Villainy Inc: Thwarting World Supremacy Through Mathematics!

**Mission 1 – The Golf of Mexico – Teacher Quick-Print Answer Key**

## The Situation

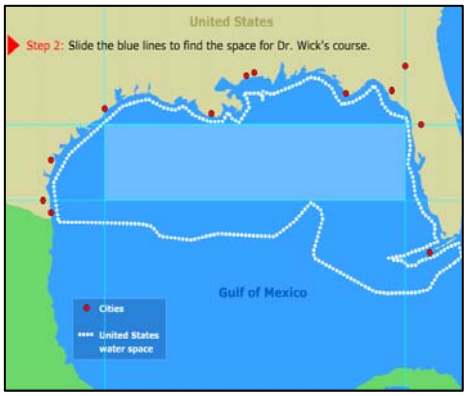
Dr. Eugene Wick I.D. and his associate Platypus have decided to turn the Gulf of Mexico into a golf course. As a double agent working for the Anti-Villainy Unit (AVU), the student's job is to foil Dr. Wick's plans by following AVU orders to make his scheme as expensive and problematic as possible. Mission 1, The Golf of Mexico, consists of 4 animation scenes and 4 math activities.

## Animation Scene 1

Dr. Wick explains he has purchased the rights from the Federal Agency of Watery Management (FAWM) to build on the largest area possible inside US water space in the Gulf of Mexico.

## Activity A – Find course location and area (measurement – area)

The AVU asks that you follow Dr. Wick's orders and find the largest rectangular area possible.




**The 4 steps on the problem To-Do list are:**

- Step 1: Read the deal Dr. Wick made with FAWM
- Step 2: Slide the blue lines to find the space for Dr. Wick's course
- Step 3: Use your tools to find the length and width of Dr. Wick's course
- Step 4: Calculate the area of Dr. Wick's golf course

**Correct Answers:**

- **Find the Largest Space**: The blue lines should be pulled to the final position in the picture to the left.
- **Find the Length and Width**: The length is **760 miles**. The width is **160 miles**.
- **Calculate the Area of the course**: The area is 760mi. x 160mi. = **121,600**

## Animation Scene 2

Dr. Wick presents three options for covering the golf course – kelp, a top-secret substance (Agent W), and his personal favorite, Boards & Rope. He has information on all three and asks you to pick the best option, but says he doesn't want to be bothered with the details.

## Activity B – Choose the building material (knowledge of algebra, patterns, or functions – multi-operation problems)

The AVU changes your mission, asking you to order the three options from most expensive to least expensive so you can recommend the worst option to Dr. Wick.

**The 2 steps on the To-Do list are:**

- Step 1: Find the cost for each of the three options
- Step 2: Slide the most expensive option to the left and the least expensive option to the right

**Correct Answers:**

- **Klimas Kelp:** 0 + ($100*121,600**)** + 0 + $7,000,000 = **$19,160,000**
- **Agent W:** $10,000,000 + ($74*121,600) + 0 + ($1.25*121,600) = **$19,150,400**
- **Boards & Rope:**

| *Additional Cost* | *Maintenance* |
|---|---|
| $5500/100 sq. mi. = X/1 sq. mi. | $550/10 sq. mi. = X/1 sq. mi. |
| X = $55 per sq. mi. | X = $55 per sq. mi. |

Total = 0 + ($47.75*121,600) + ($55*121,600) + ($55*121,600) = **$19,182,400**

- Order of answers (most expensive on left, least expensive on right):
  **Boards & Rope, Klimas Kelp, Agent W**

## Animation Scene 3

Dr. Wick has been busy designing special triangular holes for his golf course. He asks you to find out just how many of his massive holes can fit on his course.

## Activity C – Find number of holes on course (knowledge of geometric figures, measurement – tessellations)

The AVU asks you to follow Dr. Wick's orders – the more holes he has, the more expensive it will be when it all comes crashing down.

**The 2 steps on the To-Do list are**:

- Step 1: Find the most triangular holes that can fit on Dr. Wick's course
- Step 2: Enter the total number of triangular holes and submit

**Correct Answer:**

- **152** triangular holes fit on the golf course.

## Animation Scene 4

After gathering "careful market research" at a local miniature golf course, Dr. Wick asks you to look at his data and suggest an admission price for his newly created course.

## Activity D – Create an Admission Price Report (knowledge of algebra, patterns, or functions – patterns, function table)

To complete Wick's ruin, the AVU asks you to recommend the admission price that leads to the smallest income for Dr. Wick. To be sure you've made the right recommendation, the AVU also asks you submit a report showing your calculations.

**The 4 steps on the To-Do list are:**

- Step 1: Title and label the report graph
- Step 2: Calculate the income (profit) for each admission price.
- Step 3: Enter the admission price that makes Dr. Wick the *least* income
- Step 4: Submit report to AVU and admission price to Dr. Wick

**Correct Answers:**

- **Ten fields** must be entered for full credit on this problem:
  - A **graph title** must be entered – Ex. "Profit vs. Admission Price for Dr. Wick's Course"
  - The **blank income label** on the y-axis should read **720**.
  - The **blank admission price label** on the x-axis should read **30**.
  - **Income (profit)** blanks should read:
    - $55 x 14 = **$770**
    - $80 x 10 = **$800**
    - $15 x 51 = **$765**
    - $65 x 12 = **$780**
    - $50 x 15 = **$750**
    - $38 x 20 = **$760**
  - The **recommended admission price** should be **$50,** as that admission price brings in the least profit for Dr. Wick.

## Ending Animation Scenes

There are 3 possible ending animations, based on your answers on the last math activity.

- **0-6 correct answers** loads the worst ending, in which Dr. Wick and Platypus escape in a golf cart. (Receives *Good* overall mission rating)
- **7-9 correct answers** loads the okay ending, in which Dr. Wick and Platypus are stranded on part of their golf course island. (Receives *Above Average* overall mission rating)
- **A perfect 10 correct answers** loads the best ending, in which Dr. Wick and Platypus sink along with the rest of the golf course. (Receives *Outstanding* overall mission rating.