STEM

The Battle between 2-D and 3-D

Shapes



Georgia Beth

Table of Contents

Welcome! 4

Round 1 8

Round 2 12

Round 3 16

Round 4 23

And the Winner Is 26

Problem Solving 28

Glossary 30

Index 31

Answer Key 32

For Review Only



Welcome!

Olivia enters the noisy convention hall. She spots the welcome poster above the sign-in booth. Walking far ahead of her friends, she quietly makes her way through the crowd.

Olivia stays quiet as she approaches the booth. She assumes the staff will know who she is. After all, she's the creator of *Technicolor Jet*. She prepares to receive her well-deserved compliments and praise. Just then, she finds Jack Larkin, the famous video game **designer**, unexpectedly standing next to her. He is only inches away. The staff makes a big fuss over him. Olivia tries to remain cool and unfazed. She pretends not to notice, except she feels her heart racing. She is in the presence of a legend. Butterflies begin to flutter in her stomach. Her palms start to sweat. She gulps nervously.

"Attention, all **2-D** and **3-D** finalists. Please report to **Amphitheater** 7," a deep voice announces over the loudspeaker.

Olivia quickly gives her name to the sign-in booth staff to receive her convention badge. She races through the mob of people, name tag in hand. She travels back the way she came. This time, she is less confident and self-assured. Olivia moves cautiously though the convention hall in search of Amphitheater 7.

For Review Only



For Review Only



A small crowd awaits the start of a competition in a dark amphitheater.

For Review Only

The contestants take a long escalator to an underground amphitheater. A small crowd of gamers looks on. Jack and Olivia take their places on the raised area at the center of the stage.

The **emcee** begins, "Welcome to the National Gaming Challenge. Today's competition is between the finalists of the 2-D and 3-D categories. Jack Larkin will create two-dimensional video games, and Olivia Kuan will work in three-dimensional virtual reality. There will be four rounds of competition. Each round will focus on a different shape. Whoever creates the best games will win and…become the new reigning champion!"

Visions of classic video games flash in Jack's head. His old favorites always come to mind whenever it is time to design a new game.

Olivia begins chewing her gum in slow motion. Her mind, though, is moving at lightning speed. She silently vows to create something that no one has ever imagined.

"Do you accept this challenge?" the emcee asks Jack and Olivia.

"I do," they both answer. They give each other a quick glance.

"Then, let the games begin," the emcee declares to the audience. "Competition will start tomorrow. Tonight, have some dinner and meet new people. Good luck to you both!".

For Review Only

LET'S EXPLORE MATH

Jack designs classic 2-D games. Identify the polygons used in the characters below.





Round 1

That night Jack stays up late trying to prepare. In the morning, he moans at the piercing sound of the alarm, but he's proud of what he's created. He is excited and ready to wow the convention crowd.

During Round 1, Jack shares his game, *Burst the Bubble*, with the audience. More importantly, he shares it with the panel of judges. Judges start the game and are greeted with a satisfying pop and a dreamy series of bubbles. Then, they pop bubbles to travel through an underwater world. Soon, bubbles appear faster, forming dense clouds that are easy to get lost in.

For Review Only

"I'm almost there!" a judge yelps, his thumb jumping furiously on the controller. Looking on, Olivia pops her gum carelessly. But, she is worried. The judge looks like he has completely fallen for the game.

"They're just bubbles, but I could play this all day!" he exclaims, finally putting the controller down. "How did you do it?"

"The game takes advantage of the progress **principle**," Jack replies. "Players want to keep playing when they feel like they are making progress."



"It doesn't hurt that you're testing reaction times," Olivia adds.

"That's on purpose. I love speed games because they get my heart pumping," says Jack.

"It looks like the judges love them, too," Olivia admits to herself.

LET'S EXPLORE MATH

Suppose that one of the challenges in *Burst the Bubble* is to pop bubbles containing quadrilaterals. Choose all of the bubbles that players should pop.

A.



B.



C.



D.



E.



F.



For Review Only

Math Talk

1. What are ways to classify shapes?
2. How are squares and rectangles the same? How are they different?
3. Can a shape be classified in more than one way? Justify your answer.
4. Name and describe two quadrilaterals that are not parallelograms. How are parallelograms different?
5. How can a drawing help you prove that a shape should be classified a certain way?
6. What are some 2-dimensional shapes that you might encounter in real life?

For Review Only