

# **Eureka!**

## **Gerry the Gerbil Meets Euclid**

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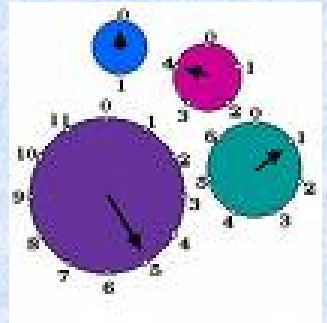
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# The Ubiquitous Euclidean Algorithm



**GCD Find the Greatest Common Divisor**

**Find Multiplicative Inverses in Cyclic Groups**



**Encrypt Messages: From Shifts to RSA Encryption**

# Meet Gerry the Gun-Toting Gerbil



Gerry's standing one space from the **gold**...

He can walk **5** spaces or hop **9** spaces.

# Gerry's Second Challenge



Gotta Get Gold



Gerry's *still* standing one space from the **gold**...  
But *now*, he can walk **9** spaces or hop **15** spaces.

# Why Gerry the Gerbil Won



Using the Euclidean Algorithm

First Number

Second Number

```
9 = 1(5) + 4
5 = 1(4) + 1
4 = 4(1) + 0
The GCD of 5 and 9 is 1
```

Factors of 5: **1**, 5

Factors of 9: **1**, 3, 9

Since the GCD of 5 and 9 is **1**, Gerry can hop and jump to get the **gold**.

# An Unwinnable Situation...



Using the Euclidean Algorithm

First Number

Second Number

15 = 1 (9) + 6  
9 = 1 (6) + 3  
6 = 2 (3) + 0  
The GCD of 15 and 9 is 3

Factors of 15: 1, **3**, 5, 15

Factors of 9: 1, **3**, 9

He can only pick up the pot of **gold** when he's a multiple of **3** units away.

# The Mathematics Involved

- Students use problem-solving in a game situation.
- Students get practice grouping, substituting, and collecting like terms with two variables.
- Students learn new ideas related to the GCF and Euclidean Algorithm.

# Indiana Academic Standards Addressed

*Operations With Real Numbers:*

- A1.1.3

*Pairs of Linear Equations and Inequalities:*

- A1.5.3

*Mathematical Reasoning and Problem Solving:*

- A1.9.1, A1.9.2, A1.9.3