Shaping My Knowledge

Warm-up

First, have students work in four groups to write a description of the Big Bang as a flipped-classroom task. Then, ask groups to post their definitions on a digital platform. Finally, invite others to vote on the description they like best and why.

Teaching Tip

For Exercise 4
First, give students time and the tools needed. Then, if appropriate, provide access to a digital tool they can use. However, emphasize that the exercise is to use their imagination to create a visual representation of the Big Bang and the ensuing expansion, not replicate an existing image. For the presentation stage of the exercise, create a gallery walk with half the students standing with their images as artists and the others acting as gallery visitors listening to the descriptions. Finally, have students change places.

Differentiation Strategy

For Exercise 3
Go to the Differentiation Strategies Bank and adapt this exercise using Strategy 6.

Flexi Exercises
(To adjust to students' needs, you can either use or not the activities below)

Exercise 2

Science

What do the past and present of the universe look like?

01 **Complete the graphic organizer about the Big Bang Theory. Then, compare your notes with a classmate.**
Answers will vary.

What I know

What I think I know

What I want to know

02 **Read "Ignite a Spark" and update your organizer.**

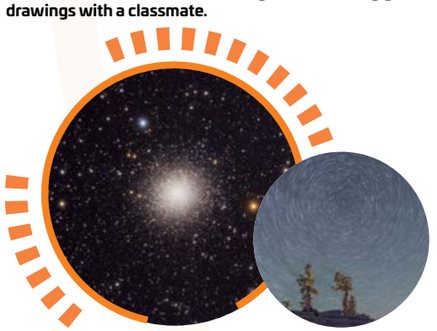
03 **Read the text again and complete the sentences about the astronomers.**
Answers will vary.

1. Georges Lemaître _____
2. Vesto Slipher _____
3. Edwin Hubble _____
4. A group of three astronomers _____

Ignite a Spark

No light, no sound, only nothingness, when suddenly there was a **spark**, and everything started. Welcome to the City Planetarium's History of the Universe—the **Big Bang** and Beyond.
In millions of times less than a second, that spark ignited, rapidly growing in brilliance and **accelerating** in speed. The temperature soared, and from that moment, colors exploded into existence, and space started its **expansion** in all directions.
In addition, there were atoms for the first time, and, to be clear, time began. This is our best theory on what happened at the birth, so to speak, of the universe. Scientists have created more advanced technology to test and retested the theory, and these analyses support it. Before that astronomers made discoveries; such as Georges Lemaître, who first **conceived** of the Big Bang theory; Vesto Slipher and others who first proposed the concept of an ever-expanding universe; and Edwin Hubble, who proved galaxies farthest away were moving faster than the closer ones, hence, if things were moving away from each other, they must have been close together in the past. More recently, in 1998, three astronomers won the Nobel Prize in physics for discovering that this expansion is accelerating.
So, what happened next? The conditions were perfect for tiny particles to mix to allow for the **development** of stars, galaxies, black holes, and all the other elements we know of. Billions of years later, a tiny planet off to the side in a galaxy far, far away became hospitable for carbon-based life, and a group of people sat in a room contemplating how it all started.
I get chills!
And now? Here we sit in an ever-expanding universe that started with a bang 13.8 billion years ago.

04 **Draw a picture of the Big Bang and the expanding universe. Then, take turns showing and describing your drawings with a classmate.**



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Language Structures and Functions Tip

For Exercise 5
First, prepare six sentence cards (with blanks) for each group, a homophone deck or pile with extra/decoy cards, and a Mission Log Sheet on which to write their final answers. Next, review homophones and explain the mission: *The cosmic database has been corrupted! You must repair the astronomers' communication logs by inserting the correct homophones. If not, future generations may misunderstand the origin of the universe!* Afterward, each group spreads its sentence cards on the table. Homophone cards are spread face-up in the center. Groups race to choose the correct homophone for each blank, place it on the sentence card using Blu-Tack or underlining it in pen, and record it on their Mission Log Sheet. Afterward, each group must explain one sentence aloud when ready. The teacher (Mission Commander) visits each group, checking logic and giving clues like: *Houston, we have a spelling problem* (if incorrect). *Confirmed contact with the correct homophone* (if accurate). Finally, if time allows and you deem necessary, review the grammar point in more detail.

Teaching Tip

For Exercise 8
First, have students conduct this as a physical interview instead of a writing exercise. After students have written their questions, have them separate and individually interview another student. Finally, they should change classmates and take the role of a scientist.

Differentiation Strategy

For Exercise 7
Go to the Differentiation Strategies Bank and adapt this exercise using Strategy 6.

Wrap-up

First, have students create a chain story about the Big Bang using a homophone or homonym in each sentence. This can be completed on paper or using a digital tool. Then, start the text with *The Big Bang was…* Each group creates an ending to the sentence, adds the word *and*, and passes their paper to the next group, who completes the sentence and adds the word *however…* continue with the words *although, furthermore,* and *in conclusion*. Finally, groups should return the texts to the original groups and read them.

Flexi Exercises
(To adjust to students' needs, you can either use or not the activities below)

Exercise 6

05 Choose the correct homophone of the words in the word bank to complete the sentences.

herd peaked	no threw	its there

1. Astronomers _____peeked_____ through powerful telescopes to see that galaxies were moving away from each other.
2. The Big Bang marked the birth of the universe; its echo can still be _____heard_____ in cosmic background radiation.
3. The rate of expansion affects the universe's future, but we still don't _____know_____ all the answers.
4. Some galaxies are so far away that _____their_____ light takes billions of years to reach us.
5. The theory predicts that space will continue to expand until _____it's_____ too cold to support life.
6. The stars we see today formed from matter that spread _____through_____ the universe over billions of years.

06 Write the meanings of the homophones in Exercise 5.
Possible answers

1. peaked - _____reached the highest point_____
   peeked – _____looked quickly or secretly_____
2. herd – _____a group of animals_____
   heard – _____past of "hear"_____
3. know – _____to understand or have knowledge_____
   no – _____opposite of "yes"_____
4. their – _____possessive adjective of "they"_____
   there – _____at a place that is not here_____
   they're – _____contraction of "they are"_____
5. it's – _____contraction of "it is"_____
   its – _____belonging to it_____
6. through – _____from one side to the other_____
   threw – _____past of "throw"_____

07 Imagine you are to interview the winners of the Nobel Prize in 2011 for discovering that the universe's expansion is accelerating. Write three questions you'd like to ask them about their research.
Answers will vary.

08 Imagine you are one of the astronomers who won the Nobel Prize in 2011. Write the answers to the questions of the interview. Use three homophones.
Answers will vary.