The Metals Risk Game

This game is designed to practice answering Products from Rocks questions. They are based on the AQA C1a Module but other syllabuses may group these topics differently.

This game can be played with 2, 3 or 4 players. The following pages contain the game board, and 4 question sheets, each with a different set of true or false questions. Rules for playing each game are included on the playing board.

There are 3 games in this series available from GamePlan Games. All the games use the same 'True or False' questions, but each game offers a different playing objective. You can renew your motivation for learning the same facts by playing a different game. If you would like some new questions, why not buy the "Round the Block" game from our website?

Here is a summary of the Products from Rocks games, which are available for FREE download from www.GamePlanGames.co.uk

Game	No. of players	No. of sheets	Playing objective
Fractionating	2,3 or 4	1	To be first to get from the bottom to the top of the fractionating column.
Metals Risk	2,3 or 4	1	Make yours the dominating metal in the market.
Limestone Battle	2,3 or 4	1 each	To guess positions of your opponent's 3 Limestone molecules.

You can also download and print off the Revision Sheet which is designed to help you to understand why an answer you thought was right is actually wrong.

Metals Risk Game

Preparation

- Cut out the metal hexagons and their 36 matching squares.
- Each player chooses a metal hexagon and places them on a numbered home market on the board. The numbered hexagons indicate the starting positions according to the number of players, e.g. for 2 players the two hexagons marked "2" will be used. It is best to choose a metal that matches its strongest market!
- Each player takes a question sheet.
- Decide who will start.

To Play

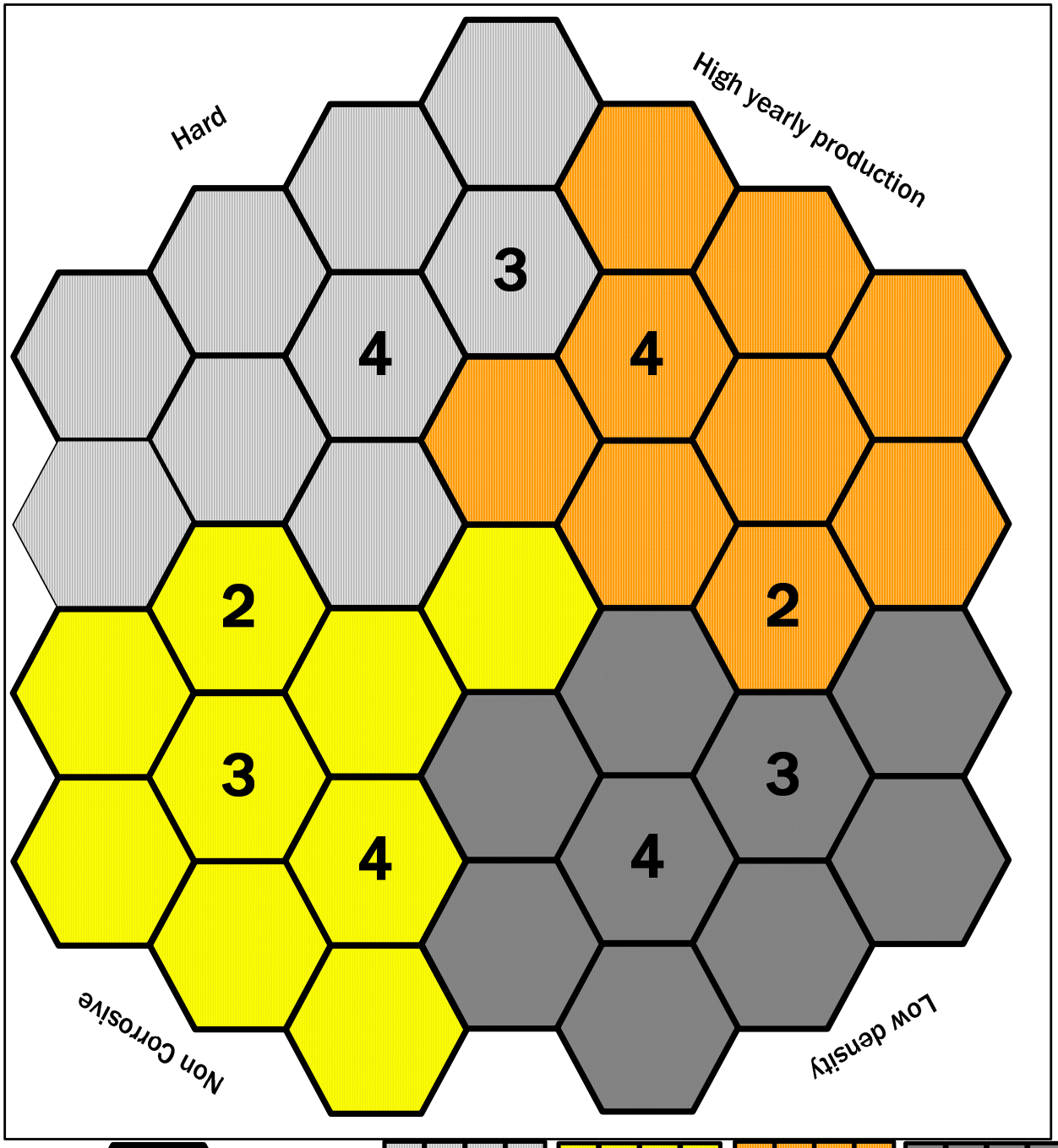
- On their go, each player decides which market they want to try and trade in. **This market must be directly next to one in which they already trading.**
- The player to the left of the player is the Question Master for this players go.
- The Question master checks how many questions that the player must answer correctly to sell in that market. They do this by checking the Sales table for the metal and the target market.
- The Question master then asks the player, the indicated number of 'true or false' questions.
- The Question master checks the answers in the grid on the question sheet.
- If the player answers all the questions correctly then....
    - If the target market is unoccupied, that player can place a metal marker on the board in the target market, thus extending and **marking their trading area**.
    - If the target market already uses another metal, then the player for the existing metal answers **one question in defence**, which if correct, repels the challenge.
- Play continues with the next player, moving round in a clockwise direction, players taking it in turns to ask questions and extend their trading areas by correctly answering questions.
- If a trading area completely surrounds a group of another metal on their go, all the surrounded metal squares are removed from that area. NOTE The original metal hexagon cannot be removed.

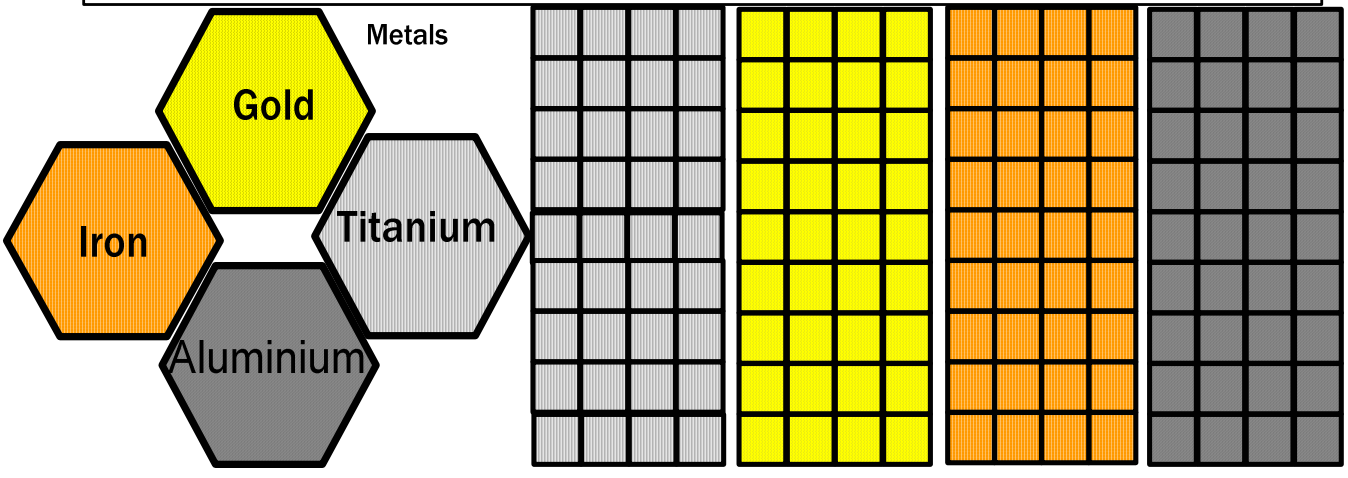
Ending the game

- Play continues until:
    a) The whole board becomes one trading area. The player who has cornered the market is crowned Entrepreneur of the World!
    b) A pre-agreed time or question limit is reached. The player with the largest trading area wins!
    c) There is a stalemate – everyone keeps getting all the questions right. All players agree to end the game and the player with the largest trading area is declared the winner.

Sales Table

Metal	Market type: Non corrosive	Hard	High yearly production	Low density
Gold	1 question	2 questions	2 questions	3 questions
Iron	3 questions	2 questions	1 question	2 questions
Titanium	2 questions	1 question	3 questions	2 questions
Aluminium	2 questions	3 questions	2 questions	1 question





Products from Rocks A – True or false?

1. $MgCO_3$ is the formula for a compound.
2. Potassium is a transition metal
3. The formula for quicklime is CaO.
4. If you heat Calcium Carbonate it gives off Carbon Dioxide
5. Crude oil can be separated into fractions because heat breaks it down
6. Calcium Carbonate, Carbon Dioxide and water are all compounds
7. Iron Oxide is turned into pig-Iron by heating with coke
8. Burning fossil fuels in a limited supply of air produces Carbon dioxide which causes human poisoning
9. The method used to extract a metal from its ore depends on its density
10. Aluminium and Titanium are more expensive than iron because they need a lot of energy to extract them
11. Aluminium is used in aircraft because it is very strong
12. The chemical name for slaked lime is Calcium Hydroxide
13. Gold is used to make jewellery
14. The larger the alkane molecule the lower the boiling point
15. Chromium is mixed with iron to make high alloy steels
16. Kerosene has a lower boiling point that petrol
17. The main metal in Limestone is Calcium
18. Magnesium is in the same group as Sodium
19. In dot cross diagrams the dot is the nucleus
20. In a compound, atoms are held together by bond
21. Copper is used to make steel
22. When copper carbonate is heated, the gas given off is Carbon Dioxide.
23. One argument for allowing limestone quarrying in National Parks is that it provides jobs for local people
24. One argument against allowing limestone quarrying in National Parks is that we don't use limestone for building anymore.
25. Transporting limestone by lorries causes pollution and damage to buildings. This could be reduced by transporting it by rail.
26. The black powder left from heating Copper Carbonate is Copper Oxide
27. Rocks from which metals can be extracted economically are called alloys
28. Burning a pure alkane never produces sulphur dioxide
29. A blast furnace operates continuously for several years because it is expensive to heat it up
30. Pig-Iron is not used for making cars because it is too brittle

Answers

True	False
1, 3, 4, 6, 7, 10, 12, 13, 15, 17, 19, 20, 22, 23, 25, 26, 28, 29, 30	2, 5, 8, 9, 11, 14, 16, 18, 21, 24, 27

Products from Rocks B– True or false?

1. Cl_2 is the formula for a compound.
2. Limestone is used to make quicklime
3. Wetting Calcium Carbonate produces Calcium Hydroxide
4. Carbon, Iron and Oxygen are all metals
5. The formula for carbon dioxide is CO
6. A mixture of sand, stones cement and water makes concrete
7. Heating limestone, sand and sodium carbonate makes mortar
8. Pig-Iron is changed into pure Iron by adding carbon
9. Burning fossil fuels can produces particles in the air which causes global dimming
10. Crude oil can be separated into fractions because it is a mixture of compounds
11. The diesel fraction has molecules that are longer than petrol molecules
12. Aluminium is very reactive but stops corroding when the oxide layer stops oxygen reaching the rest of the metal
13. The chemical name for slaked lime is Calcium Oxide
14. C_3H_8 is collected near the top of the fractionating column
15. Petrol is a thinner liquid than diesel
16. Copper is used for making water pipes.
17. Metals with high melting points are liquid at room temperature.
18. Brittle metals do not shatter when hit with a hammer
19. Coal is likely to produce acid rain when burned
20. When copper carbonate is heated, the gas given off is Copper Oxide.
21. One argument for allowing limestone quarrying in National Parks is that it provides jobs for local people
22. One argument against allowing limestone quarrying in National Parks is that quarries make unsightly scars on the landscape.
23. Dropping hard steel balls onto concrete is a test for its hardness
24. Gold is often found as ingots in rock because it is a reactive metal
25. The formula for the alkane with 2 Carbon atoms is C_2H_4
26. There is at least 250 years supply of Aluminium ore left at our present rate of usage
27. Pure Iron is soft and easily shaped because the atoms can rotate
28. Magnesium oxide is heavier than magnesium before it is burned because it is a compound
29. Sulfur dioxide is an alkane.
30. Aluminium is better than iron for making cans for fizzy drinks because rust is toxic

Answers

True	False
2, 6, 9, 10, 11, 12, 14, 15, 16, 19, 21, 22, 23, 26, 28, 30	1, 3, 4, 5, 7, 8, 13, 17, 18, 20, 24, 25, 27, 29

Products from Rocks C– True or false?

1. CO_2 is the formula for a compound.
2. The atoms in ammonia are held together by chemical symbols
3. O_2 is the formula for a compound.
4. The formula for Calcium Carbonate is $CaCO_2$.
5. Each atom has a nucleus surrounded by electrons
6. Copper carbonate is an element
7. Burning fossil fuels in plenty of air produces Carbon monoxide which causes acid rain.
8. Titanium is used in aircraft because it has a low density and is also strong.
9. It is important to recycle Aluminium because it needs electrolysis to extract it.
10. Slaked lime can be used to make quicklime
11. Aluminium is an unreactive metal found native in the earth
12. Quicklime is made by thermal decomposition in a kiln
13. Heating Calcium Carbonate produces Calcium Hydroxide
14. Titanium is mixed with other metals to make it harder
15. Titanium is often used because it has a high density
16. Iron is a transition metal
17. A mixture of Slaked lime, sand and water makes glass
18. Ethanol is a clean fuel producing only Carbon Dioxide and water
19. In dot cross diagrams the crosses are electrons
20. The black powder left from heating Copper Carbonate is Carbon
21. One argument for allowing limestone quarrying in National Parks is that it created more space for wildlife
22. Limestone is important in the manufacture of cement
23. Rocks from which metals can be extracted economically are called ores
24. Pure iron is changed into Low-alloy steels by removing impurities
25. Aluminium is extracted from Aluminium Oxide by electrolysis. It is expensive because it takes a lot of electricity.
26. Alkanes with small molecules have high boiling points
27. The formula for the alkane with 2 Carbon atoms is C_2H_6
28. It takes less energy to make iron if scrap iron is used because it does not need to reduce the iron oxide in the scrap.
29. A blast furnace operates continuously for several years because that way it produces less waste slag.
30. Zinc is more reactive than Iron and can be extracted from its ore by using carbon.

Answers

True	False
1, 5, 8, 9, 12, 14, 16, 18, 19, 22, 23, 25, 27, 28, 30	2, 3, 4, 6, 7, 10, 11, 13, 15, 17, 20, 21, 24, 26, 29

Products from Rocks D – True or false?

1. Ca is the formula for a compound
2. The atoms in a molecule are represented by bonds
3. The formula for water is H_2O.
4. Fluorine is a compound
5. A mixture of metals is known as an alloy
6. Bronze, Calcium and Copper are all elements
7. Heating limestone and clay makes cement
8. Blowing Carbon Dioxide through lime water creates Calcium Carbonate
9. Slaked lime is made by reacting quicklime with carbon dioxide
10. The diesel fraction has molecules that are smaller than petrol molecules
11. Crude oil is heated before it goes into the fractionating column to make it into a vapour.
12. $C_{16}H_{34}$ has a higher boiling point than $C_{12}H_{26}$
13. Slaked lime can be used to make mortar
14. C_3H_8 has a higher boiling point than C_8H_{18}
15. Tough metals do not shatter when hit with a hammer
16. C_3H_8 catches fire more easily than $C_{12}H_{26}$
17. Electrical cables are made of silver
18. Oxygen is often combined with metals in ores
19. Good conductors let heat pass through easily
20. In dot cross diagrams the crosses are protons
21. Transporting limestone by lorries causes pollution and damage to buildings. This could be reduced by using larger lorries.
22. Lithium is an element
23. Limestone is important in the manufacture of Aluminium
24. The method used to extract a metal from its ore depends on its reactivity
25. Limestone is important in the manufacture of Copper
26. Burning a pure alkane never produces water vapour
27. Pure Iron is soft and easily shaped because the atoms can slide over eachother
28. The formula for the alkane with 2 Carbon atoms is C_2H_2
29. All akanes are hydrocarbons
30. Substances in the same horizontal row of the periodic table have similar chemical properties

Answers

True	False
3, 5, 7, 8, 11, 12, 13, 15, 16, 18, 19, 22, 24, 27, 29	1, 2, 4, 6, 9, 10, 14, 17, 20, 21, 23, 25, 26, 28, 30