Projectile Motion Investigation Worksheet

Name: _____ Date: _____

Part 1: Initial Predictions

Before watching the video, answer these questions:

If one bullet is dropped and another is fired horizontally from the same height at the exact same time, which will hit the ground first?

My prediction: _____

Why I think this: _____

Draw your prediction below:

[Space for drawing]

Label your drawing with:

- Starting height
- Path of dropped bullet
- Path of fired bullet
- Expected landing points

Part 2: Video Observation

After watching "The Bullet Drop" video:

What actually happened? _____

Was your prediction correct? _____

What surprised you? _____

Part 3: Motion Analysis

Draw the actual paths of both bullets:

[Space for drawing]

Mark and label:

• Initial position

• Gravity force arrows

• Velocity arrows

• Time intervals (t_1, t_2, t_3, t_4)

Part 4: Understanding the Physics

Complete these statements:

The vertical motion of both bullets is affected by...

_____

The horizontal motion of the fired bullet...

_____

Gravity pulls...

_____

The bullets hit at the same time because...

_____

Part 5: Vector Analysis

Draw arrows to show the forces acting on:

Dropped Bullet:

[Space for drawing]

Fired Bullet:

[Space for drawing]

Part 6: Investigation Questions

What factors affect how far the fired bullet travels horizontally?

_____

_____

_____

What factors affect how long it takes for the bullets to hit the ground?

_____

_____

_____

If we doubled the initial height, what would happen to:

Time to fall: _____

Horizontal distance: _____

Part 7: Real-World Connections

List three examples from everyday life where you see this principle in action:

Part 8: Challenge Questions

How would air resistance affect:

Dropped bullet: _____

Fired bullet: _____

If we fired the bullet at an upward angle instead of horizontally, how would this change the scenario?

Exit Ticket

Draw and explain what would happen if gravity suddenly stopped working after the bullets were released:

[Space for drawing and explanation]

For Further Thinking:• How could you test this principle safely at home?

What other variables might affect this scenario?

_____

How might this principle be useful in real-world applications?

_____

Remember: Include detailed labels and arrows in all your drawings!

Note to students: Keep this worksheet in your physics portfolio for future reference.