y las probabilidades se dan en la siguiente tabla.

Número de cabezas de brócoli	0	1	2	3	4
Probabilidad	$\frac{1}{12}$	$\frac{1}{6}$	$\frac{5}{12}$	$\frac{1}{4}$	$\frac{1}{12}$

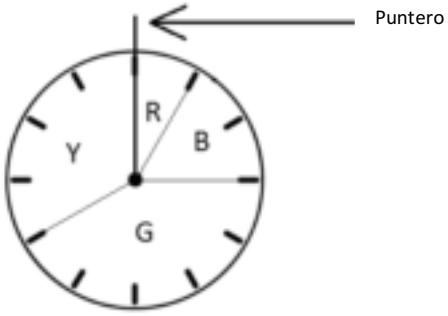
3. Encuentra la probabilidad de que Jenna:
   a. Compre exactamente 3 cabezas de brócoli

   b. No compre exactamente 3 cabezas de brócoli

   c. Compre más de 1 cabeza de brócoli

   d. Compre al menos 3 cabezas de brócoli

El siguiente diagrama muestra una ruleta diseñada como un reloj. Los sectores de la ruleta son de color rojo (R), azul (B), verde (G) y amarillo (Y).



4. Escribe tus respuestas como fracciones en su mínima expresión, encuentra la probabilidad de que el puntero se detenga en los siguientes colores.
   a. Rojo:
   b. Azul:
   c. Verde:
   d. Amarillo:

5. Completa la tabla de probabilidades a continuación.

Color	Rojo	Azul	Verde	Amarillo
Probabilidad				

6. Encuentra la probabilidad de que el puntero se detenga en la región azul o verde.

7. Encuentra la probabilidad de que el puntero no se detenga en la región verde.

Lección 6: Usar diagramas de árbol para representar un espacio muestral y calcular las probabilidades

Lesson Video

Trabajo en clase

Supón que una niña asiste a un jardín de niños, donde los estudiantes están estudiando los colores primarios. Para ayudar a enseñar las habilidades del calendario, el maestro pide a cada estudiante que tenga un calendario en su cajita. En cada uno de los cuatro días que los estudiantes están aprendiendo los colores primarios en clase, los estudiantes colocan un punto de color en sus calendarios: azul, amarillo o rojo. Cuando los cuatro días de la semana escolar hayan pasado (lunes a jueves), ¿cómo se verá el calendario de la niña?

Un resultado sería cuatro puntos azules si el estudiante eligió azul cada día. Pero ten en cuenta que el primer día (lunes) podría ser de color azul y el día siguiente (martes) podría ser de color amarillo y el miércoles podría ser de color azul y el jueves podría ser de color rojo. O tal vez el lunes y martes podrían ser de color amarillo, el miércoles podría ser de color azul y el jueves podría ser de color rojo. O tal vez los lunes, martes y el miércoles podrían ser de color azul y el jueves podría ser de color rojo y así sucesivamente.

Aunque esto parezca difícil de seguir ahora, ¡sólo hemos mencionado 3 de los 81 resultados posibles en términos de los cuatro días de colores! ¡Enumerar los otros 78 resultados tomaría varias páginas! En lugar de mostrar los resultados de la manera descrita anteriormente (particularmente cuando la situación tiene varias etapas, como los múltiples días en el caso anterior), a menudo utilizamos un *diagrama de árbol* para mostrar todos los posibles resultados visualmente. Además, cuando los resultados de cada etapa son el resultado de un experimento aleatorio, los diagramas de árbol son útiles para calcular probabilidades.

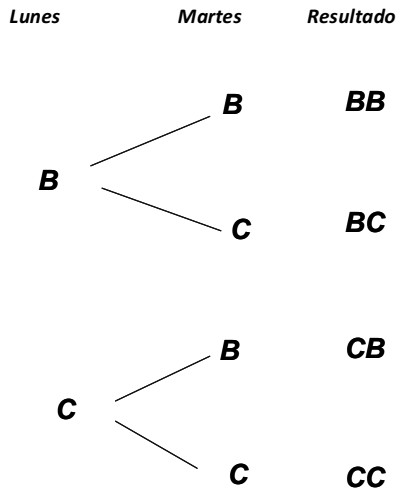
Ejemplo 1: Dos noches de juegos

Imagina que una familia decide jugar un juego cada noche. Todos ellos están de acuerdo en usar un dado tetraédrico (es decir, una pirámide de cuatro lados donde cuatro de los resultados posibles tienen la misma probabilidad—ve la imagen al final de la lección) cada noche para determinar al azar si van a jugar un juego de mesa (B) o un juego de cartas (C). El diagrama de árbol que indica los posibles resultados generales durante dos noches consecutivas se desarrolla a continuación.

Para hacer un diagrama de árbol, primero presenta todas las posibilidades de la primera etapa (en este caso, el lunes).

Lunes	*Martes*	*Resultado*
B		
C		

Después, a partir de *cada* rama de la primera etapa, conecta todas las posibilidades de la segunda etapa (martes).



Nota: Si la situación tiene más de dos etapas, este proceso se repite hasta que se hayan presentado todas las etapas.

a. Si BB representa dos noches consecutivas de juegos de mesa, ¿qué representa CB?

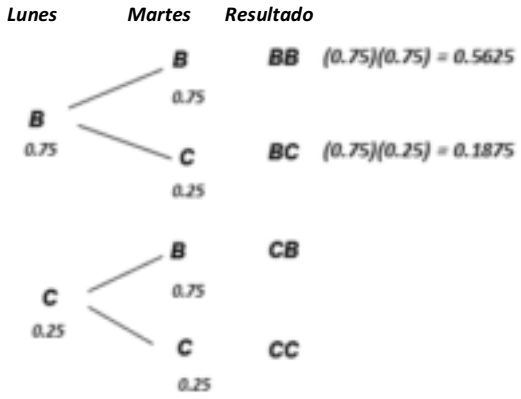
b. Enumera los resultados donde exactamente un juego de mesa se juega en dos días. ¿Cuántos resultados había?

Ejemplo 2: Dos noches de juegos (con probabilidades)

En el Ejemplo 1, el resultado de cada noche es el resultado de un experimento aleatorio (tirar el dado tetraédrico). Por lo tanto, hay una probabilidad asociada con el resultado de cada noche.

Al multiplicar las probabilidades de los resultados de cada etapa, podemos obtener la probabilidad para cada "rama del árbol". En este caso, podemos calcular la probabilidad de cada uno de nuestros cuatro resultados: BB, BC, CB y CC.

Para esta familia, un juego de cartas se jugará si el dado cae mostrando un valor de 1 y un juego de mesa se jugará si el dado cae mostrando un valor de 2, 3 o 4. Esto hace que la probabilidad de un juego de mesa (B) en una noche determinada sea 0.75.



a. Se muestran las probabilidades para dos de los cuatro resultados. Ahora, calcula las probabilidades de los dos resultados restantes.

b. ¿Cuál es la probabilidad de que haya exactamente una noche de juego de mesa en las dos noches?

Ejercicios 1–3 Dos niños

Dos amigos se encuentran en una tienda de abarrotes y observan que una familia vecina le dio la bienvenida a su segundo hijo. Resulta que los dos hijos de esta familia son niñas y no son gemelas. Uno de los amigos tiene curiosidad acerca de cuáles son las posibilidades de tener 2 niñas en los primeros 2 nacimientos de una familia. Supongamos que, por cada nacimiento, la probabilidad de un niño es 0.5 y la probabilidad una niña también es 0.5.

1. Dibuja un diagrama de árbol que demuestre los cuatro resultados posibles de nacimiento en una familia con 2 hijos (no gemelos). Utiliza el símbolo B para el resultado de *niño* y G para el resultado de *niña*. Considera el primer nacimiento como la primera etapa. (Consulta el ejemplo 1 si necesitas ayuda para empezar).

2. Escribe las probabilidades de los resultados de cada etapa en el diagrama de árbol que desarrollaste anteriormente y determina las probabilidades para cada uno de los 4 posibles resultados de nacimiento en una familia con 2 hijos (no gemelos).

3. ¿Cuál es la probabilidad de que una familia tenga 2 niñas en esta situación? ¿Es mayor o menor que la probabilidad de tener exactamente 1 niña en 2 nacimientos?

Number Correct: _____

Integer Division—Round 1

Directions: Determine the quotient of the integers, and write it in the column to the right.

1.	$4 \div 1$	
2.	$4 \div (-1)$	
3.	$-4 \div (-1)$	
4.	$-4 \div 1$	
5.	$6 \div 2$	
6.	$-6 \div (-2)$	
7.	$-6 \div 2$	
8.	$6 \div -2$	
9.	$8 \div (-4)$	
10.	$-8 \div (-4)$	
11.	$-8 \div 4$	
12.	$8 \div 4$	
13.	$9 \div (-3)$	
14.	$-9 \div 3$	
15.	$-10 \div 5$	
16.	$10 \div (-2)$	
17.	$-10 \div (-2)$	
18.	$-10 \div (-5)$	
19.	$-14 \div 7$	
20.	$14 \div (-2)$	
21.	$-14 \div (-2)$	
22.	$-14 \div (-7)$	

23.	$-16 \div (-4)$	
24.	$16 \div (-2)$	
25.	$-16 \div 4$	
26.	$-20 \div 4$	
27.	$-20 \div (-4)$	
28.	$-28 \div 4$	
29.	$28 \div (-7)$	
30.	$-28 \div (-7)$	
31.	$-40 \div (-5)$	
32.	$56 \div (-7)$	
33.	$96 \div (-3)$	
34.	$-121 \div (-11)$	
35.	$169 \div (-13)$	
36.	$-175 \div 25$	
37.	$1 \div 4$	
38.	$-1 \div 4$	
39.	$-1 \div (-4)$	
40.	$-3 \div (-4)$	
41.	$-5 \div 20$	
42.	$6 \div (-18)$	
43.	$-24 \div 48$	
44.	$-16 \div 64$	

Number Correct: _____

Improvement: _____

Integer Division—Round 2

Directions: Determine the quotient of the integers, and write it in the column to the right.

1.	$5 \div 1$	
2.	$5 \div (-1)$	
3.	$-5 \div (-1)$	
4.	$-5 \div 1$	
5.	$6 \div 3$	
6.	$-6 \div (-3)$	
7.	$-6 \div 3$	
8.	$6 \div -3$	
9.	$8 \div (-2)$	
10.	$-8 \div (-2)$	
11.	$-8 \div 2$	
12.	$8 \div 2$	
13.	$-9 \div (-3)$	
14.	$9 \div 3$	
15.	$-12 \div 6$	
16.	$12 \div (-2)$	
17.	$-12 \div (-2)$	
18.	$-12 \div (-6)$	
19.	$-16 \div 8$	
20.	$16 \div (-2)$	
21.	$-16 \div (-2)$	
22.	$-16 \div (-8)$	

23.	$-18 \div (-9)$	
24.	$18 \div (-2)$	
25.	$-18 \div 9$	
26.	$-24 \div 4$	
27.	$-24 \div (-4)$	
28.	$-24 \div 6$	
29.	$30 \div (-6)$	
30.	$-30 \div (-5)$	
31.	$-48 \div (-6)$	
32.	$64 \div (-4)$	
33.	$105 \div (-7)$	
34.	$-144 \div (-12)$	
35.	$196 \div (-14)$	
36.	$-225 \div 25$	
37.	$2 \div 4$	
38.	$-2 \div 4$	
39.	$-2 \div (-4)$	
40.	$-4 \div (-8)$	
41.	$-5 \div 40$	
42.	$6 \div (-42)$	
43.	$-25 \div 75$	
44.	$-18 \div 108$	

Lesson 3: Chance Experiments with Equally Likely Outcomes

Classwork

Exercises 1–6

Jamal, a seventh grader, wants to design a game that involves tossing paper cups. Jamal tosses a paper cup five times and records the outcome of each toss. An *outcome* is the result of a single trial of an experiment.

Lesson Video

Here are the results of each toss:

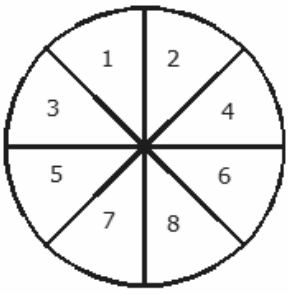
Jamal noted that the paper cup could land in one of three ways: on its side, right side up, or upside down. The collection of these three outcomes is called the *sample space* of the experiment. The *sample space* of an experiment is the set of all possible outcomes of that experiment.

For example, the sample space when flipping a coin is heads, tails.

The sample space when drawing a colored cube from a bag that has 3 red, 2 blue, 1 yellow, and 4 green cubes is red, blue, yellow, green.

For each of the following chance experiments, list the sample space (i.e., all the possible outcomes).

1. Drawing a colored cube from a bag with 2 green, 1 red, 10 blue, and 3 black
2. Tossing an empty soup can to see how it lands
3. Shooting a free throw in a basketball game
4. Rolling a number cube with the numbers 1–6 on its faces
5. Selecting a letter from the word *probability*
6. Spinning the spinner:



Example 2: Equally Likely Outcomes

The sample space for the paper cup toss was on its side, right side up, and upside down.

The outcomes of an experiment are equally likely to occur when the probability of each outcome is equal.

Toss the paper cup 30 times, and record in a table the results of each toss.

Toss	Outcome
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	

Exercises 7–12

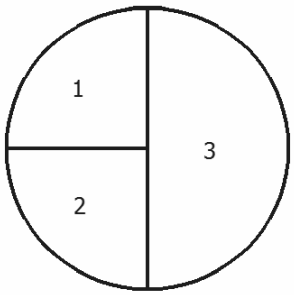
7. Using the results of your experiment, what is your estimate for the probability of a paper cup landing on its side?

8. Using the results of your experiment, what is your estimate for the probability of a paper cup landing upside down?

9. Using the results of your experiment, what is your estimate for the probability of a paper cup landing right side up?

10. Based on your results, do you think the three outcomes are equally likely to occur?

11. Using the spinner below, answer the following questions.



a. Are the events spinning and landing on 1 or 2 equally likely?

b. Are the events spinning and landing on 2 or 3 equally likely?

c. How many times do you predict the spinner will land on each section after 100 spins?

12. Draw a spinner that has 3 sections that are equally likely to occur when the spinner is spun. How many times do you think the spinner will land on each section after 100 spins?

Lesson 4: Calculating Probabilities for Chance Experiments with Equally Likely Outcomes

Lesson Video

Classwork

Examples: Theoretical Probability

In a previous lesson, you saw that to find an estimate of the probability of an event for a chance experiment you divide

$$P(\text{event}) = \frac{\text{Number of observed occurrences of the event}}{\text{Total number of observations}}.$$

Your teacher has a bag with some cubes colored yellow, green, blue, and red. The cubes are identical except for their color. Your teacher will conduct a chance experiment by randomly drawing a cube with replacement from the bag. Record the outcome of each draw in the table below.

Trial	Outcome
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

1. Based on the 20 trials, estimate for the probability of
   a. Choosing a yellow cube
   b. Choosing a green cube
   c. Choosing a red cube
   d. Choosing a blue cube

2. If there are 40 cubes in the bag, how many cubes of each color are in the bag? Explain.

3. If your teacher were to randomly draw another 20 cubes one at a time and with replacement from the bag, would you see exactly the same results? Explain.

4. Find the fraction of each color of cubes in the bag.

Yellow

Green

Red

Blue

Each fraction is the *theoretical probability* of choosing a particular color of cube when a cube is randomly drawn from the bag.

When all the possible outcomes of an experiment are equally likely, the probability of each outcome is

$$P(\text{outcome}) = \frac{1}{\text{Number of possible outcomes}}.$$

An event is a collection of outcomes, and when the outcomes are equally likely, the theoretical probability of an event can be expressed as

$$P(\text{event}) = \frac{\text{Number of favorable outcomes}}{\text{Number of possible outcomes}}.$$

The theoretical probability of drawing a blue cube is

$$P(\text{blue}) = \frac{\text{Number of blue cubes}}{\text{Total number of cubes}} = \frac{10}{40}.$$

5. Is each color equally likely to be chosen? Explain your answer.

6. How do the theoretical probabilities of choosing each color from Exercise 4 compare to the experimental probabilities you found in Exercise 1?

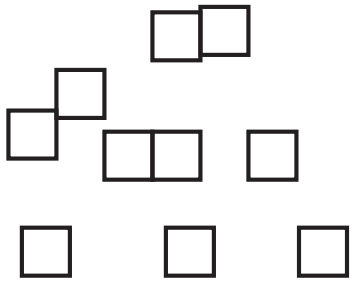
7. An experiment consisted of flipping a nickel and a dime. The first step in finding the theoretical probability of obtaining a heads on the nickel and a heads on the dime is to list the sample space. For this experiment, complete the sample space below.

Nickel Dime

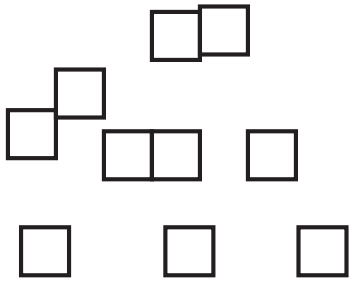
What is the probability of flipping two heads?

Exercises 1–4

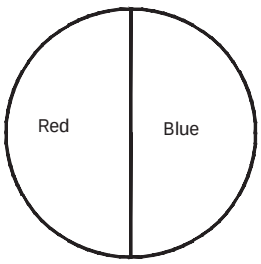
1. Consider a chance experiment of rolling a six-sided number cube with the numbers 1–6 on the faces.
   a. What is the sample space? List the probability of each outcome in the sample space.
   b. What is the probability of rolling an odd number?
   c. What is the probability of rolling a number less than 5?
2. Consider an experiment of randomly selecting a letter from the word *number*.
   a. What is the sample space? List the probability of each outcome in the sample space.
   b. What is the probability of selecting a vowel?
   c. What is the probability of selecting the letter *z*?
3. Consider an experiment of randomly selecting a square from a bag of 10 squares.
   a. Color the squares below so that the probability of selecting a blue square is $\frac{1}{2}$.

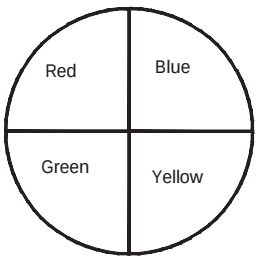


   b. Color the squares below so that the probability of selecting a blue square is $\frac{4}{5}$.



4. Students are playing a game that requires spinning the two spinners shown below. A student wins the game if both spins land on red. What is the probability of winning the game? Remember to first list the sample space and the probability of each outcome in the sample space. There are eight possible outcomes to this chance experiment.





Lesson 5: Chance Experiments with Outcomes That Are Not Equally Likely

Lesson Video

Classwork

In previous lessons, you learned that when the outcomes in a sample space are equally likely, the probability of an event is the number of outcomes in the event divided by the number of outcomes in the sample space. However, when the outcomes in the sample space are *not* equally likely, we need to take a different approach.

Example 1

When Jenna goes to the farmers' market, she usually buys bananas. The number of bananas she might buy and their probabilities are shown in the table below.

Number of Bananas	0	1	2	3	4	5
Probability	0.1	0.1	0.1	0.2	0.2	0.3

a. What is the probability that Jenna buys exactly 3 bananas?

b. What is the probability that Jenna does not buy any bananas?

c. What is the probability that Jenna buys more than 3 bananas?

d. What is the probability that Jenna buys at least 3 bananas?

e. What is the probability that Jenna does not buy exactly 3 bananas?

Notice that the sum of the probabilities in the table is one whole $(0.1 + 0.1 + 0.1 + 0.2 + 0.2 + 0.3 = 1)$. This is always true; when we add up the probabilities of all the possible outcomes, the result is always 1. So, taking 1 and subtracting the probability of the event gives us the probability of something *not* occurring.

Exercises 1–2

Jenna's husband, Rick, is concerned about his diet. On any given day, he eats 0, 1, 2, 3, or 4 servings of fruits and vegetables. The probabilities are given in the table below.

Number of Servings of Fruits and Vegetables	0	1	2	3	4
Probability	0.08	0.13	0.28	0.39	0.12

1. On a given day, find the probability that Rick eats

   a. Two servings of fruits and vegetables

   b. More than two servings of fruits and vegetables

   c. At least two servings of fruits and vegetables

2. Find the probability that Rick does not eat exactly two servings of fruits and vegetables.

Example 2

Luis works in an office, and the phone rings occasionally. The possible number of phone calls he receives in an afternoon and their probabilities are given in the table below.

Number of Phone Calls	0	1	2	3	4
Probability	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{2}{9}$	$\frac{1}{3}$	$\frac{1}{9}$

a. Find the probability that Luis receives 3 or 4 phone calls.

b. Find the probability that Luis receives fewer than 2 phone calls.

c. Find the probability that Luis receives 2 or fewer phone calls.

d. Find the probability that Luis does not receive 4 phone calls.

Exercises 3–7

When Jenna goes to the farmers' market, she also usually buys some broccoli. The possible number of heads of broccoli that she buys and the probabilities are given in the table below.

Number of Heads of Broccoli	0	1	2	3	4
Probability	$\frac{1}{12}$	$\frac{1}{6}$	$\frac{5}{12}$	$\frac{1}{4}$	$\frac{1}{12}$

3. Find the probability that Jenna:

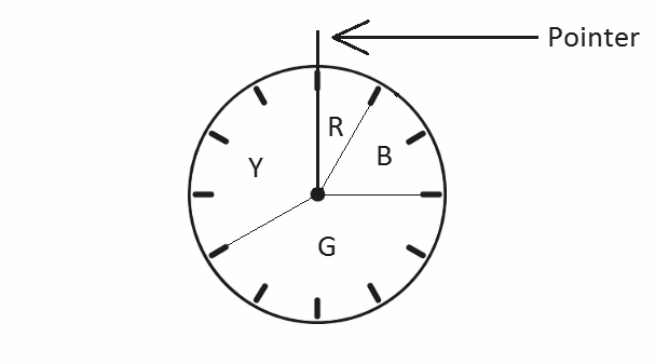
   a. Buys exactly 3 heads of broccoli

   b. Does not buy exactly 3 heads of broccoli

   c. Buys more than 1 head of broccoli

   d. Buys at least 3 heads of broccoli

The diagram below shows a spinner designed like the face of a clock. The sectors of the spinner are colored red (R), blue (B), green (G), and yellow (Y).



4. Writing your answers as fractions in lowest terms, find the probability that the pointer stops on the following colors.
   a. Red:
   b. Blue:
   c. Green:
   d. Yellow:

5. Complete the table of probabilities below.

Color	Red	Blue	Green	Yellow
Probability				

6. Find the probability that the pointer stops in either the blue region or the green region.

7. Find the probability that the pointer does not stop in the green region.

Lesson 6: Using Tree Diagrams to Represent a Sample Space and to Calculate Probabilities

Lesson Video

Classwork

Suppose a girl attends a preschool where the students are studying primary colors. To help teach calendar skills, the teacher has each student maintain a calendar in his cubby. For each of the four days that the students are covering primary colors in class, students get to place a colored dot on their calendars: blue, yellow, or red. When the four days of the school week have passed (Monday–Thursday), what might the young girl's calendar look like?

One outcome would be four blue dots if the student chose blue each day. But consider that the first day (Monday) could be blue, and the next day (Tuesday) could be yellow, and Wednesday could be blue, and Thursday could be red. Or maybe Monday and Tuesday could be yellow, Wednesday could be blue, and Thursday could be red. Or maybe Monday, Tuesday, and Wednesday could be blue, and Thursday could be red, and so on and so forth.

As hard to follow as this seems now, we have only mentioned 3 of the 81 possible outcomes in terms of the four days of colors! Listing the other 78 outcomes would take several pages! Rather than listing outcomes in the manner described above (particularly when the situation has multiple stages, such as the multiple days in the case above), we often use a *tree diagram* to display all possible outcomes visually. Additionally, when the outcomes of each stage are the result of a chance experiment, tree diagrams are helpful for computing probabilities.

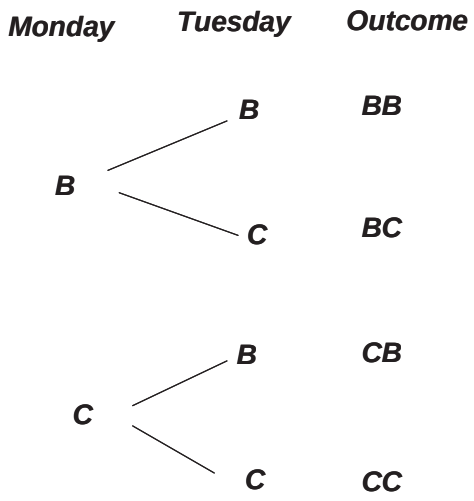
Example 1: Two Nights of Games

Imagine that a family decides to play a game each night. They all agree to use a tetrahedral die (i.e., a four-sided pyramidal die where each of four possible outcomes is equally likely—see the image at the end of this lesson) each night to randomly determine if they will play a board game (B) or a card game (C). The tree diagram mapping the possible overall outcomes over two consecutive nights will be developed below.

To make a tree diagram, first present all possibilities for the first stage (in this case, Monday).

Monday	*Tuesday*	*Outcome*
B		
C		

Then, from *each* branch of the first stage, attach all possibilities for the second stage (Tuesday).



Note: If the situation has more than two stages, this process would be repeated until all stages have been presented.

a. If BB represents two straight nights of board games, what does CB represent?

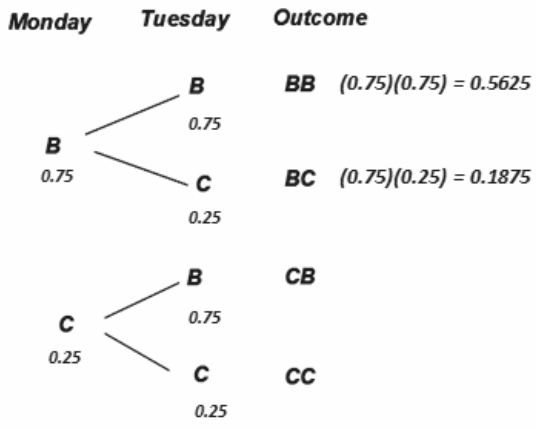
b. List the outcomes where exactly one board game is played over two days. How many outcomes were there?

Example 2: Two Nights of Games (with Probabilities)

In Example 1, each night's outcome is the result of a chance experiment (rolling the tetrahedral die). Thus, there is a probability associated with each night's outcome.

By multiplying the probabilities of the outcomes from each stage, we can obtain the probability for each "branch of the tree." In this case, we can figure out the probability of each of our four outcomes: BB, BC, CB, and CC.

For this family, a card game will be played if the die lands showing a value of 1, and a board game will be played if the die lands showing a value of 2, 3, or 4. This makes the probability of a board game (B) on a given night 0.75.



a. The probabilities for two of the four outcomes are shown. Now, compute the probabilities for the two remaining outcomes.

b. What is the probability that there will be exactly one night of board games over the two nights?

Exercises 1–3: Two Children

Two friends meet at a grocery store and remark that a neighboring family just welcomed their second child. It turns out that both children in this family are girls, and they are not twins. One of the friends is curious about what the chances are of having 2 girls in a family's first 2 births. Suppose that for each birth, the probability of a boy birth is 0.5 and the probability of a girl birth is also 0.5.

1. Draw a tree diagram demonstrating the four possible birth outcomes for a family with 2 children (no twins). Use the symbol B for the outcome of *boy* and G for the outcome of *girl*. Consider the first birth to be the first stage. (Refer to Example 1 if you need help getting started.)

2. Write in the probabilities of each stage's outcome to the tree diagram you developed above, and determine the probabilities for each of the 4 possible birth outcomes for a family with 2 children (no twins).

3. What is the probability of a family having 2 girls in this situation? Is that greater than or less than the probability of having exactly 1 girl in 2 births?

Unit 5

Why We Explore

Austrian BASE jumper Felix Baumgartner jumps from the edge of space, 39 km (24 mi.) above the surface of the Earth.

"We really need to show people the world in a different light, in a new format—something that they can engage with and be excited about."

—Corey Jaskolski

1. In the photo, we see a man jump from the edge of space and then free-fall, attached only to a helium balloon. Would you try this? Why or why not?
2. Why do you think people explore? What can be learned from exploring new places?
3. Where would you like to explore? Explain.

1 Why do we explore? Discuss. Then listen and read. **TR: 57**

Scientists working inside the Rising Star cave, where fossils of *Homo naledi* were discovered.

The desire for **knowledge** about our world pushes explorers into the smallest caves, the deepest oceans, and even outer space. People have been exploring for centuries. But any explorer will tell you that the more they **investigate**, the more they realize there's still so much to learn.

Explorer Sylvia Earle is a deep-ocean **pioneer** with a long list of achievements. She has engaged in 7,000 hours of underwater study and written nearly 200 scientific articles on her findings. In 1970, she and a team of women "aquanauts" were required to live underwater for weeks at a time to **research** marine life. The fact that so much of the ocean remains undiscovered **has driven** Sylvia's work. In fact, even though explorers have been studying the world's oceans for years, they've only seen about five percent of them! Sylvia's **purpose** in life has been to protect the sea, and she encourages others to do so as well.

Paleoanthropologist Lee Berger has been searching for ancient hominids in **remote** parts of Africa for over two decades. He is **curious** about the family of primates that evolved into *Homo sapiens*, or human beings. Lee has made some **exciting** discoveries over time, but his most important discovery came in 2014 when he led an expedition at the Rising Star cave system, near Johannesburg, South Africa. To explore one of the caves, researchers had to squeeze through an opening less than 25 cm (10 in.) wide. Lee wasn't small enough to do it himself, so he gathered an **expert** team of female researchers who made it inside. There they found over 1,550 bones, representing at least 15 individuals.

The bones were brought to the lab where skeletons were assembled. Lee used 3D scanning to identify an entirely new hominid species: *Homo naledi*. Creating the skeleton was just the first step in understanding the new species. "The discoveries we're now making show that in some ways, the age of exploration is still just beginning," says Lee.

Engineer and inventor Corey Jaskolski not only explores, but also creates **high-tech** tools that allow people to **look into** the past without harming its artifacts. Corey wants explorers to protect what they **encounter** so that future generations can learn from them, too. "When we discover things, we have a responsibility to preserve them as well," he says.

2 Learn new words. Listen and repeat. **TR: 58**

3 Work in pairs. Why do you think each explorer's contributions are important? How does an explorer's work matter to all of us?

THE **Explorer** GENE

Are we born to explore?

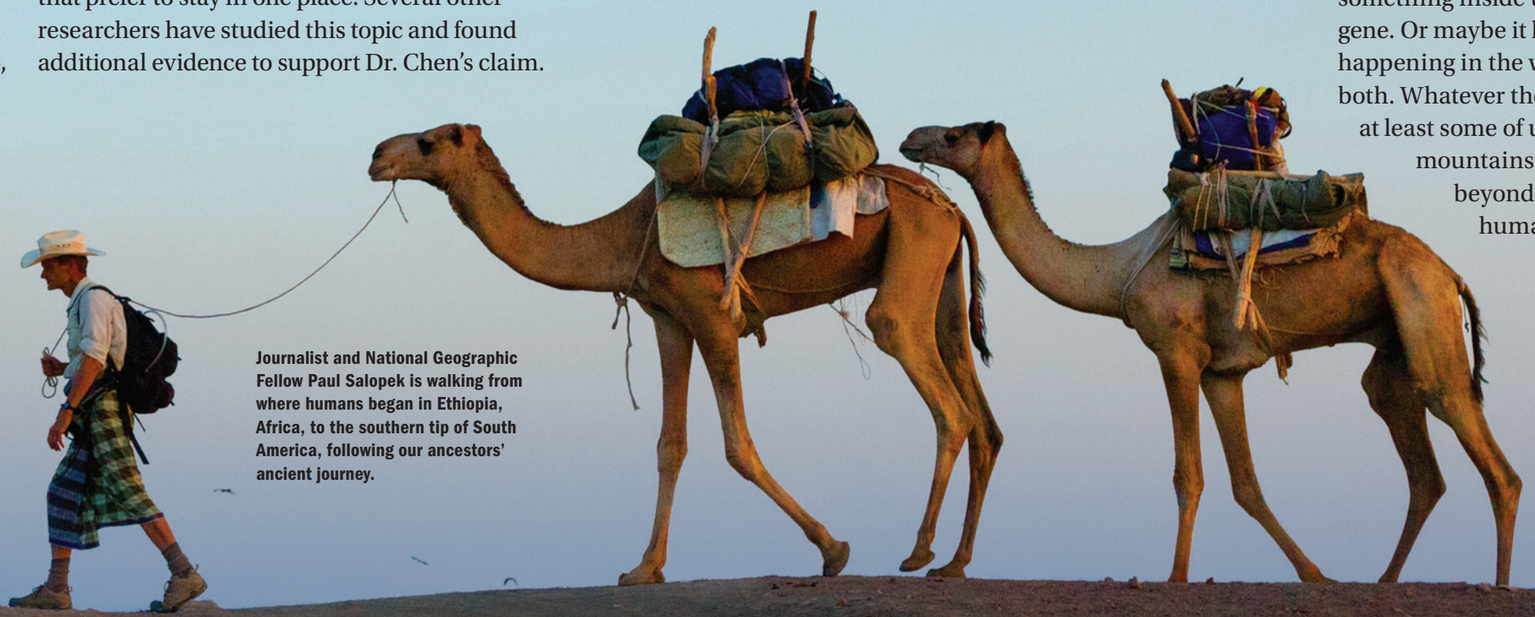
Of all the animals on Earth, none are so driven to explore as humans. Other animals will go in search of food or water. But humans can be motivated simply by the possibility of discovery. So what is it exactly that caused us to spread out across the globe 60,000 years ago, instead of just staying in Africa?

Perhaps it's in our DNA. In 1999, Dr. Chuansheng Chen led a team of scientists who were studying a gene known as *DRD4-7R*. This gene is found in about twenty percent of all humans. It's been associated with higher rates of risk-taking, exploration, and interest in new ideas. Dr. Chen found that *DRD4-7R* is more common in societies that move around a lot than those who don't. For example, studies in Africa show that the gene is much more common in nomadic tribes than in tribes that prefer to stay in one place. Several other researchers have studied this topic and found additional evidence to support Dr. Chen's claim.

But can a single gene be responsible for a trait as complex as the desire to explore? Dr. Kenneth Kidd doesn't think so. He thinks *DRD4-7R* might increase curiosity, but other equally important sets of genes give us intelligent minds and skilled hands. We then use our minds and hands to create things. He believes that not just one gene, but groups of genes work together to create complex behaviors like exploration.

The context we live in also plays a role in our desire to explore. For example, during the European Age of Exploration, explorers became rich and famous for their discoveries. This drove others to try to increase their wealth through exploration. In this case, their exploration was more likely motivated by money than by genes.

Maybe the desire to explore comes from something inside us, such as the *DRD4-7R* gene. Or maybe it has more to do with what's happening in the world around us. Maybe both. Whatever the reason, it seems we (or at least some of us) will keep exploring the mountains, the sea, the stars, and beyond, because that's just what humans do.



Journalist and National Geographic Fellow Paul Salopek is walking from where humans began in Ethiopia, Africa, to the southern tip of South America, following our ancestors' ancient journey.

17 **Before you read, discuss in pairs.** Based on the title and the photo, what do you think you'll learn in this reading?

18 **Learn new words.** Find these words in the reading. What do you think they mean? Look at how they're pronounced in a dictionary. Say them aloud. Then listen and repeat. TR: 67

associated	**gene**	**to motivate**	**trait**

19 **While you read, think about a person you know who might have the explorer gene.** TR: 68

20 **After you read, work in pairs to answer the questions.**

1. What makes humans explore? How are we different from other animals?
2. What traits is the *DRD4-7R* gene associated with?
3. What percent of humans have this gene?
4. What is Dr. Kenneth Kidd's opinion regarding *DRD4-7R*'s connection to exploration?
5. What else might cause humans to explore?

21 **Work in pairs.** Describe the person that you thought of in Activity 19. Give examples to explain why you think this person has the gene.

22 **Discuss in groups.**

1. Do you believe a gene causes humans to explore? Or do you think it has more to do with other factors? Explain.
2. Do you think you have the *DRD4-7R* gene? Explain with examples. What other beliefs and behaviors might be caused by something in your genes?
3. Are humans exploring more now than in the past? Will we ever stop exploring? Explain.

GRAMMAR TR: 69

Geographic use of *the*

I'm going to **the Himalayas** to climb **Mt. Everest**.

The Yangtze is the longest river in **Asia**. **Lake Baikal** is the largest lake in **Asia**.

The equator passes through **Isabella Island**, the largest of **the Galápagos Islands**.

Explorer Ferdinand Magellan was born in **Portugal**, but died in **the Philippines**.

Explorer Gertrude Bell wrote a book about **Syria** after her travels to **the Middle East**.

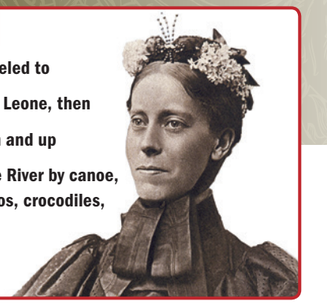
29 **Read.** Fill in the timeline of female explorers by adding *the* when necessary.

1805

Native American Sacagawea guided Lewis and Clark through _____ Oregon Territory of _____ United States.

1894

Mary Kingsley traveled to _____ Sierra Leone, then _____ Gabon and up _____ Ogowe River by canoe, encountering hippos, crocodiles, and gorillas.



1908

Mountaineer Annie Smith Peck was the first person to climb _____ Huascarán, a 6,768 m (22,204 ft.) mountain in _____ Peru.

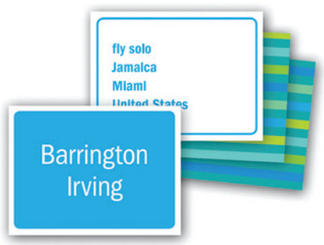
1932

Amelia Earhart flew solo across _____ Atlantic Ocean from _____ Canada to _____ Ireland.

1953

Eugenie Clark wrote a book about studying sharks in _____ South Pacific Ocean and _____ Sea of Cortez, near _____ Mexico.

30 **Work in pairs.** Cut out the cards and place them face-down. Take turns trying to match the information with the explorer. When you make a match, describe the explorer's work, using the places on the card.



Go to p. 167.

WRITING

When we compare and contrast two people, things, or ideas, we use phrases such as the following:

Compare:	**in the same way**	**likewise**	**similarly**
Contrast:	**by comparison**	**in contrast**	**on one hand . . . on the other hand**

31 **Read the model.** Work in pairs to identify the parts of the writing. How does the writer compare and contrast exploration past and present? Underline the phrases.

Exploration has changed a lot over time. In the past, only adventurers who were willing to take risks were considered explorers. In contrast, anyone can be an explorer today thanks to modern technology.

In the past, when explorers traveled the world, people back home had to wait for months to hear about their adventures. Explorers kept journals and wrote letters about their experiences. They would only be able to tell others what they saw after they returned. By the end of the nineteenth century, explorers were also able to take photos in the same way that they do today. However, they were unable to see the photos right away. It often took a long time for them to get photos printed.

By comparison, today's explorers can travel around the globe and can send back live, real-time images. Thanks to high-tech devices and the Internet, anyone can interact with them. When a discovery is made, we can see photos on social media and read blog posts the same day. We may not be there, but we still take part in the adventure. Similarly, thanks to high-tech cameras and 3D scanners, archeologists and other scientists can now study objects without ever touching or removing them from their sites. This way, people can learn about these things without the risk of harming or breaking them.

There are similarities between exploration in the past and the present. For example, explorers are driven by curiosity and the desire for knowledge about the world. Likewise, people want to share what they discover with others, both in writing and with photos. So, even though the methods may be different, our reasons for exploring have stayed the same over time.

32 **Work in pairs.** How is the way we explore different now compared to the past?

33 **Write.** Write an essay that compares and contrasts exploring out in the field with exploring virtually.

At Home Activities and Resources for Families (English Language Development)

Greetings dear parent/guardian. Thank you for supporting your child's learning at home. The resources provided in this packet will provide your child with additional opportunities to practice English language development skills through different vocabulary, grammar, and reading skills.

Each packet has stories to read in English with questions and vocabulary activities. You do not need to print any activities as responses can be written on a separate sheet of paper.

Thank you again for your enthusiasm and willingness to do activities with your child at home.

Actividades en el hogar y recursos para familias (Desarrollo del idioma inglés)

Saludos querido padre/tutor. Gracias por apoyar el aprendizaje de su hijo en casa. Los recursos en este paquete le brindarán a su hijo oportunidades para practicar su desarrollo del inglés a través de diferentes actividades de vocabulario, gramática y lectura.

Cada paquete tiene historias para leer en inglés con preguntas y actividades de vocabulario. No necesita imprimir ninguna actividad, ya que las respuestas pueden escribirse en una hoja de papel por separado.

Gracias nuevamente por su entusiasmo en completar las actividades con su hijo en casa.

Read on Your Own

FOCUS ON GENRE

Realistic Fiction Realistic fiction is a story that is not true, but could really happen. The characters act like real people. This story is about two girls who are practicing for a show at school.

FOCUS ON WORDS

Verb Ending: *-ed* When you read and come to a word you don't know, blend the sounds together to read it. You just learned about verbs that end in *-ed*.

hugged

High Frequency Words Say these words as whole words when you read.

saw	**was**
were	**their**
said	**began**
about	**dance**
thought	**again**

Eva's LESSON

Eva was mad. She tapped her foot. She looked at the clock above the stove.

"Veronica has ten more seconds to get here," she said. Eva waited and waited.

Veronica was always late.

They had planned to talk about their dance for the school show. Eva thought Veronica was not very good. She thought Veronica needed a lot of help.

While she waited, Eva played the CD for their dance. She clapped her hands and kicked to the beat. She began to sing. She kicked again. This time, she kicked too high. She slipped and landed on the rug! Just then, Veronica peeked in the kitchen window. She saw Eva and rushed to help her. Eva smiled and rubbed her leg. "I thought you were the one who needed help. Now I know I was the one," she joked.

Think About "Eva's Lesson"

CHECK YOUR UNDERSTANDING

Make a chart. Write what happened as a result of each cause. Use the finished chart to tell the story to a partner. Then listen as your partner tells the story.

Cause	Effect
Veronica and Eva wanted to dance in the school show.	They needed to practice.
Veronica was late.	
Eva kicked too high.	
Veronica helped Eva.	

High Frequency Words

▲ A Thanksgiving Day parade

REVIEW HIGH FREQUENCY WORDS

Read the words aloud. Which word goes in the sentence?

enough	through
really	world
above	on

1. The parade goes _____ the streets.
2. The floats are _____ big.
3. This parade is _____ Thanksgiving Day.

LEARN NEW WORDS

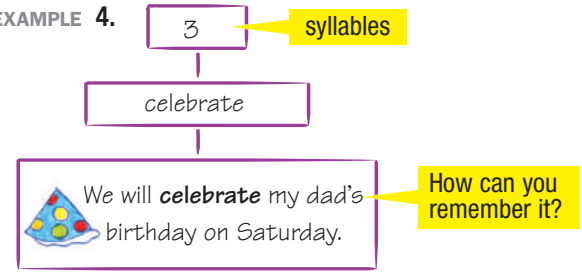
Study these words. Say them as whole words when you read.

celebrate	We like to **celebrate**. Today is my sister's birthday.
most	**Most** of her friends are here, but not all of them.
young	Her friends are **young** kids from school.
children	There are about 10 **children** in our yard.
started	The party **started** at 3:00.

PRACTICE

4.–8. Make a map for each new word. Write the word in the center. Complete the other boxes and use the word in a sentence of your own.

EXAMPLE **4.**



9.–13. Write each sentence. Add the missing word.

EXAMPLE **9.** In my family, we dance when we celebrate.

9. In my family, we dance when we __ __ __ __ __ __ __ __ __.
10. I learned the waltz when I was very __ __ __ __ __.
11. I __ __ __ __ __ __ __ to learn it when I was 5.
12. My father wants all his __ __ __ __ __ __ __ __ to know how to dance.
13. __ __ __ __ of us are very good dancers!

More High Frequency Words

How to Learn a New Word

- Look at the word.
- Listen to the word.
- Listen to the word in a sentence. What does it mean?
- Say the word.
- Spell the word.
- Say the word again.

REVIEW HIGH FREQUENCY WORDS

Read the words aloud. Which word goes in the sentence?

Our	Other
family	city
father	river

1. _____ parents like to spend time with us.

2. The whole _____ likes to do things together.

3. My _____ and mother are special people.

LEARN NEW WORDS

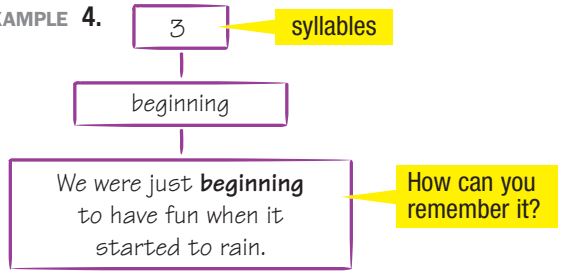
Study these words. Say them as whole words when you read.

beginning	It is now 4:00, and it is **beginning** to rain.
change	My mother says, "We need to **change** our plans!"
another	"Let's move the party to **another** place!"
only	The house is the **only** place to go.
following	The kids are quickly **following** me inside. This is fun!

PRACTICE

4.–8. Make a map for each new word. Write the word in the center. Complete the other boxes and use the word in a sentence of your own.

EXAMPLE **4.**



9.–13. Write each sentence. Add the missing word.

EXAMPLE **9.** The basic dance steps never change.

9. The basic dance steps never __ __ __ __ __ __.

10. The waltz is not the __ __ __ __ dance I know.

11. My father is teaching me __ __ __ __ __ __ __ dance called the cha-cha.

12. My house is __ __ __ __ __ __ __ __ __ to look like a dance club!

13. I am __ __ __ __ __ __ __ __ __ in my father's dancing footsteps!

Friday is here! Today is MARVEL DAY.

It's time to get in shape like an Avenger. We are going to get in shape like the **HULK**!

5 rounds of:

1. 30 seconds butt kickers
2. 80 punches (Punch the air. Make sure no one is around you.)
3. 10 knee jump tucks (Jump as high as you can and bring your knees to your chest)
4. 20 sit ups
5. 10 raised leg circle
6. 10 pushups. If you can't do a regular pushup, do modified on your knee pushups!
7. 40 jumping jacks

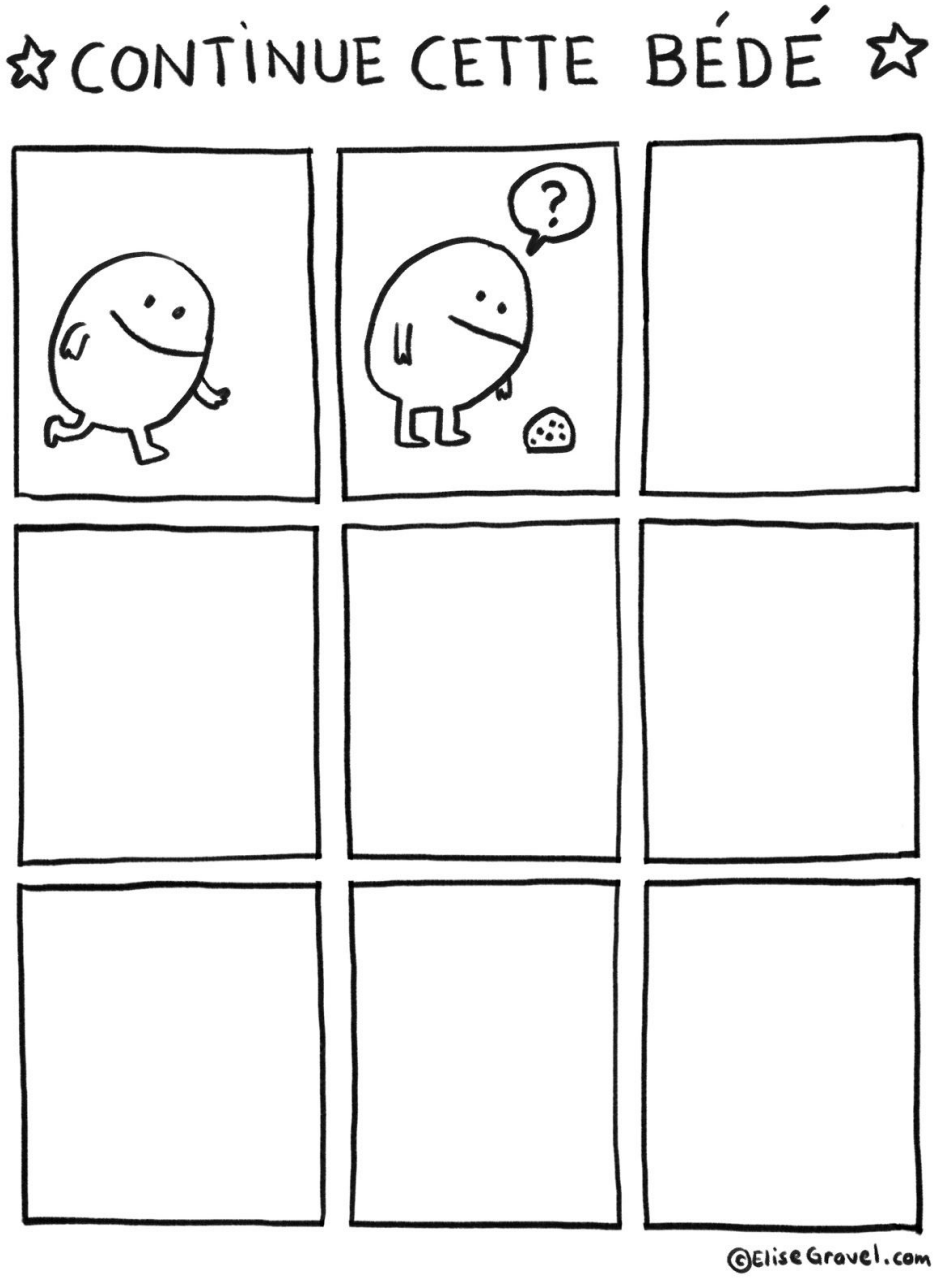
Now time to cool down from Hulk mode!
Do each one of these for 30 seconds. Feel free to repeat them more than once to get an even better stretch.

1. Stand up toe-touch
2. Quad Stretches
3. Forward fold
4. Butterfly Stretch
5. Sitting toe touch each leg

World Languages - At Home Activities

- Write as many words as you can think of in the language you are studying on cards. Create simple sentences with the words. Challenge yourself to make the sentences longer. Use this resource to help you.→
- Research a monument or tourist site in a country where the target language is spoken and create a postcard about an imaginary visit you had.
- In the language you are studying, explore resources on the topic of pets and make a poster in that language including things you should do and should not do to take the best care of your pet.
- Investigate the life and art of a famous artist from the target language culture. Create a visual presentation in the target language about the artist.

- Complete the comic below with speech bubbles in the language you are studying:



Television Programming Schedules

TPS20

	Daily
6:00-6:30 am	Recess
6:30 -7:00 am	Pre K - Math Pre K - Reading in English and Spanish.
7:00-8:00 am	Kindergarten - Math Kindergarten - Reading in English and Spanish
8:00-9:00 am	1st Grade - Math 1st Grade - Reading in English and Spanish
9:00- 10:00 am	2nd Grade - Math 2nd Grade - Reading in English and Spanish
10:00-11:00 am	3rd Grade - Math 3rd Grade - Reading in English and Spanish
11:00-11:30 am	Pre K - Math PreK - Reading in English and Spanish. *(repeat of 6:30 am program)*
11:30-12:00 pm	Recess
12:00-1:00 pm	4th Grade - Math 4th Grade - Reading in English and Spanish.
1:00-2:00 pm	5th Grade - Math 5th Grade - Reading in English and Spanish.
2:00-2:30 pm	Recess *(repeat of 6:00 am program)*
2:30-3:00 pm	Specials (Art, Music, SEL, or STEM)
3:00-4:00 pm	6th Grade - Math 6th Grade - English/Language Arts
4:00-5:00 pm	7th Grade - Math 7th Grade - English/Language Arts
5:00-6:00 pm	8th Grade - Math 8th Grade - English/Language Arts

Canal TPS20

	Diario
6:00-6:30 am	Recreo
6:30 - 7:00 am	Prekínder - Matemáticas Prekínder – Lectura en inglés y español.
7:00-8:00 am	Kínder - Matemáticas Kínder- Lectura en inglés y español.
8:00-9:00 am	Primer Grado - Matemáticas Primer Grado - Lectura en inglés y español.
9:00-10:00 am	Segundo Grado - Matemáticas Segundo Grado - Lectura en inglés y español.
10:00-11:00 am	Tercer Grado – Matemáticas Tercer Grado - Lectura en inglés y español.
11:00-11:30 am	Prekínder - Matemáticas Prekínder - Lectura en inglés y español. *(repitiendo el programa de las 6:30)*
11:30-12:00 pm	Recreo

Rock n' Roll Conversations

Take the opportunity to have a conversation with a family member of another generation about the music of their generation. Please have this conversation either in person or by phone or Skype/Facetime. Please avoid a conversation by text or SnapChat as these platforms limit responses and expressions. Use a platform or media that allows real-time responses. The conversation can be with a mom, dad, an aunt, uncle, grandparent or even a neighbor. Just someone from another generation. You may even want record the conversation with your Chromebook or other devise to refer back to answer these question later.

The following are conversation starters. This is by no means all the questions you can ask or may not apply to the genres of music. Have a conversation.

QUESTIONS:

What type of music did you listen to in middle school?

Was the music you liked part of a Dance Decade era? (40's – Swing, 50's – Rock a'billy, 70's – Disco? 80's Pop?)

What was important in the music? (drum beats? Lyrics?)

Were the lyrics important? Were the lyrics poetic (meaningful? Study-worthy? Well-structured? Experience-based? Danceable? Are the lyrics awesome or mostly fluff – not of significant meaning? (i.e. Joni Mitchell vs. Taylor Swift).

Who were some of your favorite artists in middle school? What did you enjoy most about their music (in depth)? Did you attend any live performances? What was the venue? How was that experience?

Did your favorite artists write their own music? Is the music it more "mass produced" (voice doubled, auto-tuned) or more acoustic – regardless of the era?

What did your parents think of the music you liked at my age? What do you think of the music I listen to? (play a bit of your music if the person is not sure the type of music you listen to).

If time permits, listen to a song by each other's favorite artist. After listening, share what you like about the artist.

Question: Are there any common reactions between how your guest's parents thought about their music and how YOUR parents think about your music?

Any Final thoughts?