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## Testing Gold Percentage

### 1. Nitric Acid ( $\text{HNO}_3$ )

- Used alone for silver and low-karat gold testing.
- Reacts strongly with base metals and low-purity gold but does not affect high-purity gold.

### 2. Aqua Regia (Nitric Acid + Hydrochloric Acid, $\text{HNO}_3 + \text{HCl}$ )

- A mixture of 3 parts hydrochloric acid and 1 part nitric acid.
- Dissolves all gold and is used in higher-karat testing.

### 3. Pre-Mixed Gold Testing Acids (Varying Strengths)

- Acid kits contain different strength mixtures to test for specific karats:
  - 10K testing acid: Mostly nitric acid; dissolves gold under 10K.
  - 14K testing acid: A mix of nitric and hydrochloric acid.
  - 18K testing acid: A slightly stronger aqua regia mix.
  - 22K testing acid: Higher concentration of hydrochloric acid.
  - 24K gold is resistant to all but full-strength aqua regia.

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The percentage of gold in different karats is calculated based on 24K being pure gold (99.9%). Here's the breakdown:

- 8K Gold → 33.3% gold (8/24 parts gold, 66.7% other metals)
- 10K Gold → 41.7% gold (10/24 parts gold, 58.3% other metals)
- 14K Gold → 58.3% gold (14/24 parts gold, 41.7% other metals)
- 18K Gold → 75.0% gold (18/24 parts gold, 25.0% other metals)
- 22K Gold → 91.7% gold (22/24 parts gold, 8.3% other metals)
- 24K Gold → 99.9% pure gold (virtually no other metals)

The remaining percentage consists of alloy metals like silver, copper, nickel, or zinc, which impact color and hardness. Lower karat gold (like 8K or 10K) is more durable but less valuable, while higher karats (18K, 22K) are softer and more expensive.

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## Navigator's Role

### Outline of a Navigator's Role in Maritime and Aviation Navigation

#### 1. General Role of a Navigator

- A navigator is responsible for determining a vessel or aircraft's position, plotting a course, and ensuring safe and efficient travel from one point to another.
- Uses various methods, including celestial navigation, dead reckoning, electronic instruments, and radio signals.

## 2. Maritime Navigation (Sea Navigation)

A ship's navigator ensures the vessel follows a safe and efficient course while avoiding hazards.

### A. Core Responsibilities

1. Route Planning
  - Uses nautical charts, ocean currents, and weather reports to plan the safest and most efficient route.
  - Considers factors such as fuel efficiency, tides, and legal shipping lanes.
2. Position Determination
  - Uses tools like:
    - Sextant and celestial navigation (stars, sun, moon)
    - GPS and radar
    - Dead reckoning (estimating position based on speed, direction, and time)
3. Maintaining Course
  - Constantly monitors and adjusts heading based on weather conditions, currents, and obstacles.
  - Uses compasses, gyrocompasses, and electronic charting systems.
4. Collision Avoidance and Safety
  - Watches for other vessels using radar, AIS (Automatic Identification System), and visual spotting.
  - Communicates with other ships and port authorities.
5. Logkeeping
  - Records daily position, weather conditions, course changes, and significant events.

### 3. Aviation Navigation (Airplane Navigation)

An aircraft navigator (historically a dedicated crew member, now largely replaced by automated systems) ensures an aircraft follows a precise route to its destination.

#### A. Core Responsibilities

1. Flight Planning
  - Determines the best route considering airspace regulations, weather conditions, wind patterns, and fuel efficiency.
  - Uses aeronautical charts, GPS, and air traffic control (ATC) instructions.
2. Position Determination
  - Uses:
    - Inertial navigation systems (INS)
    - GPS (Global Positioning System)
    - Radio beacons (VOR, DME, ADF, etc.)
    - Dead reckoning (estimating position based on speed, heading, and time)
3. Course Adjustments
  - Adjusts flight path based on:
    - ATC instructions
    - Weather changes
    - Wind speed and direction
4. Communication and Coordination
  - Maintains communication with ATC, pilots, and flight operations.
  - Ensures compliance with airspace restrictions and safety protocols.
5. Landing Preparations

- Guides the aircraft toward the destination airport using Instrument Landing Systems (ILS), GPS, and ATC guidance.
- Coordinates with pilots to ensure a smooth approach and landing.

#### 4. Key Differences Between Sea and Air Navigation

Aspect	Maritime Navigation	Aviation Navigation
Medium	Water (ocean, rivers)	Air (atmosphere)
Speed of Travel	Slow (knots)	Fast (mach, knots)
Tools Used	Sextant, compass, GPS, radar, AIS	GPS, INS, VOR, ATC guidance
Navigation Risks	Storms, icebergs, collisions	Turbulence, air traffic, weather
Course Changes	Gradual adjustments	Rapid and precise corrections

#### 5. Modern Advancements

- Sea Navigation: Automation, ECDIS (Electronic Chart Display and Information System), and advanced GPS tracking.
- Aviation Navigation: Autopilot, GPS-based flight management systems, and satellite navigation.

Would you like a more detailed comparison of specific techniques?

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# Navigation

The Bible frequently uses navigation as a metaphor for living well, often framing it in terms of following the right path, avoiding dangers, and seeking divine guidance. Here are some key passages and themes where navigation serves as a metaphor for moral and spiritual living:

### 1. Staying on the Right Path

- Proverbs 3:5-6 – “Trust in the Lord with all your heart and lean not on your own understanding; in all your ways submit to him, and he will make your paths straight.”
  - This passage suggests that trusting God is like following a reliable navigator who will guide one’s path in life.
  - Psalm 119:105 – “Your word is a lamp for my feet, a light on my path.”
    - Here, God’s word is compared to a guiding light, like a lighthouse or celestial navigation for sailors.
    - Isaiah 30:21 – “Whether you turn to the right or to the left, your ears will hear a voice behind you, saying, ‘This is the way; walk in it.’”
      - This verse implies that divine guidance helps believers navigate life’s choices.

### 2. Avoiding Shipwreck (Moral or Spiritual Failure)

- 1 Timothy 1:19 – “Holding on to faith and a good conscience, which some have rejected and so have suffered shipwreck with regard to the faith.”
  - Paul warns that losing faith is like a shipwreck—straying from the right course leads to disaster.

- James 3:4 – “Or take ships as an example. Although they are so large and are driven by strong winds, they are steered by a very small rudder wherever the pilot wants to go.”

- This compares human speech (and by extension, wisdom) to a rudder that steers the course of life.

### 3. The Dangers of Drifting or Getting Lost

- Hebrews 2:1 – “We must pay the most careful attention, therefore, to what we have heard, so that we do not drift away.”

- The imagery of drifting suggests a person who loses their moral or spiritual bearings, like a ship without direction.

- Ephesians 4:14 – “Then we will no longer be infants, tossed back and forth by the waves, and blown here and there by every wind of teaching and by the cunning and craftiness of people in their deceitful scheming.”

- This warns against being easily misled, comparing unstable faith to a ship tossed in a storm.

### 4. Jesus as the Ultimate Navigator

- John 14:6 – “Jesus answered, ‘I am the way and the truth and the life. No one comes to the Father except through me.’”

- Jesus presents himself as the ultimate guide, the true path to follow.

- Matthew 7:13-14 – “Enter through the narrow gate. For wide is the gate and broad is the road that leads to destruction, and many enter through it. But small is the gate and narrow the road that leads to life, and only a few find it.”

- Like a careful navigator choosing the safest route, believers are urged to take the right path, even if it is difficult.

## 5. The Final Destination (Heaven as the Safe Harbor)

- Hebrews 6:19 – “We have this hope as an anchor for the soul, firm and secure.”
  - Hope in Christ is like an anchor that keeps believers steady.
  - Revelation 21:1 – “Then I saw ‘a new heaven and a new earth,’ for the first heaven and the first earth had passed away, and there was no longer any sea.”
    - The imagery of reaching a new, perfected world suggests arriving at a final destination, like a ship safely reaching shore.