FUN AND GAMES

FIREWORKS

Multiplication

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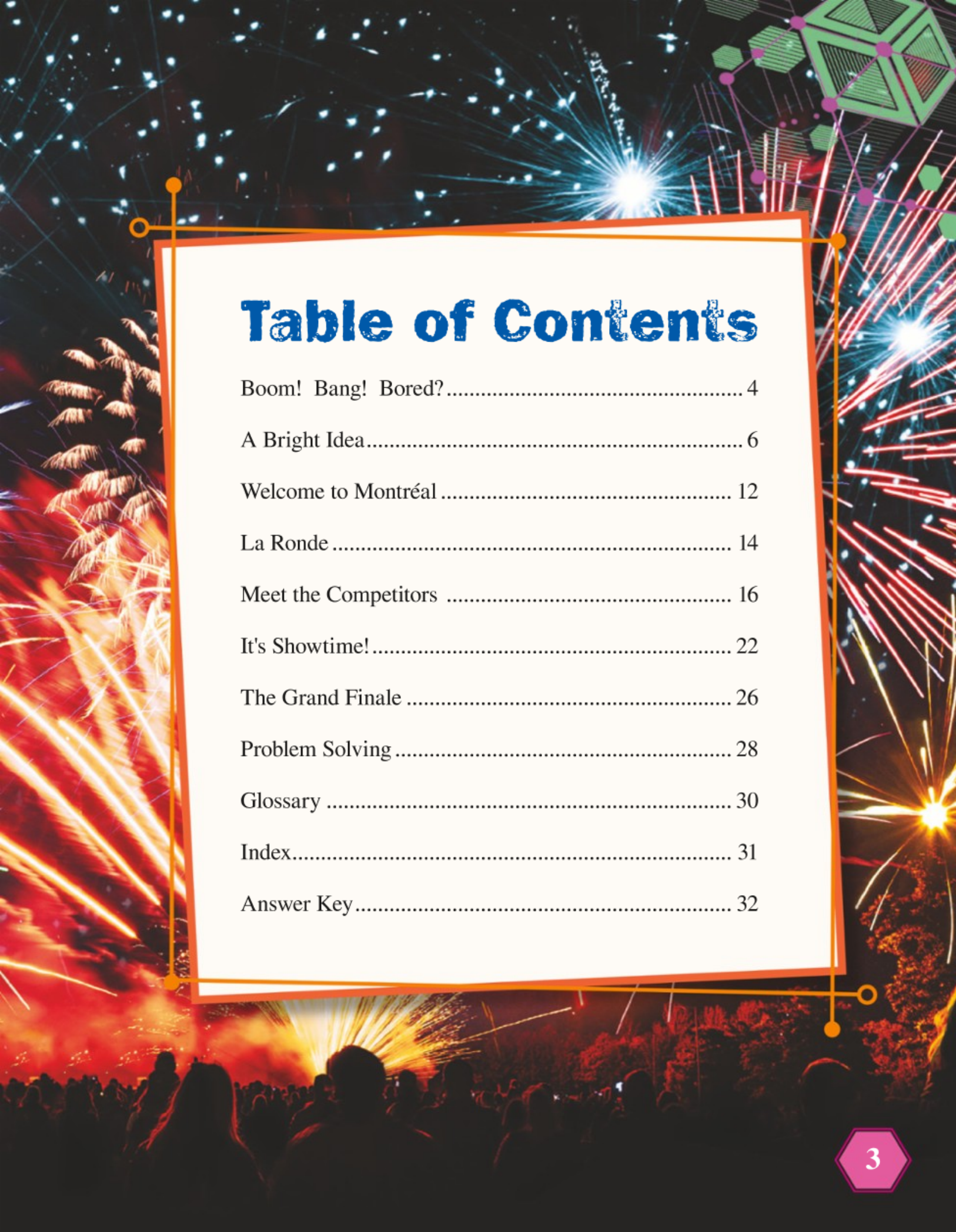

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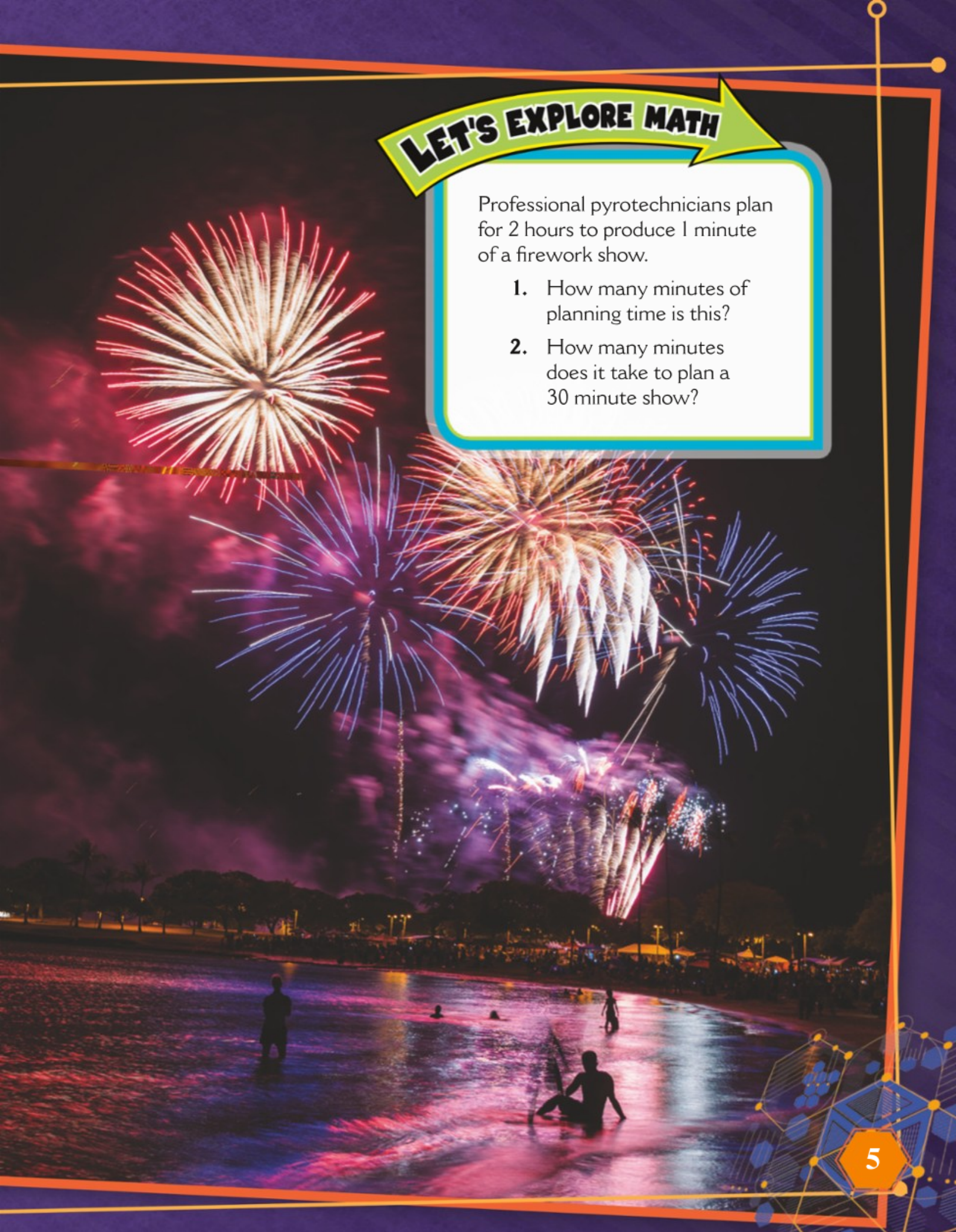
Boom! Bang! Bored?

Bang! Whoosh! Pop! Stella has a gigantic smile on her face as the glow from an orange burst erupts in the night sky. *Hiss! Snap!* The sound of a silver whistling whirl delights Stella's ears. *Boom!* Silence. *Bang!* A giant, blue flower explodes in the air. Stella cheers along with the crowd. Her father's fireworks sure are impressive. Behind the scenes, though, away from the crowd, Stella knows that her father is bored and unhappy.

Stella's father is a **pyrotechnician**. He sets off fireworks for a living, and it is his job to dazzle audiences with his firework show. But lately, Stella's father has become bored. He feels that he knows everything about fireworks. He can identify the exact **proportion** of ingredients needed to make any type of explosion. Barium is used for green fireworks and lithium for red fireworks. Shells loaded with many small, round pieces of metal called **stars** will create one large explosion. Adding more black powder to the **lift charge** at the bottom part of the firework will propel it higher into the sky, and changing the length of the **fuse** will **detonate** the firework at precisely the right time. To him, fireworks are simply careful calculations and measurements, which achieve a consistent, predictable result in color and sound. He feels that he has nothing left to learn.

Pyrotechnicians prepare for a firework show.



LET'S EXPLORE MATH

Professional pyrotechnicians plan for 2 hours to produce 1 minute of a firework show.

1. How many minutes of planning time is this?
2. How many minutes does it take to plan a 30 minute show?

A Bright Idea

Stella decides to help her father love fireworks again. She remembers a story he once told her. He was a young boy celebrating Independence Day with his family. He watched in amazement as a giant red star popped. He gasped as a white pinwheel fizzled. Those glittering explosions **inspired** him.

Suddenly, Stella has an idea. She remembers her father telling her about an event called the Fireworks Festival of Montréal. There, people compete to make the greatest firework displays in the world. Surely, this competition would help **reignite** her father's passion for fireworks.

A child celebrates while watching fireworks.

Chrysanthemum fireworks light the sky over Montréal.

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