GOLD PROSPECTING

A Complete Field Guide

Geology · Identification · Panning · Extraction

From reading the landscape to recovering your find — everything a prospector needs to know.

Hunt the signs of a gold system — not just gold color.

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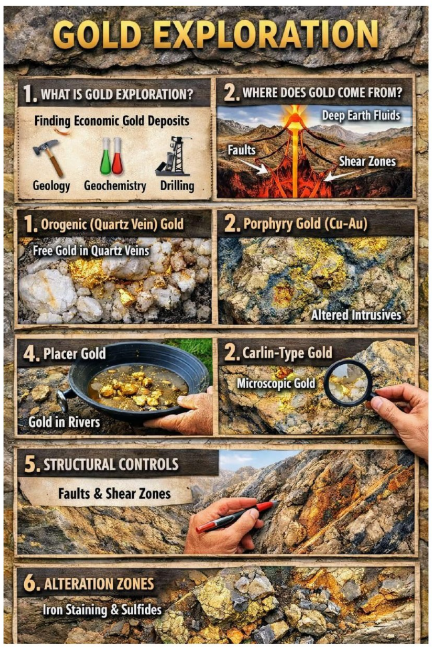
CHAPTER 1

What Is Gold Exploration?



Gold Exploration — geology, geochemistry & drilling

Gold exploration is the science and art of finding economically viable gold deposits. It combines three core disciplines: **geology**, **geochemistry**, and **drilling**. Successful prospectors understand that finding gold starts with reading the ground beneath their feet.

The Three Pillars

■ GEOLOGY	■ GEOCHEMISTRY	■ DRILLING
Study rock types, structures, faults & alteration zones.	Analyse soil, rock & water for trace-element anomalies.	Confirm surface findings at depth with drill core.

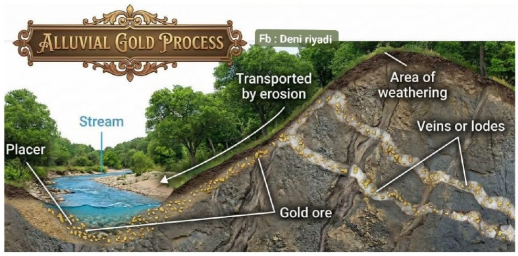
CHAPTER 2

Where Does Gold Come From?

Gold originates deep within the Earth, carried upward by hydrothermal fluids through faults and shear zones. As these superheated fluids cool, gold precipitates and crystallises — often in quartz veins. Over millions of years, erosion redistributes gold into rivers as placer deposits.

Gold process — from volcanic source to river placer deposit

Erosion carries gold from ancient bedrock veins down to the river



Alluvial gold process — weathering, transport & placer formation

CHAPTER 3

Types of Gold Deposits

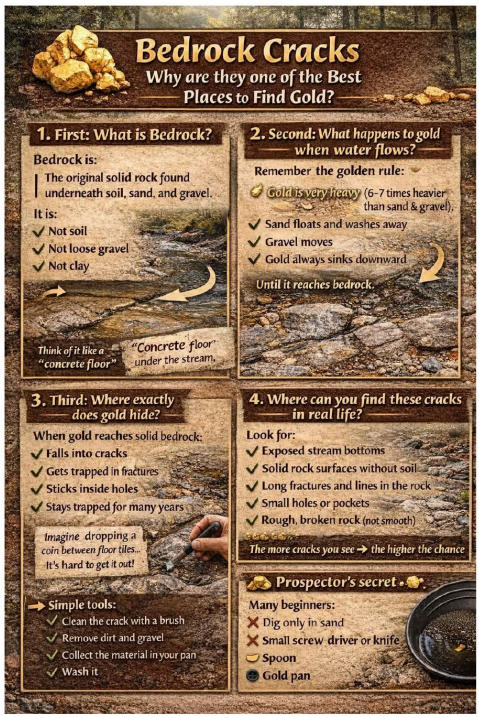
Five main types of gold ore — free-milling, refractory, oxidised, alluvial, telluride

Gold does not occur in just one form. Understanding deposit types tells you what to look for, where to look, and how to extract it. The five principal types are summarised in the image above.

#	ORE TYPE	KEY FEATURES	RECOVERY
1	Free-Milling	Easily separated by gravity/cyanidation. Quartz vein gold in granite. 10–30 g/t.	90–95%
2	Refractory	Gold locked in sulfides. Needs roasting before cyanidation. Grade 2–5 g/t.	50–95%
3	Oxidised	Weathered sulfide ores near surface (gossan). Easier extraction.	85–95%
4	Alluvial	Gold in riverbeds — simple gravity separation. Nuggets to several kg.	Up to 90%
5	Telluride	Gold + tellurium. Specialised roasting or high-temp smelting. 1–3 g/t.	Up to 95%

CHAPTER 4

Bedrock Cracks: The Best Place to Find Gold



Bedrock cracks — why they are one of the best places to find gold

■ GOLDEN RULE ■

Don't look for gold… look for the place where gold stops moving.

How to Work a Bedrock Crack

- ✓ Clean the crack with a brush to remove loose material
- ✓ Remove all dirt and gravel from the opening
- ✓ Collect all material into your gold pan
- ✓ Wash slowly — gold stays at the bottom

CHAPTER 5

Reading the Rocks: Real Indicators vs. Illusions

Are these rocks a sign of gold… or just an illusion?

■ MISLEADING SIGNS	■ REAL GOLD INDICATORS
✓ Plain white quartz — no fractures	✓ Fractured quartz with iron-oxide staining
✓ Shiny pyrite (fool's gold)	✓ Sulfide minerals (pyrite, arsenopyrite)
✓ Rusty rocks alone	✓ Altered rock colours (red, yellow, black)
✓ Heavy stones without other clues	✓ Faults and veins in bedrock
✓ Smooth river gravel	✓ Black sand concentrations

■ GOLDEN RULE ■

Samples tell the truth… not just the rocks!

CHAPTER 6

Top Rocks for Precious Metals

Top rocks for gold & silver — quartz veins, volcanic rocks, sulfide ores, placer & PGM hosts

Different rock types host different styles of mineralisation. Knowing your host rock is the foundation of hard-rock prospecting.

PROSPECTOR'S TIP — THREE KEYS TO HOST ROCK
• ■ Hydrothermal Activity — evidence of past hot water means gold may have been deposited nearby
• ■ Cracks & Veins — structural pathways are the arteries of gold deposition; follow the veins
• ■ Heavy Minerals & Iron Oxides — where magnetite, hematite & limonite accumulate, gold often follows

CHAPTE R 7

Beginner's Guide to Finding Gold Nuggets

The easiest way for beginners to find gold nuggets — location, tools & panning

Step 1 — Choose the Right Location (80% of Success)

- ■ Old riverbeds and dry stream channels
- ■ Sharp bends in rivers and valleys
- ■ Behind and downstream of large rocks
- ■ Below small waterfalls
- ■ Focus on valleys through ancient rocky or mineralised zones

Biggest Beginner Mistakes to Avoid

- ✗ Digging randomly without reading the geology
- ✗ Ignoring bedrock cracks — the #1 gold trap
- ✗ Giving up too quickly
- ✗ Panning too fast and washing gold away

CHAPTER 8

Gold Traps in Streams & Valleys

Gold traps — stream bends, large rocks, bedrock cracks & black sand

1. Stream Bends	Inside curves = slow water = gold deposits. One of the best spots for nuggets.
2. Behind Large Rocks	The calm eddy pocket directly behind a boulder traps settling gold.
3. Bedrock Cracks	Gold cannot go deeper once it hits bedrock — it falls into cracks and stays.
4. Black Sand Zones	Heavy magnetite / hematite travels and deposits with gold. Follow the black sand.

CHAPTER 9

Recognising a Real Gold Area

How do you know you're in a real gold area? — geological and field signs

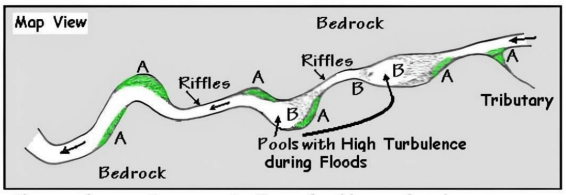
■ STRONG GEOLOGICAL SIGNS	■ FIELD SIGNS IN RIVERS
✓ Quartz veins (broken & rusty)	✓ Gold in bedrock cracks & inside bends
✓ Rock colour changes (red, yellow, black)	✓ Black sand concentrate in pan
✓ Heavy minerals — black sand & pyrite	✓ Visible gold flakes in rock
✓ Fault lines in outcrop	✓ Iron staining on stream bottom
✓ Alteration zones	✓ Tributary confluences

■ GOLDEN RULE ■

There is no gold site without geology!

CHAPTE
R 10

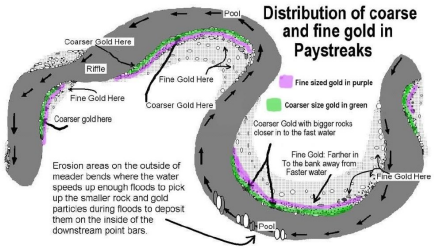
River Gold Distribution & Paystreaks



A's are where major concentrations of gold were found.
B's are where minor gold concentrations were.
The riffles had coarse gold; while the scoured out pools had none.
The tributary confluence had a major concentration of gold too.

This seems to be a bedrock stream based on the location of the placers at the A's which are where the currents slow behind bedrock obstructions.

Map view — major (A) and minor (B) gold concentrations in a bedrock stream



Distribution of coarse and fine gold in paystreaks at meander bends

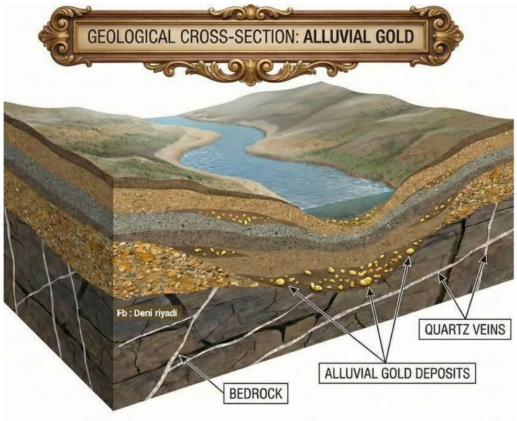
Paystreaks — ribbons of concentrated gold — follow predictable patterns based on water velocity. Coarser gold settles closer to fast water; fine gold travels farther to the quiet inner bank. The A-zones at bedrock obstructions and riffles hold major concentrations; B-zones are secondary.

■ GOLDEN RULE ■

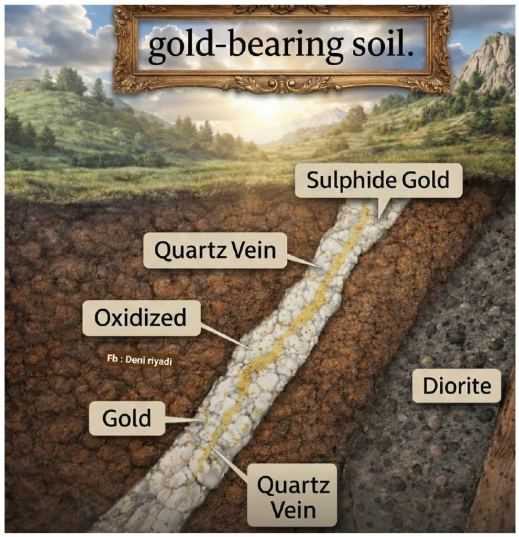
Follow the paystreak upstream to find where concentration peaks — that leads to the source vein.

CHAPTE R 11

Geological Cross-Sections: Alluvial Gold



Geological cross-section — alluvial gold deposits above bedrock with quartz veins



Gold-bearing soil profile — sulphide gold, quartz vein, oxidised zone & diorite

These cross-sections illustrate how gold concentrates above bedrock and within quartz veins in the subsurface. Alluvial deposits overlie the bedrock; quartz veins cut through the country rock at depth. Sulphide and oxidised zones record the chemical history of the deposit.

CHAPTE R 12

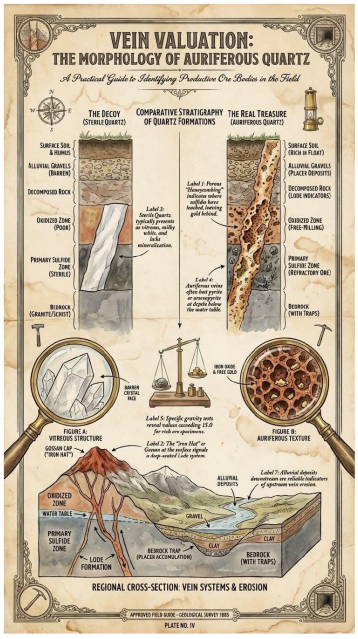
Decoding the Lode: Vein Valuation

Decoding the lode — quartz texture, gossan, specific gravity & sulfide association

Vein valuation — hydrothermal signatures in bedrock quartz

■ STERILE 'BULL' QUARTZ	■ PRODUCTIVE 'VUGGY' QUARTZ
✓ Smooth, milky-white appearance	✓ Vuggy cavities & crystal-lined voids
✓ Massive unbroken texture	✓ Pyrite & sulfide inclusions
✓ No metallic minerals	✓ Iron gossan (rust-red) staining
✓ No iron staining	✓ Boxwork honeycomb structures

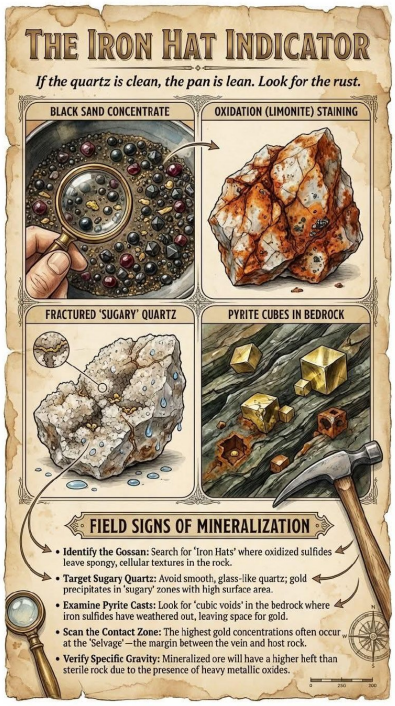
Decoding the ore body — barren quartz vs. auriferous lode with signs of a mineralised system



Vein valuation: morphology of auriferous quartz — regional cross-section of vein systems

CHAPTER 13

The Iron Hat Indicator



The Iron Hat Indicator — black sand concentrate, oxidation staining, sugary quartz & pyrite cubes

"If the quartz is clean, the pan is lean — look for the rust." The Iron Hat (gossan) forms when sulfide minerals weather at the surface, leaving porous, rust-red rock riddled with cavities that often trap free gold.

FIELD SIGNS OF MINERALIZATION
• Identify the Gossan — 'Iron Hats' where oxidised sulfides leave spongy, cellular rock textures
• Target Sugary Quartz — avoid smooth glass-like quartz; gold precipitates in high-surface-area zones
• Examine Pyrite Casts — cubic voids in bedrock where iron sulfides have weathered out
• Scan the Contact Zone — highest gold at the 'Selvage' margin between vein and host rock
• Verify Specific Gravity — mineralised ore feels noticeably heavier than sterile rock

CHAPTER 14

The Oxidised Indicator: Signs of a Live Vein

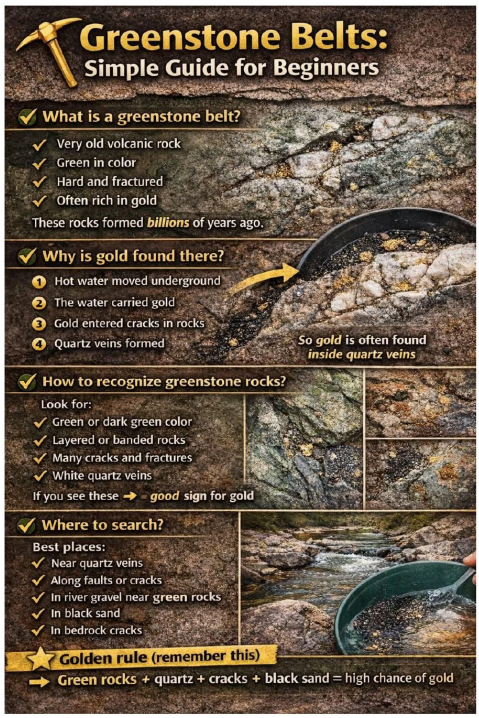
The Oxidised Indicator — differentiating sterile bull quartz from mineralised lode systems

Black sand concentration, iron-oxide gossan, shattered 'sugar' quartz, and sulfide minerals together constitute the oxidised indicator — the surface expression of a buried gold system.

- Shattered Texture — 'sugar' quartz shattered by tectonic pressure creates space for gold
- Oxidation Staining — dark red/orange from breakdown of iron-bearing sulfides
- Sulfide Voids — small cubic holes where pyrite has leached out, often with free-milling gold
- Wall-Rock Alteration — softened, bleached host rock at the contact with the vein
- Specific Gravity Check — mineralised quartz is significantly denser than sterile rock

CHAPTE R 15

Greenstone Belts: Ancient Gold Terrains



Greenstone belts — simple guide for beginners

Greenstone belts are among the oldest and most productive gold-bearing terrains on Earth, formed billions of years ago. They host massive orogenic gold deposits worldwide.

■ GOLDEN RULE ■

Green rocks + quartz + cracks + black sand = high chance of gold

CHAPTER 16

Vegetation Changes as a Prospecting Clue

Vegetation changes — a rare clue for finding minerals & gold

Mineral-rich soil changes soil chemistry, reduces water absorption, and can be toxic to plants. The result is stressed, stunted, or absent vegetation — a visible surface anomaly worth investigating.

What to Look For in the Field

★ Weak or yellow plants

★ Bare patches of soil

★ Stunted or short vegetation

★ Different plant community from surroundings

■ GOLDEN RULE ■

Quartz veins + rusty/red soil + sparse vegetation = high chance of minerals & gold

CHAPTER 17

Finding Gold Underground Without a Metal Detector

How to find gold under the ground — observe rocks, dig & pan, best locations, soil test

A systematic approach using geology, digging, and panning can reveal gold up to 50 cm deep without any electronic equipment.

Step 1 — Observe the Rocks

- Quartz veins with iron staining
- Schist or gneiss bedrock
- Iron rust stains on surface
- Black sand in nearby streams

Step 2 — Dig & Pan (Shallow Test Pit)

- Dig 30–50 cm in a promising spot
- Collect 1–2 kg of soil
- Wash in a gold pan
- Look for gold flakes or dust

■ GOLDEN RULE ■

Quartz + Rust + Black Sand = Promising Area

CHAPTER 18

Microscopic Gold in Hard Rock

Microscopic gold in hard rock — hidden gold locked in quartz veins and sulfides

Most gold is invisible to the naked eye — smaller than a grain of sand and thinner than a hair. Visible gold is >0.1 mm; microscopic gold is <0.01 mm. Despite being invisible it can exceed 10 g/t and is recoverable with the right technique.

Field Signs to Look For

- Quartz veins in host rock
- Rusty / iron-stained rocks
- Pyrite and sulfide minerals
- Hydrothermally altered rocks

CHAPTER 19

Recovering Microscopic Gold from Hard Rock

How to recover microscopic gold from hard rock — step-by-step, safe & chemical-free

A three-stage process — crush, concentrate, collect — allows small-scale miners to recover microscopic gold safely without mercury or cyanide.

1. Crushing & Grinding	Break rock, crush to gravel, grind to fine powder <0.5 mm to liberate gold.
2. Gravity Concentration	Use a gold pan, sluice box, or shaking table to separate heavy gold from lighter waste.
3. Collecting Fine Gold	Use a magnet to remove iron sands, then borax-smelt the concentrate to produce pure gold.

■ GOLDEN RULE ■

No Mercury · No Cyanide · Safe & Chemical-Free Methods

CHAPTER 20

Mineral Signatures & Black Sand

Mineral signatures — heavy black sand, iron-oxide gossans, fractured quartz & indicator garnets

Black sand areas — a beginner's guide to finding gold

Black sand (magnetite, hematite, ilmenite) is heavy like gold, travels with gold, and deposits with gold. Where you find black sand concentrations you are in the right environment. The magnet test is quick and reliable — magnetic black sand signals a promising zone.

■ GOLDEN RULE ■

Black Sand + Heavy Concentrate + Iron Staining = Promising Zone

CHAPTER 21

From Creek to Canyon: Follow the Float

From creek to canyon — follow the float to find the primary vein

Gold in a stream came from somewhere upstream. By back-tracking the 'float' — pieces of eroded vein material — you can locate the primary lode source.

Reading Gold Morphology

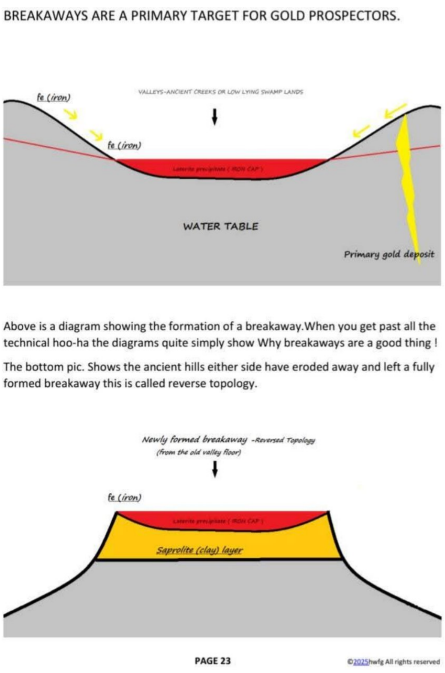
- ■ Sharp, jagged gold → you are within metres of the primary lode source
- ■ Smooth, rounded gold → the source is further upstream
- ■ Follow the paystreak upstream until concentration peaks, then search outcrops
- ■ Look for 'rotten' vuggy quartz with heavy iron staining on surrounding hillsides

■ GOLDEN RULE ■

Sharp angular gold in your pan = you are close to the vein!

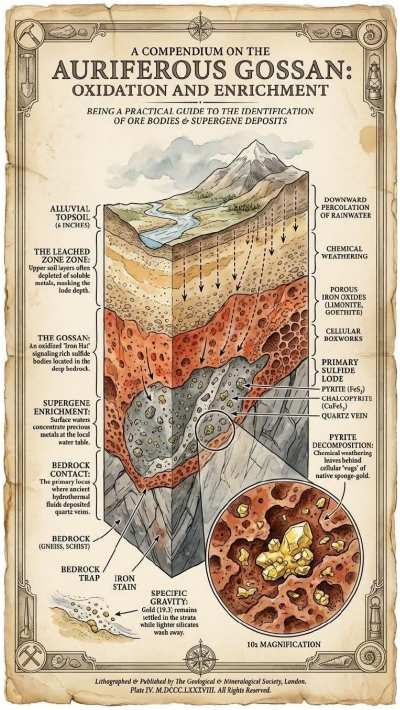
CHAPTER 22

Breakaways & Gossan Systems



Breakaways — a primary target for gold prospectors (formation diagram)

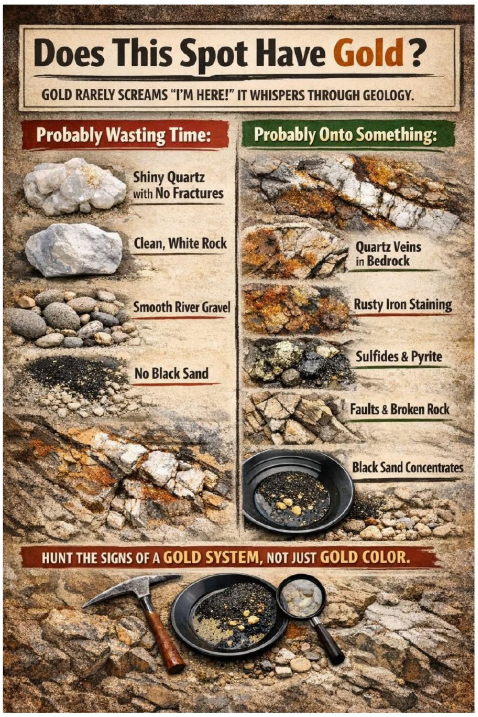
Breakaways form where ancient hills erode to expose the valley floor — a process called reverse topology. The iron-oxide cap (laterite / gossan) traps and concentrates gold near the surface above the primary sulfide lode below the water table.



Auriferous gossan — oxidation and enrichment, a practical guide to identifying ore bodies

CHAPTER 23

Does This Spot Have Gold?



Does this spot have gold? — probably wasting time vs. probably onto something

■ PROBABLY WASTING TIME	■ PROBABLY ONTO SOMETHING
✓ Shiny quartz with no fractures	✓ Quartz veins in bedrock with rust
✓ Clean white rock — no alteration	✓ Sulfides & pyrite present
✓ Smooth river gravel	✓ Faults and broken rock
✓ No black sand in pans	✓ Black sand concentrates in pan

■ GOLDEN RULE ■

Hunt the signs of a gold SYSTEM — not just gold color.

CHAPTER 24

Evaluating a Location: Is It Worth Pursuing?

How to know if a location is worth pursuing for gold — signs, tips & checklist

Signs of Substantial Gold

- ■ Heavy mineral deposits — magnetite, garnet visible in pans
- ■ Visible gold — flakes or streaks in rock or pan
- ■ Quartz with rusty stains — yellow or iron-stained veins in bedrock
- ■ Sediment traps — inside stream bends with black sand accumulation

Systematic Prospecting Tips

- ★ Start Small — test multiple spots before committing to one area
- ★ Take Notes — record location, depth, panning results, rock types
- ★ Safety First — obtain required permits and protect the environment
- ★ Magnet Test — magnetic black sand in your pan is a positive indicator

CHAPTER ✦

Field Quick Reference — Master Checklist

LOCATION

- ■ Old riverbeds, dry channels & valley floors
- ■ Ancient rocky formations and mineralised zones
- ■ Areas with local gold mining history

GEOLOGY TO LOOK FOR

- ■ Quartz veins — rusty, fractured, vuggy types
- ■ Iron staining and gossan (rust-coloured rock)
- ■ Sulfide minerals — pyrite, arsenopyrite, galena
- ■ Greenstone or metamorphic host rock
- ■ Faults, shear zones, structural features

IN RIVERS & STREAMS

- ■ Inside bends of streams (point bars)
- ■ Behind large boulders (calm eddy zone)
- ■ Bedrock cracks and crevices — clean them out!
- ■ Black sand concentrations
- ■ Below waterfalls and rapids

YOUR PAN TELLS YOU

- ■ Black sand present = promising zone
- ■ Heavy dense concentrate = good sign
- ■ Gold colour (yellow specks / crescent) = success!
- ■ Angular gold = close to source vein

■ Rounded gold = far from source

AVOID THESE MISTAKES

■ Digging randomly without reading geology

■ Ignoring bedrock cracks

■ Panning too fast — wash gold away

■ Trusting shiny rocks alone (pyrite ≠ gold)

■ Giving up after one unproductive area

■ GOLDEN RULE ■

Gold rarely screams 'I'm here!' — it whispers through geology. Hunt the signs of a gold system, not just gold color.